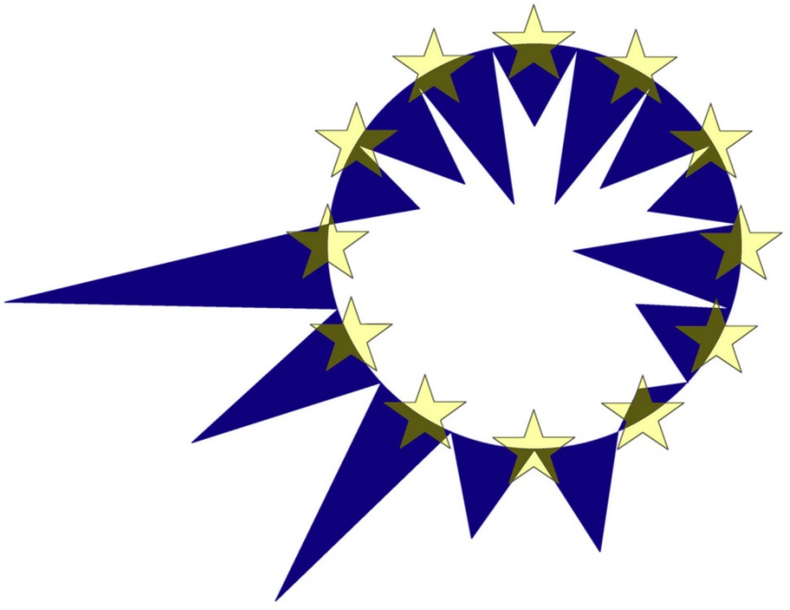
# EUROMOD

## COUNTRY REPORT



# GERMANY (DE)

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EUROMOD is a tax-benefit microsimulation model for the European Union (EU) that enables researchers and policy analysts to calculate, in a comparable manner, the effects of taxes and benefits on household incomes and work incentives for the population of each country and for the EU as a whole.

EUROMOD has been enlarged to cover 27 Member States and is updated to recent policy systems using data from the European Union Statistics on Income and Living Conditions (EU-SILC) as the input database, supported by DG-EMPL of the European Commission.

This report documents the work done in one annual update for Germany. This work was carried out by the EUROMOD core developer team, based mainly in ISER at the University of Essex, in collaboration with a national team.

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This report accompanies the release of EUROMOD G1.0. There may be minor differences between the results presented here and those obtained with G1.0 due to further improvements since the report was prepared.

For more information, see: http://www.iser.essex.ac.uk/research/euromod

This document is supported by the European Union Programme for Employment and Social Solidarity – PROGRESS (2007-2013).

This programme is managed by the Directorate-General for Employment, social affairs and equal opportunities of the European Commission. It was established to finally support the implementation of the objectives of the European Union in the employment and social affairs area, as set out in the Social Agenda, and thereby contribute to the achievement of the Lisbon Strategy goals in these fields.

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For more information see: http://ec.europa.eu/progress

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# 1. BASIC INFORMATION

In the introductory chapter, firstly some basic figures on the economy in Germany will be given. Thereafter, the tax and benefit system in Germany will be introduced. Finally, more details on the single policy instruments related to social benefits, to social contributions, and to taxes will be provided.

## 1.1 Basic Figures

When taking a look at dynamics in the structure of the German population during recent years (see Table 1) a demographical change becomes apparent. On the one hand, overall population shrinks slightly, from 82.0m in 2009 to 81.8m in 2012.[1] On the other hand, the age structure of the population changes significantly. While the share of children in the population decreases continuously (from 19.0% in 2009 to 18.4% in 2011), the share of people in retirement increases (from 20.4% in 2009 to 20.6% in 2011). At the same time, life expectancy increases slightly, for men and women, and the fertility rate stays fairly constant. Unemployment has been decreasing over the recent four years, and GDP per capita was largely constant.

Table 1. Basic figures

| | Pop. [1] (m.) | Pop. [1] ≤ 19 (%) | Pop. [1] ≥ 65 (%) | Life [1] expect. (years) m \| f | Fertility [1] rate | Unemp. [1] rate m \| f | GDP [1] per head (PPS) | Currency Name |
|---|---|---|---|---|---|---|---|---|
| 2009 | 82.002 | 19.0 | 20.4 | 77.8 \| 82.8 | 1.36 | 8.1 \| 7.3 | 116 | EURO |
| 2010 | 81.802 | 18.8 | 20.7 | 78.0 \| 83.0 | 1.39 | 7.5 \| 6.6 | 118 | EURO |
| 2011 | 81.752 | 18.4 | 20.6 | 78.4 \| 83.2 | 1.36 | 6.2 \| 5.6 | 120 | EURO |
| 2012 | 81.844* | n/a | n/a | n/a | n/a | n/a | n/a | EURO |

Notes: * This figure is preliminary.
Source: [1] Eurostat (November 2012) on-line data base; [2] Statistisches Bundesamt Deutschland.
Total population - [demo_gind] at 1 January (last accessed on 08.10.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_gind&lang=en
Proportion of population aged 0-19 years: Structure indicators [demo_pjanind] (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanind&lang=en
Proportion of population aged 65 and over: Structure indicators [demo_pjanind] (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanind&lang=en
Life expectancy at birth, by gender - [demo_mlexpec] (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_mlexpec&lang=en
Fertility indicators: Total fertility rate - [demo_find] (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_find&lang=en
GDP per capita in PPS (EU-27 = 100) - [tec00114]; (last accessed on 08.10.2012)
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tec00114&plugin=1
Unemployment rate by gender - [Labour force statistics by sex and age: indicators]; (last accessed on 23.11.2012)
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsiem110&plugin=1

[1] This decrease in population is also present in earlier years. See earlier country reports for Germany. The focus in this country report shall be on the recent four years, for which the current EUROMODupdate project has been undertaken.

## 1.2 The Tax and Benefit System

Firstly, some aggregate figures from the fiscal budget will be presented, and thereafter, some general information on the structure of the tax and benefit system in Germany will be given.

### 1.2.1 Aggregate Figures from Fiscal Budget

Total general government revenue in Germany amounts to about 45% of GDP (see Table 2), slightly more holds for total general government expenditures (48% in 2009, down to 45% in 2011). Regarding the tax and benefit system, this fraction is lower. Total tax receipts amount to about 23% of GDP and social protection to about 21%. Total social security contributions aggregate to some 14% of GDP. All these figures were more or less stable over the time between 2009 and 2011.

Table 2. Tax-benefit system and government budget

| | [a]Total general government revenue % of GDP | [b]Total tax receipts % of GDP[2] | [b]Total social security contributions % of GDP | [a]Total general government expenditure % of GDP | [a]Social protection % of GDP[1] |
|---|---|---|---|---|---|
| 2009 | 45.1 | 22.9 | 14.4 | 48.2 | 21.2 |
| 2010 | 43.6 | 22.0 | 14.1 | 47.7 | 20.6 |
| 2011 | 44.5 | n/a | n/a | 45.3 | n/a |
| 2012 | n/a | n/a | n/a | n/a | n/a |

Notes: [1]Expenditure on social protection contains: social benefits, which consist of transfers, in cash or in kind, to households and individuals to relieve them of the burden of a defined set of risks or needs; administration costs, which represent the costs charged to the scheme for its management and administration; other expenditure, which consists of miscellaneous expenditure by social protection schemes (payment of property income and other).
[2]Total receipts from taxes without social contributions.
Source: [a]Eurostat (October 2012) on-line database; [b]OECD (November 2012) on-line database.
Total tax receipts (% of GDP) do not include social security contributions. (last accessed on 23.11.2012)
http://stats.oecd.org/index.aspx?r=84234
Total expenditures for social protection – [gov_a_exp] ; (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_a_exp&lang=en
Total general government expenditure - [gov_a_main]; (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_a_main&lang=en
Total general government revenue - [gov_a_main]; (last accessed on 06.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_a_main&lang=en

The structure of total social protection expenditures can be broken down by various functions (see Table 3). It becomes apparent that the major parts of social protection spending are devoted to sickness and health care (about 32%) and to old-age (33%). Family and children (10%), disability (8%), survivors (7%), and unemployment are of minor relevance, and housing (2%) as well as social exclusion (1%) are of lowest relevance in public social protection expenditures.

Table 3. Social protection expenditure by function (as % of total social protection expenditure)

| | Sickness/ health care | Disability | Old age | Survivors | Family/ children | Unemployment | Housing | Social exclusion[1] |
|---|---|---|---|---|---|---|---|---|
| 2009 | 32.10 | 8.07 | 33.09 | 7.28 | 10.44 | 6.28 | 2.14 | 0.59 |
| 2010* | 32.24 | 8.17 | 33.04 | 7.19 | 10.85 | 5.76 | 2.14 | 0.60 |
| 2011 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 2012 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

Notes: * The figures for 2010 are preliminary.
[1] Social exclusion not elsewhere classified.
Source: Eurostat (November 2012) on-line database;
Social benefits by function - [spr_exp_sum]; (% of total benefits) (last accessed on 23.11.2012)
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=spr_exp_sum&lang=en

The structure of total tax receipts can be broken down by groups of taxes, grouped according to the sort of tax (Table 4). Taxes on goods and services, e.g. VAT and excise duties, have the greatest share (about 48%) in total tax receipts. The share of personal income tax is only slightly lower (41%), whereas corporate income taxes (6%) and other taxes are of only minor relevance (5%). There is some dynamics in this structure over the recent four years apparent.

Table 4. Taxation (as % of total taxation)[1]

| | Personal income tax | Corporate income tax[2] | Taxes on goods and services | Other taxes |
|---|---|---|---|---|
| 2009 | 41.2 | 6.0 | 48.4 | 4.5 |
| 2010 | 40.2 | 6.9 | 48.4 | 4.5 |
| 2011 | 40.6 | 7.5 | 47.3 | 4.6 |
| 2012 | n/a | n/a | n/a | n/a |

Notes: [1] Total tax receipts here without receipts from social security contributions; figures are recalculated.
[2] Sum of corporate tax and net local business tax.
Source: OECD (December 2012).
http://stats.oecd.org/index.aspx?r=84234 (last accessed on 07.12.2012)

### 1.2.2 Basic Information about the Tax-Benefit System

The German fiscal budget consists of three major single funds, i.e. the budget of the state ("Bund"), the budget of the federal states ("Länder"), and the budget of the municipalities ("Gemeinden"). Furthermore, the budget of the social insurance system ("Sozialversicherungen") is sometimes subsumed under the fiscal budget. Generally, tax and benefit rules may vary over the three main levels, "Bund", "Länder", and "Gemeinden". Some taxes are levied by one of the three administrative units alone, whereas other taxes are shared. However, with respect to tax and benefits rules as well as rates, the German tax and benefit system is a largely unified, national system. Some exceptions can be found among the taxes. The tax rate for church taxes varies slightly over the Länder. At the local business tax as well as the property tax, tax rates vary significantly between municipalities, as the local jurisdictions levy their own multipliers. Tax rates for the real property acquisition tax vary over the "Länder".

In Germany, the fiscal year for taxes and benefits runs from 1st of January to 31st of December. This is usually the time when changes in taxes or benefits apply. However, the current pension value and the basic benefit rate for "unemployment benefits II" are adjusted annually on 1st of July.

The statutory pension age in Germany is 65. This age will be gradually increased, for entry into old-age pension between 2012 and 2031, by one month each year, so that the statutory pension age will be 67 in 2031. Generally, entering retirement earlier is only possible with reduction in the pension level. This used to be different for women ("Altersrente für Frauen"). However since 2004, there is no possibility anymore for women – as it is for men -- to enter retirement earlier, without accepting reductions.

Students in Germany may leave secondary schools with a general-school-leaving degree at the age of 15, and the Youth Employment Protection Act ("Jugendarbeitsschutzgesetz") settles the minimum employment age at 15. However, till the age of 18, school leavers are obliged to pursue secondary education in the framework of vocational training or apprenticeships, at least on a part-time basis.

The definition of dependent children that is most commonly applied in the German tax and transfer system relates to the definition in the context of child benefits ("Kindergeld"). According to these regulations, dependent children are biological, adopted, or foster children, aged 18 or younger, who live in the same household with their parents. They can at maximum be aged 25 in case they are still in tertiary education and their income does not exceed specific thresholds.

Lone parents are generally eligible to a household allowance for single parents in German income taxation law. Single parents, in this context, are not married and not widows or widowers. They must be living in a household together with a dependent child which is eligible for child benefits and actually belongs to the household. No other adult person – not even a grandparent -- is allowed to live in this household. Parents may though prove that they do not pool money with other adults in the household. Only the parent who is eligible to the allowance can receive it and it cannot be assigned to the other parent in any case.

Generally, individuals are taxed individually in German income tax law. Married couples are assessed to joint taxation in the form of full income splitting. Taxable income of the spouses is added up, the tax schedule is applied to half of this sum, and the resulting tax burden is doubled.

A specific element of German income tax law is the progression clause (*Progressionsvorbehalt*). This is relevant for some types of income which are not directly subject to income tax, e.g. unemployment benefits I. Even though these incomes are not included in the tax base, they are included in the base used to determine the tax bracket of the progressive income tax schedule. This way these incomes may increase the income tax rate used for the other income sources which are subject to the income tax.

Up until the end of 2008, income from capital and income from employment were taxed at the same rate in Germany. There was a withholding tax prepayment ("Kapitalertragsteuer"), collected at source. Since 2009, a final withholding tax on capital income ("Abgeltungssteuer") has been implemented, with a flat tax rate of 25% on capital income exceeding an allowance that is collected at source.

Taxes on income from dependent employment are collected at source, i.e. directly at the employer every month, in the form of pay-roll tax ("Lohnsteuer"). Monthly income is also the reference figure for most of the means-tested benefits in German benefit law. Usually a past time frame of three to 24 months is applied, where monthly income may not exceed specific thresholds, on average. As pay-roll taxes are not final in Germany, it is common to file income tax returns in order to apply tax allowances and deductions. This is usually done altogether at the end of the year (or even in the following year).

There is no systematic statutory indexation of tax schedules and benefit levels to inflation in general in Germany. Tax schedules and benefit levels are rather adjusted irregularly by discretionary policies, usually in the framework of broad tax reforms. This holds especially for the income tax schedule. The current pension value ("Rentenwert"), which represents the current old-age pension claims for one year of average contributions and determines the basis for the level of old-age pensions, is adjusted annually according to the growth rate of gross earnings from dependent

employees. The annual growth rate of the "Rentenwert" in turn determines the annual adjustment of the basic benefit rate for "unemployment benefits II" (see below).

## 1.3 Social Benefits

Social benefits are grouped into benefits from the statutory unemployment insurance, the statutory health and accident insurances, the statutory pension insurance, and public transfers to private households.

### 1.3.1 Benefits from Statutory Unemployment Insurance

**Unemployment Benefits I** (*Arbeitslosengeld I*): Unemployed individuals, under the age of 65, who are generally able to work at least 15 hours per week, are entitled to "unemployment benefits I" in case they paid contributions to the unemployment insurance for at least 12 months within the two years preceding the unemployment spell. "Unemployment benefits I" are non-means-tested benefits. They amount to 60% of previous net earnings for childless individuals and to 67% for individuals with at least one child in terms of income tax law. Recipients are allowed to work up to 15 hours per week to top up benefits. Earnings from employment of up to 15 hours per week reduce the amount of benefits paid; an allowance for earnings of 165 euros per month is granted. 165 euros per month can be earned in addition to the benefit without reductions. Earnings above this allowance reduce the benefit level.

The duration of entitlement to "unemployment benefits I" depends on the individual's age and number of months contributions were made in the previous 2-3 years. Contributions made for 12 months entitle to six months of benefits. Benefits are paid for a maximum of 12 months for individuals who paid contributions for 24 months. For individuals who are aged 55 or older, benefits can be paid for up to 18 months in case contributions were made for 36 months. This rule for old individuals was slightly changed in 2008. Since 2008, benefits are paid for 8 months in case contributions have been made for 16 months. They can be paid out up to 15 months for individuals who are aged 50 or older and have made contributions for at least 30 months. Contributions made for 36 months entitle to 18 months of benefits for individuals who are aged 55 or older. After the age of 58, and with contributions of at least 48, benefits can be paid for up to 24 months. Unemployment benefits are subject to progression clause in income taxation (see Table 10).

**Short-Term Work Compensations** (*Kurzarbeitergeld*): Employees insured by the unemployment insurance are eligible to short-term work compensations in case their employers temporarily apply for short-term work due to business cycle effects or global economic downturn. In this case, 60% of the forgone net earnings are paid by the unemployment insurance, usually for a time of six months. This time frame may be extended up to 24 months. In 2009 the rule for Short-term Work Compensations was changed and the new provision was set valid until 2012. In the first 6 months of short-term work 50% of the contributions to statutory social insurance are reimbursed by the employment agencies and from the seventh month onwards 100% are reimbursed. Contributions to statutory social insurances are also paid for. Short-term work compensations are subject to progression clause in income taxation (see Table 10).

**Transfer Short-Term Work Compensations** (*Transferkurzarbeitergeld*): Transfer short-term work compensations are a special form of short-term work compensations. Employees generally eligible to short-term work compensations are entitled to transfer short-term work compensations in case their employers apply measures of operational restructuring, in turn of which the employee is endangered to become unemployed. Transfer short-term work compensations are paid for a time of up to 12 months, and levels correspond to the regulations for general short-term work compensations. They are subject to progression clause in income taxation (see Table 10).

**Seasonal Short-Term Work Compensations** (*Saison-Kurzarbeitergeld, formerly Wintergeld or Winterausfallgeld*): Seasonal short-term work compensations are supposed to foster employment in the construction sector during winter time. Employees in the construction sector who are unemployed during the months between December and March are generally entitled to seasonal short-term work compensations. The level of benefits corresponds to the level of general short-term work compensations. They are subject to progression clause in income taxation (see Table 10).

**Insolvency Benefits** (*Insolvenzgeld*): Employees insured in the unemployment insurance are eligible to insolvency benefits in case their employers become insolvent. In this case, the unemployment insurance pays the employees' net earnings – up to the contribution assessment threshold from the statutory pension insurance (5,400 euros per month in West-Germany and 4,550 in the East in 2009) – for a time of three months following the insolvency. The benefit is financed by the unemployment insurance and by the employer who has to pay a special levy for insolvency (*Insolvenzumlage*). Since 2009 the levy has to be paid to the statutory health insurance. The levy rate was in 2009 around 0.10% of the employees' earnings, in 2010 0.41%, in 2011 was set to zero and in 2012 was increased to 0.04%. Insolvency benefits are subject to progression clause in income taxation (see Table 10).

**Unemployment Benefits for Part-Time Unemployment** (*Teilarbeitslosengeld*): Individuals who are working part-time in more than one job and lose less than all of their jobs are entitled to "unemployment benefits for part-time unemployment" if they have contributed to the statutory unemployment insurance for at least 12 months on *all* of their jobs. Benefits are paid for up to six months and levels correspond to the "unemployment benefits I". They are subject to progression clause in income taxation (see Table 10).

**Benefits for Early Retirement** (*Vorruhestandsgeld, Altersteilzeitzuschläge*): Employees may negotiate with their employers that they work part-time, i.e. 50% of their usual hours, from the age of 55 on, either continuously or blocked in years of full and zero hours. In this case, part-time earnings are raised by 20% in the form of benefits for early retirement paid by the unemployment insurance. In addition, contributions to the statutory old-age pension insurance are raised. These benefits are only paid by the insurance provided that the employer employs an additional employee in turn who was unemployed before. Otherwise, the employer has to pay for the benefits. Benefits for early retirement are income tax exempt, but they are subject to progressive taxation. They are subject to progression clause in income taxation (see Table 10).

**Benefit for Business Start-ups** (*Gründungszuschuss*: *Förderung der Existenzgründung, Ich-AG und Überbrückungsgeld*): Recipients of unemployment benefits who start a business and become self-employed are eligible to business start-ups benefit during the first months following the start-up. Employment agencies pay benefits amounting to the level of previous unemployment benefits for up to 9 months, and a monthly lump-sum of 300€ for another 3 months at maximum. Benefits are tax-free and not subject to progression clause in income taxation.

**Benefits for Re-training** (*Umschulungszuschüsse*): Unemployed individuals are generally eligible to re-training benefits, paid for by employment agencies, while they receive unemployment benefits I. Benefits for re-training cover travel expenses, costs for overnight accommodations, meals, and child care costs. For the period of the funded training, recipients generally remain eligible for unemployment benefits I. However, rules for unemployment benefits, such as the frequency in which applications must be filed, remain unchanged during the training.

### 1.3.2 Benefits from Statutory Health and Accident Insurance

**Maternity-Leave Benefits** (*Mutterschaftsgeld*): All mothers who are employed and insured by the statutory health insurance, at the time when they go on maternity leave, are eligible to maternity-leave benefits. Maternity-leave benefits are paid by the statutory health insurance system for six weeks before the child's birth and eight weeks thereafter (time of maternity leave) in order to compensate foregone income from employment. The level of benefits amounts to a maximum of 13 euros per day or 385 euros per month. Benefits are reduced if employment was less than full time. The remaining gap between maternity-leave benefits and the previous net labour income must be closed by the employer at the time of maternity leave. Maternity-leave benefits are subject to progression clause in income taxation (see Table 10).

**Sickness Benefits** (*Krankengeld der gesetzlichen sowie der privaten Pflegezusatz- oder Krankentagegeldversicherung*): All individuals insured by the statutory health insurance are entitled to sickness benefits. These are generally employees and recipients of unemployment benefits I, not however recipients of unemployment benefits II. In case sickness prevents them from working, generally *the employer* is obliged to continue salary payment for a time of six weeks. Only after these six weeks, sickness benefits are paid for by the statutory health insurance. They generally amount to 70% of the previous gross earnings and at a maximum to 90% of previous

net earnings. Social security contributions are subtracted from the benefit level, like from regular earnings -- however, only contributions to pension, long-term care, and unemployment insurance. Employer contributions are covered by the health insurance. In case of unemployed, where benefits are paid based on unemployment benefits I receipt, the health insurance covers also the employee social contributions.

Sickness benefits are paid for a time of up to 78 weeks for a specific illness. They are paid for a time of generally up to ten days if parents need to stay at home to care for their sick children (sickness benefits for care of sick children). Since January 2009, self-employed are only eligible to sickness benefit if they contribute to an additional health insurance, explicitly covering sickness benefits. Sickness Benefits are subject to progression clause in income taxation (see above). Individuals insured by private health insurance, may in addition contribute to an insurance that pays sickness benefits from private long-term care insurance or daily sickness allowances from private health insurances.

**Injury Benefits** (*Verletztengeld*): Injury benefits are paid to employees who are insured by the statutory accident insurance and who are physically or mentally unable to pursue his work due to therapies or curative medical treatments that are related to an accident at work. During the first six weeks of sick leave, the employer is obliged to continue salary payment. After that, injury benefits are paid for up to 78 weeks. They amount to 80% of the previous foregone gross earnings and at maximum 100% of net earnings. Injury benefits are income tax exempt, but they are subject to progressive taxation. Moreover, regulations for the sickness benefits apply. Injury benefits are subject to progression clause in income taxation (see above).

**Sickness Benefits for Military People** (*Versorgungskrankengeld*): Sickness benefits for military people are paid to military people in case they get injured while pursuing military services. They amount to 80% of the previous foregone gross earnings and at maximum 100% of net earnings. Sickness benefits for military people are subject to progression clause in income taxation (see Table 10).

**Severance Benefits** (*Übergangsgeld*): Severance benefits are paid to heavily injured or physically or mentally disabled people who can temporarily not pursue full-time employment due to vocational further training or other measures of reintegration into the labour market. Recipients need to have contributed to the statutory unemployment insurance for at least 12 months in the previous 3 years. Benefits generally amount to about 68% of previous net earnings. In case of children eligible to child benefits in the household, benefits amount to 75% of net earnings. In case of self-employment the benefit amounts to 80% of last year's underlying income for the annual contribution. They are paid for up to three months. Severance benefits are subject to progression clause in income taxation (see Table 10).

**Long-term Care Benefits from the Statutory Accident Insurance** (*Pflegegeld*): If Individuals insured in the statutory accident insurance are so helpless in consequence of the insured event that they require a considerable support for the common and recurring tasks in the course of daily life, long-term care benefits are paid and a nurse or home care is provided. Taking into account the nature or severity of health damage and the extent of assistance required, the monthly amount is between 300 € und 1,199 € (as of January 2009).

**Pensions from the Statutory Accident Insurance** (*Rente der gesetzlichen Unfallversicherung*): Individuals insured in the statutory accident insurance are eligible to pensions if consequences of an accident are severe. Consequences of an accident are considered severe if they reduce the individual's earnings capacity by at least 10 %. From the 26th week onwards the earnings capacity needs to be reduced by at least 20%. In case of a loss of the entire earnings capacity, a pension is paid that amounts to two thirds of annual individual earnings.

**Pensions for Disability to Work for Civil Servants** (*Pension aufgrund von Dienstunfähigkeit*): If a civil servant becomes unable to work and then retires as a consequence of an accident at work, he receives a pension for disability to work. Benefit levels depend on prior earnings and prior work history as a civil servant.

### 1.3.3 Benefits from Statutory Pension Insurance

**Old-Age Pensions** (*Altersrente*): Individuals who contributed to the statutory pension insurance for at least five years are entitled to the regular old-age pensions from the age of 65 on. This regular age for entry into old-age pension is gradually increasing for the younger cohorts up to 67, which will be the regular age in the year 2031. There are a few

specific old-age pension schemes, in which entitlement may start some years earlier, e.g. severe disabilities or unemployment so that actual entries into old-age pensions may vary considerably over the individuals. The level of old-age pensions is determined individually by the contributions made, the age of entry into pension, and the current pension value.

In the course of the Retirement Income Act in 2005, taxation rules for income from old-age pensions were altered. Taxation of old-age pension income is gradually shifted to deferred taxation. While in 2009, the taxable fraction of old-age pensions amounts to 58% (so that 42% are tax free), it gradually increases every year, until it reaches 100% in the year 2040. At the same time, allowances to deduct contributions to old-age pension schemes from labour income are gradually increased in turn.

**Pensions for Reduced Ability to Work** (*Erwerbsminderungsrente, Berufsunfähigkeitsrente, formerly also Erwerbsunfähigkeitsrente*): Pensions for reduced ability to work are paid to individuals who are insured in the statutory pension insurance and contributed at least five years, if their ability to work – any kind of work -- is permanently reduced. An individual's ability to work is considered permanently reduced if the individual is not able to work more than six hours per day anymore. If the individual is able to work more than three hours a day but not more than six, the individual's ability to work is considered partly reduced. It is considered fully reduced if the individual is not able to work three hours per day. According to the regulations for the regular old-age pension, the amount of pensions for reduced ability to work is determined individually by the contributions made, the age of entry into pension, and the current pension value. Recipients may have earnings from employment in addition up to limits that vary for partly and fully reduced abilities to work.

**Survivor's (Widow's and Orphan's) Pensions** (*Hinterbliebenenrente, including Witwenrente and Waisenrente*): Survivor's pensions include pensions for widows/widowers and pensions for orphans. There is a regular pension for widows and an extended one. The regular widow's pensions are paid to the surviving partner if the deceased person contributed to the statutory pension insurance for at least five years. It amounts to 25% of the level of a pension for fully-reduced ability to work for the deceased partner. The extended widow's pensions amount to 55% of this pension for reduced ability to work. It requires in addition that the surviving partner either has a child to care for who is younger than 18 or disabled, or has himself a reduced ability to work, or is aged 45 or older.

Orphan's pensions are distinguished between orphans who lost one parent and orphans who lost both parents. Orphans who lost one parent who was insured in the statutory pension insurance receive 10% of the pension claims of the deceased parent. Orphans who lost both parents receive 20% of the average pension claims of both parents. Orphan's pensions are generally paid up to age 18. They can be prolonged up to a maximum age of 27 in case the orphan is disabled or in higher education.

**Child-Care Pensions** (*Erziehungsrente*): Child-care pensions are paid to divorced and widows/widowers who contributed to the statutory pension insurance for at least five years, who did not marry again, and who care for a child younger than 18. There are differences in entitlements between East- and West-Germany according to the date of divorce. Child-care pensions are paid up to the 18$^{th}$ birthday of the child. They amount to the levels of a pension for fully-reduced ability to work, where claims of the surviving person are relevant. Regulations for additional earnings from employment apply accordingly.

**Supplementary Pension for Employees in Public Service** (*Rente der Zusatzversorgungskassen des öffentlichen Dienstes*): The additional supply of pensions for employees in public service is related to the retirement system and provides a supplementary pension measure for employees in public services. Since January 2002 this kind of pension system was transferred to an employer pension scheme model, where the amount of the pension and the contributions comply with the "law to improve the occupational pension" ("Riester-Law II "). Contributions are paid directly out of gross income by the employer. They are determined by the relationship between the insured income and reference income and an age factor.

### 1.3.4 Pensions from Other Institutions:

**Pensions from Employer Schemes** (*Werks- und Betriebsrenten*): Employers voluntarily provide their employees, not necessarily all of them, with pensions from employer schemes, in case of retirement, disability or death. Typical recipients are employees, workers, or managers. If the employers commits to paying pensions from employer schemes this can be explicitly agreed upon in individual work contracts or in collective agreement contracts. Benefits can be paid on a regular, or an irregular basis, typically to pension funds.

**Old-Age Pensions for Civil Servants** (*Pension, Altersruhegehalt*): The old-age pension for civil servants is paid to officials, judges, soldiers and priests, church officials and other persons who are in civil servants, when they reach retirement age. The regular age for entry into old-age pension for civil servants is 65, as in the statutory old-age pension insurance. It will equally be increased gradually in the future. A retired civil servant is eligible to the old-age pension if a period of at least five years of service is completed. The amount of the pension depends on employment status (full- or part-time employment) and position of the individual in the public service (*mittlerer Dienst, gehobener Dienst, höherer Dienst*).

**Pension Schemes for Self-Employed, Freelancers, and Farmers** (*Rente berufsständischer Versorgungswerke, landwirtschaftlicher Alterskassen und Landabgaberenten*) and **Supplements to Old-age Pension Insurance Contributions for Farmers** (*Zuschüsse der landwirtschaftlichen Alterskassen*): Pension schemes for self-employed are based on a statutory compulsory membership for certain groups of free-lancers and they offer their members retirement, disability and survivors' benefits, which are contribution-based. Agricultural entrepreneurs, farmers, and their family members are insured in the pension schemes for farmers. The contribution scheme for farmers is similar to that of the statutory pension insurance.

**Old-age Pensions from Foreign Countries** (*Auslandsrente*): These pensions refer to income from pension systems from foreign countries. They presumable depend on contributions. Their levels may differ by countries.

### 1.3.5 Public Transfers to Private Households

**Child Benefits** (*Kindergeld*): Parents with dependent children are eligible to child benefits. Married couples can choose who receives the benefits. In case of parents living separately, the one with whom the child stays most of the time, or the one who bears the larger share of the maintenance, receives the benefits. Benefits are paid for biological, adopted, or foster children who live in the same household with their parents. They are paid up to the age of 18. Eligibility is prolonged up to the age of 25, in case children are still in education and have an own income that does not exceed a threshold. Alternatively to child benefits, parents can claim a child tax allowance at the derivation of taxable income. Tax authorities apply the more favourable of child benefits and child allowance for the parents according to a higher-yield test. In 2009, child benefits amounted to 164 euros for each the first and second child, to 170 euros for the third child and to 195 euros for each subsequent one. Additionally, in 2009 all recipients of child benefits received a one-time benefit of 100 euros per year and per child. From 2010 to 2012 child benefits for the first two children amounted to 184 euros, to 190 euros for the third one and to 215 euros for each subsequent child. In 2009, the child tax allowance was 6,024 euros, and since 2010 the tax allowance amounts 7,008 euros.

**Parental-Leave Benefits** (*Elterngeld, formerly also Erziehungsgeld*): Parental-leave benefits were implemented in 2007. They are non-means-tested benefits that generally replace 67% of parents' foregone net labour earnings in case they suspend employment due to the birth of a child. Parental-leave benefits are paid – in addition to child benefits -- for a time frame of up to 12 months following the birth of the child, which can be prolonged for another two months if parents share parental-leave time such that each of them suspends work for at least two months. Alternatively to suspension, part-time work of up to 30 hours per week is allowed. The minimum level of parental-leave benefits is 300 euros per month, which is paid in case the recipient was unemployed before the child's birth or net income was below 300 euros. The maximum benefit level is 1,800 euros per month, which is paid if net income was 2,770 euros or more. In between, benefits generally amount to 67% of net income, considerably more for low income and slightly less for

high incomes. The relevant net income is a twelve-month average net income of the time right before the child's birth. Parental-leave benefits are income tax exempt but subject to progression clause in income taxation (see Table 10).

**Unemployment Benefits II** (*Arbeitslosengeld II*): All individuals aged 15 or older who are able to work for at least three hours per day are eligible for "unemployment benefits II". Students eligible to education allowance (*BaFöG*, see below) and pensioners are not eligible. "Unemployment benefits II" are means tested with respect to income and wealth and they are determined by the needs of the entire household (*Bedarfsgemeinschaft*). This means that the household's income and wealth are considered for the determination of needs, except for some allowances. This is usually done by a means test with regard to income and wealth. The amount of exemption for wealth for those born after 1948 consists of a basic allowance of 750€ plus 3,100€ per child and plus the minimum of 9,750€ and the maximum of 150€ multiplied by the recipient's age and 3,100€. The composition of the exemption changes for those born before 1948. For them, it amounts to a basic allowance of 750€ plus 3,100€ per child and plus the minimum of 33,800€ and the maximum of 520€ multiplied by their age and 3,100€. Depending on the number of household members the income threshold per month is calculated by the amount of the basic rates and the monthly rent including heating with regard to the household formation (lone parents or both parents are living in the household). However, unemployment is no requirement for entitlement, and there is no limitation for the hours worked.

The resulting level of benefits is determined by the number of adults and children in the household, where for the latter age is of relevance. The basic benefit rate[2], which is relevant for a single household, was 351 euros per month in 2009, 359 euros in 2010, 364 euros in 2011 and 374 in 2012. In case of two adults in an eligible household, each adult older than 25 years is entitled to 90% of the basic rate. Each child aged 18-25 and able to work is entitled to 80%. For younger children, there are three age categories that determine the level of benefits. In addition to the basic benefits, costs for housing and heating, up to a maximum amount, which depends on the size of the household, are covered in the context of "unemployment benefits II". Moreover, contributions to statutory health and old-age pension insurances are paid.

While the household's income and wealth are generally considered for the determination of needs, there are allowances granted. Benefits are unaffected by an additional (gross) income of 100 euros per month. Income between 101 and 800 euros (between 101 and 1,000 euros from 2012 on) reduced benefits at a rate of 80%, income between 800 and 1,200 euros (1,000 and 1,200 euros from 2012 on) at a rate of 90% (1,500 euros for households with children), and income above 1,200 euros is deducted at 100%. The allowance for wealth depends on the age of the adults in the household; a minimum allowance of 4,100 euros (3.100 euros since 2010) and a maximum allowance of 13,000 euros are granted. Since 2010, for individuals born before 1 January 1958, a maximum allowance of 9,750 euros is granted, for those born between 1958 and 1963, 9,900 euros, and for those born between 1964 and 1993, 10,050 euros are granted. For each child younger than 18, a wealth allowance of 4,100 euros (3,100 euros since 2010) is granted.

**Additional Child Allowances** (*Kinderzuschlag*): An additional child allowance is paid if households receive an income that covers the parents' needs according to "unemployment benefits II", but not the needs of children younger than 25 who live in the same household. The level of the additional child allowance depends on the children's needs and the household's income and wealth. The maximum amount of these benefits is 140 euros per month and entitled child. It is reduced if household income exceeds the parents' needs, or if the household holds wealth exceeding an allowance. Eligible children are unmarried, live in the household, and are not older than 25 years. They also need to be eligible for child benefits. Own income of the child, market or replacement income, reduces the benefit amount. Household income must fall in a range in order for parents to be eligible to additional child benefits.

**Social Assistance** (*Sozialhilfe*): Individuals who are not able to work at least three hours per day – either because they are aged 65 or older, or because they are aged 18-65 and physically not able to work -- are entitled to social assistance in order to secure a minimum income for everybody. These benefits are means tested with respect to income and wealth and they are determined by the needs of the entire household. This means that the household's income and wealth are considered for the determination of needs, except for allowances. The amount of exemption for wealth for singles born after 1948 is 1,600€ (base rate). For households with more than one individual, there is an additional 614€

[2] All amounts as of the 30th of June of the respective year.

per adult (except for the head of household) and 256€ per child added to the basic rate. For those born before 1948, the base rate increases up to 2,600€. In the case of general social assistance for reduced work, the income threshold per month is calculated by the amount of the basic rates and the monthly rent including heating with regard to the number of household members. The basic social assistance rate is identical to the basic rate from "unemployment benefits II". Basically, social assistance is supposed to secure a minimum income for individuals who are not eligible for "unemployment benefits II", i.e. those younger than 65 and not able to work at least three hours per day. Those 65 and older with very low pension income are however entitled to basic old-age assistance.

**Means-tested Basic Old-Age Assistance** (*Bedarfsorientierte Grundsicherung im Alter oder bei Erwerbsminderung*): The basic old-age assistance ensures the basic needs for living for older people and for those individuals, who are permanently fully incapacitated for work. Recipients must have 65 years of age, or 18 years of age and simultaneously be permanently fully incapacitated for work due to medical reasons. Claim for basic old-age assistance have individuals, who cannot support themselves with their own income and assets or with the income and assets of the non-separated spouse or consensual partner. The amount of exemption for wealth for singles born after 1948 is 1,600€ (base rate) per month. For households with more than one individual, there is an additional 614€ per adult (except for the head of household) and 256€ per child added to the basic rate. For those born before 1948, the base rate increases up to 2,600€. In the case of general social assistance for reduced work the income threshold per month is calculated by the amount of the basic rates and the monthly rent including heating with regard to the number of household members, as at social assistance. Since January 2005 the standard rate and the 15% surcharge are combined into a single new basic rate. The new basic benefit rate for old-age assistance is closely related to the basic rate from unemployment benefits II.

**Social Benefits** (*Sozialgeld*): Individuals who are not able to work at least three hours per day, so that they are not eligible to "unemployment benefits II", and who live together with individuals who are themselves entitled to "unemployment benefits II", are eligible to social benefits. Social benefits are supposed to capture those people who would otherwise not be secured by social assistance. This is usually the case for children younger than 14, or children younger than 18 who are permanently unable to work. Benefit levels correspond closely to levels of social assistance. However, the benefit is more closely related to unemployment benefits II; often aggregate amount are reported together for these two benefits in official statistics.

**Advances on Alimony Payments** (*Unterhaltsvorschuss*): Children under the age of 12 who only have a single mother or a single father (who may be divorced) are eligible to advances on alimony payments, if the other parent does not live in the same household and does not provide any alimonies, or the amount provided is below the minimum alimony. The maximum payment period is 72 months and interruptions in the payment period are possible, for example, because the other parent temporarily pays sufficient alimonies. In 2009, payments for children who had not completed the age of six amounted to 117€ and since 2010 they amount to 133€. If a child is below the age of twelve, in 2009 158€ were paid, and 180€ are paid since 2010. If relevant, benefits are reduced by received child benefits and respectively by widow's pensions.

**Benefits from Non-Profitable Charity Organizations** (*Geldleistungen von Wohlfahrtsorganisationen, e.g. AWO*): Non-profitable charity organizations support disadvantaged groups in the country. Their field typically includes social work (for children and young people, marginal groups, migrants, seniors, families, disabled, etc.), social care and poverty reduction, health promotion and prevention, care, counseling and / or training.

**Housing Benefits** (*Wohngeld*): Individuals in a household, in which the sum of income from all members does not exceed a threshold, are entitled to housing allowances. They may be renting or owning the house/flat. They are only explicitly eligible to housing benefits in case they are not eligible to "unemployment benefits II". Otherwise, housing benefits are implied by "unemployment benefits II". The level of benefits generally depends on the number of household members, the sum of their net incomes, where certain expenses for costs of living may be deducted up to certain thresholds, and the costs of rent or of loan repayments and maintenance, again up to thresholds. Benefit levels were raised significantly in 2009, when average housing benefits were raised from 90 euros up to 140 euros.

**Education Benefits** (*Ausbildungshifen/BaFöG*): Students entering higher education before the age of 30 are eligible to financial aid according to the "*Bundesausbildungsförderungsgesetz* (*BaFöG)*". Education benefits are means-tested

benefits. The benefit level depends on income and wealth of the recipient as well as on income of the recipient's parents and spouse. Moreover, it depends on the presence of siblings as well as their age and income. If the parents of the recipient are married, the income allowance for them was up to 1,555€ per (increased to 1,605€ from late 2010 on). For single parents, or parents married with a partner (not the mother or the father of the recipient), the allowance is 1,040€ per month (increased to 1,070€ from 2011 on). Moreover the amount of 470€ per month (485 from late 2010 on) is added to the income allowance of her or his parents for each non-eligible sibling. The student's own income allowance is 402€ per month plus 470€ for each own child. The assets allowance for single students amounts to 5,200€, for a married student 7,000€ plus 1,800€ for each own child.

High school students do not need to repay any of the benefits. However, university students get half of the benefits in form of an interest-free loan that has to be paid back under certain conditions after education is finished. In October 2008 and October 2010 the education benefit rate and the amount of exemption for the parental income and for the recipient's income were raised. The basic amount for students who do not live with their parents was 512 euros in 2009 and was increased to 597 euros in 2010. The amount of exemption for parental income (for married couples) was 1,555 euros from October 2008 on (in Euromod, effective from 2009 on) and was increased to 1,605 euros in late 2010. For recipients' income, the exemption amounts to 255 euros per month and has stayed constant over the period 2009-2012.

**Professional-Training Benefits** (*Berufsausbildungsbeihilfe*): Individuals who are in professional training (e.g. apprenticeships) are eligible to professional-training benefits in case their earnings do not cover reasonable costs of living. In addition, the recipient either needs to pursue his training at a location too far away from his parents' home to commute, or the recipient needs to be 18 years old, married, or have a child. The level of benefits depends on income and wealth of the recipient as well as on income of the recipient's parents and spouse. Benefits are usually paid for up to 18 months.

**Subsidization of Private Old-Age Pension Savings** (*Förderung der privaten Altersvorsorge*): Asset accumulations for private old-age pension income are subsidized in the framework of the Riester-scheme (Riester benefits). Generally, all individuals who contribute to the statutory pension insurance are eligible to Riester benefits. Benefits are paid for contributions to state-certified savings contracts. Maximum benefits are only paid if a minimum share of gross income from the previous year is contributed to the certified savings contract.

**Home Building Allowances** (*Eigenheimzulage*): Home building allowances were granted for individuals who bought a flat or a house for the purpose of owner-occupation. Recipients need to have average income over the two years before the purchase of below 70,000 euros per year. Home building allowances amount to 1% of purchasing costs (maximum of 1,250 euros) per year, plus 800 euros for each child, for a time of up to eight years. Allowances are exempt from income tax. Home building allowances were abolished at the end of 2005, where home owners could apply for these benefits for the last time. As recipients are eligible to home building allowances for a time of up to eight years, there may remain old cases in the data, i.e. individuals receive these benefits, up until 2013.

**Building Society Premiums** (*Wohnungsbauprämie*): Building society premiums are paid for savings in building-society savings contracts. Savers are eligible to premiums if their taxable income is below 25,600 euros. Savings to eligible contracts are subsidized up to 512 euros per year for a single individual and up to 1,024 euros for a married couple. At maximum, building society premiums amount to 45 euros per year and individual.

**Savings Bonuses for Employees** (*Arbeitnehmersparzulage*): Savings bonuses for employees are granted on contributions to capital formation that are directly invested by the employer out of basic salaries into various forms of savings contracts (*vermögenswirksame Leistungen*). Employees are eligible to these bonuses if their taxable income is below 20,000 euros, for a married couple below 40,000 euros. The level of bonuses depends on the type of savings contract.

**Benefits for War Victims and Burden Sharing** (*Kriegsopferversorgung und –fürsorge, Lastenausgleich*): Benefits for war victims and burden sharing are paid for military people in case they get injured while pursuing military services. Several single benefits are subsumed under benefits for war victims and burden sharing.

### 1.3.6 Scope and Scale

The social security system shall be structured according to its single fields by functions, and fractions of recipients of respective benefits in the total population shall be differentiated (see Table 5). About 30% of the population receives old-age pensions from the statutory pension insurance system. This fraction decreases only marginally between 2009 and 2011. Also benefits from the health insurance system show high rates of recipients (hospital around 22%). However, benefits from long-term care insurance (3%), accident insurance (1%), and unemployment insurance (1%) are only of minor relevance. Among public transfers to private households, child benefits are most relevant, with about 11% recipients in the population. Unemployment benefits II are less relevant (6%), and social assistance (1%), social benefits (2%) and housing benefits (1%) have lowest relevance.

Table 5. Social benefits: recipients (as % of population)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Total population (million)** | 82.002 | 81.802 | 81.752 | 81.844* |
| as % of population | | | | |
| **Social security system** | | | | |
| Old-age pension insurance[1] | 30.40 | 27.28 | 28.54 | n/a |
| Health insurance | | | | |
| *Hospital* | 21.72 | 22.04 | n/a | n/a |
| Long-term care insurance | 2.73 | 2.79 | 2.83 | n/a |
| Accident insurance | 1.03 | 1.02 | n/a | n/a |
| Unemployment insurance | | | | |
| *Unemployment benefits (Arbeitslosengeld I)* | 1.39 | 1.25 | 1.08 | n/a |
| *Unemployment benefits for further training (Arbeitslosengeld bei Weiterbildung)* | 0.09 | 0.07 | 0.07 | n/a |
| *Short-term Work Compensations (Kurzarbeitergeld)* | 1.39 | 0.61 | 0.18 | n/a |
| **Public transfers to private households** | | | | |
| Child benefit (*Kindergeld)* | 10.81 | 10.78 | 10.72 | n/a |
| Social benefit (*Sozialgeld)* | 2.22 | 2.22 | 2.13 | n/a |
| Unemployment benefit II | 5.99 | 5.98 | 5.64 | n/a |
| Social assistance (*Sozialhilfe)* | 1.31 | 1.36 | n/a | n/a |
| Housing benefit | 1.04 | 1.04 | n/a | n/a |

Notes: * Preliminary result
[1] Pension insurance and pension by reason of death.
Source: Statistisches Bundesamt Deutschland; Statistical yearbook 2012 and 2011 (Statistisches Jahrbuch 2012 und 2011); Deutsche Rentenversicherung - Rentenversicherung in Zeitreihen.

In a similar structure, in systems differentiated by functions, the social security system shall further be analysed by patterns of aggregate annual spending, as a fraction of total expenditures for any benefits (see Table 6). Social security systems have the greatest share (about 63%) of overall benefit spending, among which the statutory pension insurance (32%) and health insurance (22%) are the most relevant systems. The second largest systems can be grouped as public transfers to private households (18%), among which unemployment benefits II and social benefits (6%) as well as child and family services (5%) are of greatest relevance. Employer's schemes (8%), such as e.g. continued payments in case of sickness (4%) or occupational pensions (3%) are of minor relevance. Furthermore, less relevant are tax benefits in general (5%), and compensation (0.4%) as well as other special schemes (3%). This structure was largely constant over the recent four years.

Table 6. Social benefit: expenditure

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Annual expenditure (€-million)** [1] | 747,736 | 765,718 | 767,590 | n/a |
| as % of total expenditure | | | | |
| **Social security systems**[1] (*Sozialversicherungssysteme*) | **62.8** | **62.2** | **62.2** | **n/a** |
| Statutory pension insurance (*Rentenversicherung*) | 32.0 | 31.7 | 32.0 | n/a |
| Health insurance (*Krankenversicherung*) | 21.6 | 21.7 | 22.2 | n/a |
| Long-term care insurance (*Pflegeversicherung*) | 2.6 | 2.7 | 2.7 | n/a |
| Accident insurance (*Unfallversicherung*) | 1.5 | 1.5 | 1.5 | n/a |
| Unemployment insurance (*Arbeitslosenversicherung*) | 5.1 | 4.5 | 3.7 | n/a |
| **Other special schemes** (*Sondersysteme*) | **3.1** | **3.1** | **3.2** | **n/a** |
| **Public sector systems for civil servants** (*Systeme des öffentlichen Dienstes*) | **7.4** | **7.4** | **7.6** | **n/a** |
| Pensions (*Pensionen*) | 5.4 | 5.4 | 5.6 | n/a |
| Family supplements (*Familienzuschläge*) | 0.4 | 0.4 | 0.4 | n/a |
| State aid (*Beihilfen*) | 1.6 | 1.6 | 1.6 | n/a |
| **Employers' schemes** (*Arbeitgebersysteme*) | **8.1** | **8.2** | **8.4** | **n/a** |
| Continued payments in case of sickness (*Entgeltfortzahlung*) | 3.5 | 3.7 | 3.9 | n/a |
| Occupational pensions (*Betriebliche Altersversorgung*) | 2.8 | 3.0 | 2.9 | n/a |
| Supplementary pension (*Zusatzversorgung*) | 1.3 | 1.3 | 1.4 | n/a |
| Other employer benefits (*Sonstige Arbeitgeberleistungen*) | 0.2 | 0.2 | 0.2 | n/a |
| **Compensation schemes** (*Entschädigungssysteme*) | **0.4** | **0.4** | **0.4** | **n/a** |

| | | | | |
|---|---|---|---|---|
| **Public transfers to private households** (*Förder- und Fürsorgesysteme*) | **18.2** | **18.6** | **18.3** | **n/a** |
| Child and family services equalization scheme benefit (*Kindergeld- und Familienleistungsausgleich*) | 5.0 | 5.2 | 5.2 | n/a |
| Child-raising/parents benefit (*Erziehungsgeld/Elterngeld*) | 0.6 | 0.6 | 0.6 | n/a |
| Unemployment benefits II and Social benefits (*Grundsicherung für Arbeitsuchende:Arbeitlosengeld II und Sozialgeld*) | 5.9 | 5.8 | 5.2 | n/a |
| Other employment promotion (*sonst. Arbeitsförderung*) | 0.1 | 0.1 | 0.1 | n/a |
| Education and career advancement benefit (*Ausbildungs- und Aufstiegsförderung*) | 0.3 | 0.3 | 0.3 | n/a |
| Social assistance (*Sozialhilfe*) | 3.2 | 3.2 | 3.3 | n/a |
| Child and youth care benefit (*Kinder- und Jugendhilfe*) | 3.0 | 3.2 | 3.4 | n/a |
| Housing benefit (*Wohngeld*) | 0.2 | 0.2 | 0.2 | n/a |
| **Tax benefits** (*Steuerliche Leistungen*) | **4.6** | **4.2** | **3.9** | **n/a** |

Notes: [1] The annual social benefit expenditure and the social security systems are not consolidated by the contributions of the state as in the source; institutions without settlement.
The figures for 2010 are preliminary and for 2011 estimated.
Source: Bundesministerium für Arbeit und Soziales (2011)

## 1.4 Social Contributions

Firstly, relevant regulations related to social contributions will be introduced. Thereafter, the scope and scale of social contributions, in terms of aggregate figures, will be addressed.

### 1.4.1 Relevant Regulations

Employees and employers are obliged to pay statutory social insurance contributions (*Sozialversicherungsbeiträge*) from gross wages and salaries unless gross income exceeds certain thresholds, which allows employees to contract out of statutory health and pension insurance. In turn, social contributions grant benefit entitlements (see section 1.3). Employers withhold the employee's share of the social contributions when paying out the wage, and transfer them – together with their own share – to the employee's statutory health insurance fund, which is responsible for administration. Generally the contributions are equally split between employees and employers. Exceptions are statutory health insurance, where the employer's contribution rate is 0.9 percentage points lower, and long term care insurance, where employees, who are 23 years of age or older and who do not have children, have a 0.25 percentage points higher contribution rate. Statutory accident insurance is paid by employers only.

Social insurance contributions are paid as fixed shares of gross income (contribution rates, *Beitragssätze*) up to a contribution assessment ceiling (*Beitragsbemessungsgrenze*). Gross income above this ceiling is disregarded. Employees who earn more than the assessment ceiling for statutory pension insurance may opt out of statutory pension insurance completely. Concerning statutory health insurance, a different threshold, i.e. the threshold for compulsory health insurance (*Versicherungspflichtgrenze*), determines who may opt out. Employees who earn salaries above this threshold may choose private health insurance instead. Private health insurance premiums do not depend on gross income, but mostly on age, gender, and prior health conditions.

Table 7 shows the development of contribution rates (sum of employer's and employee's share) and assessment ceilings. Contribution rates will be tabulated differentiated by employers' rates and employees' rates and by the respective insurance, in Section 2.5. Since 2009, the federal government sets all contribution rates; before, the contribution rate to statutory health insurance depended on the employee's chosen statutory health insurance fund. The contribution assessment ceilings are adjusted every year.

Table 7. Social contributions: Contribution rates[1] and ceilings

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Statutory pension insurance** (*gesetzliche Rentenversicherung*) | | | | |
| Contribution rate | 19.9 | 19.9 | 19.9 | 19.6 |
| Assessment ceiling (western Germany), euros per month | 5,400 | 5,500 | 5,500 | 5,600 |
| Assessment ceiling (eastern Germany) , euros per month | 4,550 | 4,650 | 4,800 | 4,800 |
| Assessment ceiling (average, weighted by census population shares) | 5,216 | 5,318 | 5,350 | 5,429 |
| **Statutory health insurance** (*gesetzliche Krankenversicherung*) | | | | |
| Contribution rate | 15.2 | 14.9 | 15.5 | 15.5 |
| Assessment ceiling, euros per month (*Beitragsbemessungsgrenze*) | 3,675 | 3,750 | 3,712.5 | 3,825 |
| Threshold for compulsory insurance, euros per month (*Versicherungspflichtgrenze*) | 4,050 | 4,163 | 4,125 | 4,237.5 |
| **Statutory long term care insurance** (*soziale Pflegeversicherung*) | 1.95 | 1.95 | 1.95 | 1.95 |
| Employees above 23 years, born after 1940, w/o children (additionally) | 0.25 | 0.25 | 0.25 | 0.25 |
| Saxony (additionally, in exchange for one more holiday) | 1.00 | 1.00 | 1.00 | 1.00 |
| **Statutory unemployment insurance** (*gesetzliche Arbeitslosenversicherung*) | 2.80 | 2.80 | 3.00 | 3.00 |
| **Statutory accident insurance** (*gesetzliche Unfallversicherung*) | 1.60 | 1.60 | 1.60 | 1.60 |

Notes: [1] Contribution rates refer to the entire rate paid, i.e. the rate paid for by the employer, plus the rate paid for by the employee.

**Family insurance** (*Familienversicherung*): 1) Partners (married or registered) with low income and 2) children of a (compulsory or voluntary) member of statutory health insurance enjoy health insurance coverage without having to pay contributions. The income threshold was €360 in 2009 (€365 in 2010, €370 in 2011, €375 in 2012) or €400 in case of a Mini-job, see below. The age limit for children is 18 years in general; 23 years, if the child earns less than €400 per month; and 25 years for children in education, e.g. in tertiary education or an apprenticeship (time spent in compulsory military or civil service is acknowledged additionally).

**Mini job / midi job:** There are two types of *mini jobs*: marginal employment and short term employment. In marginal employment, earnings do not exceed €400 per month. Short term employment does not exceed two months or 50 working days during a calendar year, independent of the earnings level. The €400 mini job is tax-free and free of social insurance contributions for the employee. However, the employer has to pay contributions to statutory health and pension insurance. In 2009, the employer paid a lump sum contribution rate of 30.77%, which was raised to 31.08% in 2010 and to 3.88% in 2012. It consists of health insurance (13ppt), pension insurance (15ppt), a lump sum for payroll tax, solidarity surcharge, and church tax (2ppt), and certain levies (0.77ppt in 2009, 1.18ppt in 2010 and 0.88ppt in 2012). In contrast, short term mini jobs are contribution-free; the employer only has to pay the other levies. Mini jobs do not include contributions to the long term care and unemployment insurance.

*Midi jobs* are employments with monthly gross wages between €400.01 and €800. In this earnings range, employee's social insurance contributions are faded in linearly until they reach the full rates at a gross wage of €800. Employers pay their standard contribution rates. These contributions are comprised of statutory health, long-term care, pension, and unemployment insurance. Fading-in of social contributions is determined by population-average social contribution rates (factor: 0.7472 in 2009; 0.7585 in 2010; 0.7435 in 2011; 0.7491 in 2012). There have been about 4.9m individuals employed in *mini jobs* in Germany by the time of 2009.

**Civil servants**: Civil servants are not covered by compulsory social insurance and are not obliged to pay contributions. The federal or state government provides financial assistance (approximately 50% to 80% of the expenses) in cases of

illness, birth, long-term care and death (*Beihilfeleistungen*) and a retirement pension (*Versorgungsbezüge*). Usually civil servants have a private health insurance to insure against health costs not covered by the government's financial assistance.

**Self-employment**: Statutory health insurance is generally not compulsory for the self-employed in Germany, and most of the self-employed choose private health insurance (Fossen, 2009). As an exception, artists and publicists are covered by compulsory statutory health insurance if certain requirements are met. Voluntary membership in statutory health insurance is possible for self-employed persons who have contributed to statutory health insurance for at least the last 12 months or for at least 24 months within the last five years before entering self-employment.

The self-employed are not generally obliged to contribute to compulsory pension insurance. Specific groups of the self-employed (about a quarter of all self-employed) are obliged to contribute to statutory pension insurance (Schulze Buschoff, 2007). Compulsory pension insurance applies for self-employed teachers without employees, nurses, midwives, artists, publicists, craftsmen (who may contract out after contributing for 18 years) and some other less frequent groups. For other self-employed people, the possibility of being included in the statutory pension insurance system upon application exists; opting out later is ruled out in this case. Another possibility is voluntary membership in statutory pension insurance, which allows choice over the level of contributions (and entitlements). More relevant in practice are private pension insurance schemes – for example, state-aided basic pension schemes (*Rürup-Rente*). People becoming self-employed, having been dependently employed, have the option to stay in unemployment insurance upon application.

### 1.4.2 Scope and Scale

The social benefit system shall be further structured by its contributions. If the number of contributors to a system is related to the total population (Table 8) it becomes apparent that the accident insurance has the most contributors (75% of the total population). Statutory pension insurance, health insurance, and long-term care insurance have about similar numbers of contributors (about 63%), whereas the unemployment insurance has significantly less contributors (33%). This structure has been largely stable over recent years. However, a slight increase in the number of contributors becomes apparent for all systems.

Table 8. Social contributions: contributors (as % of population)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Total population (million)** | 82.002 | 81.802 | 81.752 | 81.844 |
| as % of population | | | | |
| **Social contributions: contributors** | | | | |
| Statutory pension insurance (*gesetzliche Rentenversicherung*) | 63.7 | 63.8 | n/a | n/a |
| Health insurance * (*gesetzliche Krankenversicherung*) | 62.5 | 63.5 | n/a | n/a |
| Accident insurance [2] (*gesetzliche Unfallversicherung*) | 74.9 | 75.6 | n/a | n/a |
| Long-term care insurance * (*gesetzliche Pflegeversicherung*) | 62.4 | 62.6 | n/a | n/a |
| Unemployment insurance [1] (*gesetzliche Arbeitslosenversicherung*) | 33.4 | 34.05 | 34.9 | n/a |

Notes: [1] Without self-employed voluntary members in statutory unemployment insurance.
[2] Without accident insurance for students.
* Without family members in family insurance.
Source: Statistisches Bundesamt Deutschland; (Statistical yearbook 2012), Deutsche Rentenversicherung, Zeitreihen (2012), Bundesagentur für Arbeit (2012), Daten des Gesundheitswesens (2012)

Contributions to social security systems, in aggregate revenue from contributions, are broken down by groups of contributors, i.e. employers, employees or self-employed and non-employed, and presented in million euros as well as in percent of total revenue from contributions (see upper panel of Table 9). Employers pay the greatest share of contributions to social security (42%), followed by employees (39%), and self-employed, together with non-employed, only pay 19% of total contributions. This structure was stable over the time of 2009 till 2011.

Furthermore, contributions to social security systems, again in aggregate revenue from contributions, are broken down by insurance system (see lower panel of Table 9). It becomes apparent that most contributions are devoted to the statutory pension insurance (about 182bn euros) and to the health insurance (172bn euros), whereas contributions to the unemployment insurance (22bn euros), the long-term insurance (21bn euros), and the accident insurance (12bn euros) are significantly lower. While contributions to the pension insurance, the health insurance and the unemployment insurance have been steadily increasing over the recent four years, contributions to the long-term insurance and the accident insurance display a much flatter growth path.

Table 9. [A] Social contributions: revenue by contributors

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Social security contributions: revenue (€-millions)** | 384,100 | 393,580 | 409,280 | n/a |
| Employers | 161,100 | 167,100 | 173,560 | n/a |
| Employees | 150,360 | 154,930 | 164,200 | n/a |
| Self-employed or non-employed[1] | 72,640 | 71,550 | 71,520 | n/a |
| **as % of total revenue** | | | | |
| Employers | 42% | 42% | 40% | n/a |
| Employees | 39% | 39% | 40% | n/a |
| Self-employed or non-employed[1] | 19% | 19% | 20% | n/a |

Notes: [1] Includes contributions by the state for recipients of social benefits
Source: Statistisches Bundesamt (2012), national accounts

[B] Social contributions: revenue by insurance

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Social contributions ( €-millions)** | / | / | / | / |
| Statutory pension insurance (*gesetzliche Rentenversicherung*) | 181,572 | 185,350 | n/a | n/a |
| Health insurance [1] (*gesetzliche Krankenversicherung*) | 171,815 | 175,322 | 183,466 | n/a |
| Accident insurance[3] (*gesetzliche Unfallversicherung*) | 11,585 | 11,917 | n/a | n/a |
| Long-term care insurance[2] (*gesetzliche Pflegeversicherung*) | 21,189 | 21,641 | 22,129 | n/a |
| Unemployment insurance (*gesetzliche Arbeitslosenversicherung*) | 21,8 | 22,6 | 25,8 | n/a |

Notes: [1] Without risk structure adjustment and without contributions from marginal employment.
[2] Without information about the private Long-term care insurance.
[3] Without accident insurance for students.
Source: Statistisches Bundesamt Deutschland (Statistical yearbook 2011) and (Statistical yearbook 2012).

## 1.5 Taxes

### 1.5.1 Direct Taxes

**Income tax** (*Einkommensteuer*): Income tax is levied on the income of natural persons. Income from various different sources is summed, and after loss compensation and several allowances and deductions, taxable income as the tax base is taxed according to a progressive tax schedule. Table 10 shows in more detail how taxable income is determined. Income from single components is added up and certain expenditures are credited against income, as well as certain allowances are granted.

There is a tax allowance for elderly persons (for people aged 64 and older). It consists of a fraction of their income that is tax-exempt (33.6% in 2009, and 32.0% in 2010) and a threshold for this allowance (1,596 euros in 2009, and 1,520 euros in 2010). Then, there is a tax allowance for tax-payers in the agriculture and forestry sector. It amounts to 670 euros per year and per taxpayer, but it is only granted in case total income does not exceed 30,700 euros per year. This allowance was constant over these years. And, there is a single parents' tax allowance, which is granted for single parents with at least one child in the household eligible to child benefits. The allowance amounts to 1,308 euros per year for the single-parent tax payer and it was constant between 2009 and 2012. Furthermore, there is a tax allowance for children, which is granted for parents instead of child benefits in case this grant is more beneficiary for the tax payers than the child benefits. This allowance amounts to 3,012 euros per year *and child* in 2009 and 3,504 from 2010 on. Since 2000, it includes an allowance for child care. The tax allowance for civil servants in 2009 consists of 33.6% of their pension that is tax-exempt up to a maximum of 2,520€ per year. Moreover there is a deduction allowed for special expenses, for example for old-age provision (see section 2.6.1 for further details). For alimonies the minimum deduction is 36€ per year as lump sum. 58% of income from private pensions is tax-exempt if the individual is entitled to the regular old-age pensions from the age of 65 on and the same fraction of income from public pensions is tax-exempt if the entrance year is 2009.

In the German income tax system in general, married couples are taxed jointly with full income splitting, i.e. the tax function is applied to half of the sum of the spouses' taxable incomes, and then the resulting tax amount is doubled. Taxable income falls into five different tax brackets. There was a basic tax allowance of €7,834 (for singles) in 2009, which was increased in 2010 up to €8,004. Within the progressive tax schedule, the lowest marginal tax rate is 14% and the highest 45%, which applies for a taxable income above €250,001 (for singles). Up to a marginal tax rate of 42%, the tax rate increases continuously and is determined by different formulas applied within the different tax brackets.

Tax on income from dependent employment is collected from persons in dependent employment at source via payroll tax (*Lohnsteuer*). Similarly, tax on capital income is collected at source via withholding tax (*Kapitalertragsteuer*). However, these taxes need not be final. It is common to file income tax returns, for example to claim income-related expenses which exceed the tax allowable lump sum for income-related expenses. In 2009, a final withholding tax on capital (*Abgeltungssteuer*) was introduced with a flat tax rate of 25%.[3] This rate applies above a saver's tax allowance, which amounts to €801 for single persons – for couples, it is doubled -- since 2009.

In the lower panel of Table 10 there is a list of benefits, income from which is subject to progression clause in German income tax law. As described in Section 1.2.2, a specific element of the German income tax law is the progression clause (*Progressionsvorbehalt*). Even though not included in the tax base, most of the contributory benefits are included in the base used to determine the tax bracket of the progressive income tax schedule. In this way these incomes increase the income tax rate used for the other income sources which are subject to the income tax.

[3] The rate of 25% excludes the solidarity surcharge of 5.5% on the tax burden. The effective rate would be 26.375% (excluding church taxes of 8% or 9%, depending on confession).

Table 10. Determination of taxable income according to German Income Tax Law (§ 2 EStG)

| **Legal income concepts and their components** | **EStG** |
|---|---|
| Income from agriculture and forestry | §§ 13 - 14a |
| + Income from business enterprise | §§ 15 - 17 |
| + Income from self-employment | § 18 |
| + Income from dependent employment | § 19 |
| + Income from capital | § 20 |
| + Income from renting and leasing | § 21 |
| + Other income | § 22 |
| **= Positive income from all sources** | **§ 2 III** |
| – Negative income (loss compensation) | |
| **= Income from all sources** | **§ 2 III** |
| – Tax allowance for elderly persons (for people over 64) | § 24a |
| – Tax allowance for agriculture and forestry | § 13 III |
| **= Adjusted gross income** | **§ 2 III** |
| – Special expenses (actual or lump-sum) | §§ 10 - 10c |
| – Extraordinary expenses (actual or lump-sum) | §§ 33 - 33c |
| – "Loss deductions" (reimbursements, loss carry forwards) | § 10d |
| **= Income** | **§ 2 IV** |
| – Tax allowance for children (*Kinderfreibetrag*) | § 32 VI |
| – Single parents' tax allowance (*Alleinerziehendenentlastungsbetrag*) | § 24b |
| = **Taxable income** (the tax base) | § 2 |
| **Progression Clause** *(Progressionsvorbehalt)* | § 32b |
| + Unemployment Benefits | |
| + Short-term Work Compensations | |
| + Insolvency Benefits | |
| + Severance Benefits | |
| + Parental-leave Benefits | |
| + Sickness benefits | |
| + Injury Benefits | |
| + Sickness Benefits for Military People | |
| + Maternity-leave Benefits | |
| + Transfer Short-term Work Compensations | |
| + Seasonal Short-term Work Compensations | |
| + Unemployment Benefits for Part-time Unemployment | |
| + Benefits for Early Retirement | |
| + Supplemented labour costs for employment | |
| = **Taxable income according to p.c.** (determining the tax rate) | § 32b |

Source: Steiner, Wrohlich, Haan, and Geyer (2008).

**Solidarity Surcharge** (*Solidaritätszuschlag*): A surcharge of 5.5% on the income tax and the capital tax, which was originally motivated with the costs of the German re-unification. The first 972Eur/month (the double for couples) of net labour or capital income are free of solidarity surcharge. Any net income above this threshold is levied with the solidarity surcharge.

**Church Tax** (*Kirchensteuer*): Members of the catholic and protestant churches (and some smaller churches) pay this tax to finance their churches, which is collected by the government together with the income tax (respectively, the payroll tax and the withholding tax on capital income). The tax base is the income tax, which is used to apply a flat tax rate of 8% (in Bavaria and Baden-Württemberg) or 9% (in the other Federal States). Taxpayers can avoid paying the church tax by officially leaving church, which is why church tax may be regarded as voluntary. This is why church taxes have not been simulated in EUROMOD.

**Property Tax** (*Grundsteuer*): A tax on real estate (land and buildings), based on the assessed tax value. Property Tax A applies to agriculture and forestry, and Property Tax B applies to other property. The tax rate varies over municipalities, as they can levy their own tax multiplier. First, to calculate the uniform basic tax (*Steuermessbetrag*), the assessed tax value is multiplied by a basic federal tax rate (*Steuermesszahl*), which is 0.6% for Property Tax A and 0.35% for Property Tax B (there are reduced rates for one and two family houses, and different rates for the Eastern federal states because of a different data basis for the assessed tax values). Second, the municipality specific multiplier (*Hebesatz*) is applied to the uniform basic tax to yield the tax liability.

**Inheritance Tax** (*Erbschaftsteuer*): A tax on capital transfer in case of inheritance. Capital transfers between living persons are similarly taxed by the gift tax (*Schenkungsteuer*). There is a tax free allowance depending on who is the recipient, e.g. from 2009 on €500,000 for the partner and €400,000 for each child. There are also additional tax exemptions for business capital if the business (with its employees) is continued. Tax rates depend on the family relationship (partner, children, grandchildren, siblings, and other people) and are progressive in the tax base, with a minimum rate of 7% and a maximum rate of 50%.

**Motor Vehicle Tax** (*Kfz-Steuer*): Tax paid by owners of motor vehicles, depending on cylinder capacity and (since July 2009) carbon dioxide emissions. The minimum (maximum) value of the tax rate per 100 cm³ cylinder capacity was until June 2009 6.75€ (25.36 €) for an Otto engine and 15.44 € (37.58 €) for a Diesel engine. Since July 2010 owners of motor vehicles have to pay 2.00 € per 100 cm³ cylinder capacity for an Otto engine and 9.50 € for a Diesel engine plus a carbon dioxide emission surcharge that amounts 2.00 € per g/km for those, who have a motor vehicle with a carbon dioxide emission of over 120 g/km (110 g/km from 2012 on). Lorries and trailers are assessed on the basis of their maximum permissible gross weight.

**Corporate Tax** (*Körperschaftsteuer*): Tax on the income of corporations with a flat tax rate of 15% from 2008 on.

**Local Business Tax** (*Gewerbesteuer*): Both incorporated and non-incorporated business enterprises are liable to the local business tax, except for liberal professionals and farmers. This tax is the main source of revenue of German municipalities. Its tax base is primarily the enterprise's operating profit attributed to the local jurisdiction, augmented by certain fractions of interest and other financing expenses. Unincorporated firms benefit from an allowance of €24,500. Tax rates vary over municipalities, as the local jurisdictions apply their own multipliers (similarly to the Property Tax, see above). In 2007, the effective local business tax rates ranged from a minimum rate of 9 % to almost 20 %, the average rate was about 16 % (Fossen and Bach, 2008). In 2008, the basic federal tax rate (which serves as a basis before municipalities apply their multipliers) was reduced from 5% to 3.5%, while the tax base was broadened. Sole proprietors and partners of non-incorporated firms can credit at least parts of the local business tax against their personal income tax (PIT) liability, depending on the size of the multiplier. In 2008, about three quarters of unincorporated enterprises could credit their local business tax completely against the PIT (Bach, Broer, and Fossen, 2010).

### 1.5.2 Indirect Taxes

**Value Added Tax** (*Umsatzsteuer*/*Mehrwertsteuer*): Tax on almost all consumption expenses. Technically, it is collected from the enterprises selling goods and services. These enterprises can claim back the VAT paid for their inputs. The general tax rate is 19%. A reduced rate of 7% applies for most foodstuffs and certain other basic necessities, and since 2010 also for overnight stays in hotels.

**Other transactional taxes:** The real property acquisition tax (*Grunderwerbsteuer*) is a tax due when real property is transferred. The general tax rate is 3.5%, but the German states may choose different rates. The insurance tax (*Versicherungsteuer*) is a tax on insurance contributions or premiums except for statutory and private life and health insurance and statutory unemployment insurance. The tax rate is generally 19%; other rates apply for specific insurances. Further transactional taxes only have minor revenues.

**Excise taxes**: Specific taxes on the consumption or usage of certain goods. Most revenue is collected from the energy tax (*Energiesteuer*), which is a tax on all fossil and biological energy carriers, and the tobacco tax (*Tabaksteuer*). In

2012, the tobacco tax rate is 1.4 Cent per cigar, 9.26 Cent per cigarette plus 1.47% of the retail price of a cigar and 21.87%, respectively. Further excise taxes, like the beer tax (*Biersteuer*), are of comparably minor importance.

### 1.5.3 Scope and Scale

Direct taxes shall be grouped by function of the tax and the number of taxpayers, in proportion to the overall population, presented over time (see Table 11). It becomes apparent that income taxes (on total earnings) are paid by about 32% of the entire population only. Rates are lower even for other taxes. Local business taxes for sole proprietors are paid by less than 2% of the population, and inheritance taxes as well as gift taxes by less than 1% of the population.

Table 11. Taxes: taxpayers (as % of population per year)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Total population (million)** | 82.002 | 81.802 | 81.752 | 81.844* |
| as % of population | | | | |
| **Direct taxes** | | | | |
| Income tax (total earnings) [a] [**] | 31.60 | 31.70 | n/a | n/a |
| Local Business Tax (sole proprietors only)[b] | 1.80 | 1.80 | n/a | n/a |
| Inheritance Tax | 0.16 | 0.13 | n/a | n/a |
| Gift tax | 0.05 | 0.03 | n/a | n/a |

Notes: [a] Figures based on given tax information only for the year 2005.
[b] Figures based on given tax information only for the year 2004.
* Preliminary figure.
[**]Relative to total population, including children.
Source: Statistisches Bundesamt Deutschland; Statistical yearbook 2011 and 2012 (Statistisches Jahrbuch 2011/2012)

If total annual tax revenue is broken down by the most important single taxes, direct ones and indirect ones (see Table 12), it becomes apparent that the most important taxes with respect to revenue are payroll taxes (about 135bn euros in 2009) and value added taxes (142bn euros in 2009). Furthermore, relevant taxes are also import turnover taxes (35bn euros in 2009, up to 51bn in 2011), local business tax (32bn euros in 2009), energy taxes (40bn euros), assessed income taxes (26bn euros), and corporate income tax (7bn euros in 2009 but up to 16bn euros in 2011).

There are some dynamics in revenue apparent for some taxes over the recent four years. In particular, revenue from corporate income taxes has increased significantly from 7bn euros in 2009 to 16bn euros in 2011. Payroll taxes were decreasing slightly from 135bn euros in 2009 to 128bn euros in 2010, just to increase up to 140bn euros in 2011. A similar development is observed for import turnover taxes and assessed income taxes. Energy taxes have increased only marginally between 2009 and 2011.

Then, there are taxes of relatively minor relevance, such as tobacco taxes (13bn euros), solidarity surcharge (about 12bn euros), property taxes (11bn euros), motor vehicle taxes (4bn euros in 2009 and up to 8bn euros in 2011), insurance taxes (11bn euros), property transfer tax (5bn euros), and electricity taxes (6bn euros). Taxes with least relevance, according to revenue, are e.g. inheritance taxes (5bn euros), customs duties (4bn euros), taxes on spirits (2bn euros), gambling and lottery taxes (2bn euros), and coffee taxes (1bn euros).

Table 12. Taxes: Revenue

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Annual revenue (€-million)** | 524,000 | 530,587 | 573,371 | n/a |
| | | | | |
| **Direct taxes** | | | | |
| *Income tax* | | | | |
| Payroll tax (*Lohnsteuer*) | 135,165 | 127,904 | 139,749 | n/a |
| Assessed income tax (*veranlagte Einkommensteuer*) | 26,430 | 31,179 | 31,996 | n/a |
| | | | | |
| Not assessed income tax and tax on interest *(nicht veranlagte Einkommensteuer und Abgeltungsteuer)* | 24,916 | 21,691 | 26,155 | n/a |
| Corporate Tax | 7,173 | 12,041 | 15,634 | n/a |
| Local Business Tax *(gross)* * | 32,421 | 35,711 | 40,424 | n/a |
| Solidarity Surcharge | 11,927 | 11,713 | 12,781 | n/a |
| Property Tax A (from agriculture and forestry) | 356 | 361 | 368 | n/a |
| Property Tax B (other properties) | 10,580 | 10,954 | 11,306 | n/a |
| Inheritance Tax | 4,550 | 4,404 | 4,246 | n/a |
| Motor Vehicle Tax | 3,803 | 8,488 | 8,422 | n/a |
| | | | | |
| **Indirect taxes** | | | | |
| Property transfer tax | 4,857 | 5,290 | 6,366 | n/a |
| Value Added Tax | 141,907 | 136,459 | 138,957 | n/a |
| Energy tax | 39,822 | 39,838 | 40,036 | n/a |
| Tobacco tax | 13,366 | 13,492 | 14,413 | n/a |
| Beer tax | 730 | 713 | 702 | n/a |
| Electricity tax | 6,278 | 6,171 | 7,247 | n/a |
| Import turnover tax | 35,084 | 43,582 | 51,075 | n/a |
| Insurance tax | 10,548 | 10,284 | 10,755 | n/a |
| Customs duty | 3,604 | 4,378 | 4,571 | n/a |
| Fire brigade tax | 323 | 326 | 365 | n/a |
| Gambling and lottery tax | 1,511 | 1,412 | 1,421 | n/a |
| Tax on spirits | 2,101 | 1,990 | 2,149 | n/a |
| Coffee tax | 997 | 1,002 | 1,028 | n/a |
| Other indirect taxes (revenue) | 1,155 | n/a | n/a | n/a |

Notes: * Not taking into account that the local business tax is deductible from its own tax base.
Source: Statistisches Bundesamt Deutschland (2012); (Fachserie 14 Reihe 4) FS14 R4 year 2009-2011

# 2. SIMULATION OF TAXES AND BENEFITS IN EUROMOD

In this section, the simulation of taxes and benefits in EUROMOD, based on the regulations for Germany presented in Sections 1.3, 1.4, and 1.5, is described. Section 2.1 will open up providing an overview over all policies. The scope of simulation will be given and structural changes between the years will be highlighted. Then, in Section 2.3 the order of simulation and interdependencies between the policies are illustrated. Finally, in Sections 2.4, 2.5, 2.6, and 2.7 simulation issues related to the single policies will be treated in more detail.

## 2.1 Scope of Simulation

As a tax and benefit microsimulation model covering all EU member countries, the scope of EUROMOD must necessarily be limited to simulating policies, for which information provided in the data is sufficient to adequately

implement the single factors of relevance in the respective policy regulations. In the case of Germany, this does not hold for all policies presented in Sections 1.3, 1.4, and 1.5. The main limitations with respect to simulation of the tax and benefit rules in EUROMOD are related to insufficient information, such as the contribution history or the earnings history of the potential recipients of a benefit. E.g. for the simulation of contributory old age benefits information on the history of the individual is required. This data is indispensable for a proper simulation, and since it is missing in SILC no simulation of the respective policy is possible. Another example would be indirect taxes, which are as well beyond the scope of EUROMOD because of lack of information on expenditures in SILC.

Table 13 and Table 14 tabulate all policies that are relevant in the context of EUROMOD. They are relevant because they are either explicitly simulated in EUROMOD, or because they are not explicitly simulated, but implicitly, as they are interrelated to other policies that are either explicitly simulated or that are in turn interrelated to simulated policies. The most relevant variable in this context is income from employment and pensions. On the one hand, it is a function of some policies, such as social insurance contributions, simulated or not simulated, and on the other hand it is an input variable in certain simulated policies that condition eligibility on a means test. Such interdependencies are further treated in the next section. Firstly, all policies are categorized in Table 13and Table 14 into such that are simulated and such that are not simulated. For the latter, relevant information on the main limitations for simulation are provided.

Generally, most of the social benefits, which merely condition on a means test, are simulated, some with more or less restrictive assumptions (Table 13). More on these assumptions will be said in Sections 2.4, 2.5, 2.6, and 2.7. However, most of the contributory benefits, most of them relating to all kind of pensions, are not simulated, due to lack of sufficient information on the contribution history. Moreover, many benefits for sickness or disability are not simulated, as there is not enough information reported on the duration and type of sickness or injury, and on the degree of disability. Furthermore, the degree of loss of the earnings capacity in relation to injury or disability would be valuable information that is not sufficiently observed in the data.

Some policies could only partly be simulated, as some regulations are not simulated due to a lack of sufficient information in the micro data. Education benefits (BaFöG) belong to this group of policies. For students who do not live with their parents, there is a lack of information on income and wealth of their parents. Simplifying assumptions have though been made in order to also simulate education benefits for students living on their own. For students who do live with their parents this information is observed, or can be estimated.

Policies that are neither observed in the micro data nor simulated in EUROMOD are completely excluded from the model. Such policies from the statutory unemployment insurance are short-term work compensations, transfer short-term work compensations, seasonal short-term work compensations, insolvency benefits, as well as benefits for part-time unemployment, benefits for early retirement, benefits for business start-ups, and benefits for re-training. From the statutory accident insurance, the non-simulated benefits are injury benefits, sickness benefits for military people, and severance benefits. From the statutory pension insurance, these are child-care pensions and supplementary pensions for employees in public service. Then there are pensions from other institutions, e.g. pensions from employer schemes, and pensions from schemes for self-employed, freelancers, and farmers, which are also not simulated. Finally, there are public transfers to private households that are not included in the data, and hence excluded from EUROMOD, such as housing benefits, professional training benefits, subsidizations of private old-age pension savings, home-building allowances, building society premiums, and savings bonuses for employees.

Table 13. Simulation of benefits in EUROMOD

| Benefit | Variable name | Treatment in EUROMOD 2009 | 2010 | 2011 | 2012 | Main Limitations |
|---|---|---|---|---|---|---|
| Benefit for early retirement | byr | I | I | I | I | Data on contribution history & wage history |
| Unemployment benefit II | bunnc_s | S | S | S | S | Data on contribution history |
| Unemployment benefits I | bunct_s | S | S | S | S | Data on contribution history |
| Severance pay | ysv | I | I | I | I | Data on job termination |
| Benefit for business start-ups | bunot | I | I | I | I | Data on self-employed & their business history |
| Benefit for re-training | buntr | I | I | I | I | Data on unemployed; eligibility for re-training |
| Old-age pension (stat. pension ins.) | poass | I | I | I | I | Data on contribution & wage history |
| Old-age pension (employees) | poa00 | I | I | I | I | Data on contribution history |
| Old-age pension (foreign country) | poaab | I | I | I | I | Data on occupation in a foreign country |
| Old-age pension (self-employed) | poaps | I | I | I | I | Data on contribution history |
| Old-age pension (empl. pub. serv.) | poapu | I | I | I | I | Data on employment history |
| Old-age pension (civil servants) | poacs | I | I | I | I | Data on employment history |
| Orphan's pension | psuor | I | I | I | I | Data on biography; contributions of deceased |
| Survivor's pension | psuwd | I | I | I | I | Data on biography; contributions of deceased |
| Benefits for war victims | boawr | I | I | I | I | Data on participation in military services |
| Sickness allowances (priv hea. ins.) | bhlps_s | S | S | S | S | Data on employment history; sickness duration |
| Lt-care benefits (stat. acc. ins.) | bhlac_s | S | S | S | S | Data on employment history; injury |
| Sickness benefits (stat. health ins.) | bhl01 | I | I | I | I | Data on employment history; sickness duration |
| Disability pensions (civil servants) | pdiot | I | I | I | I | Data on employment history; injury |
| Pensions for reduced work ability | pdi00 | I | I | I | I | Data on employment history; injury |
| Pension (statutory accident ins.) | pdiss_s | S | S | S | S | Data on injury and remaining earnings capacity |
| Maternity-leave benefit | bmact_s | S | S | S | S | Data on contribution history |
| Parental-leave benefit | bplct_s | S | S | S | S | Data on employment history |
| Additional child allowances | bchot_s | S | S | S | S | |
| Child benefits | bch_s | S | S | S | S | |
| Social benefits (Sozialgeld) | bsaot | S | S | S | S | Simulated together with bsa00_s |
| Social assistance (Sozialhilfe) | bsa00_s | S | S | S | S | |
| Education benefits (BaFöG) | bed_s | PS | PS | PS | PS | Data on parents' income if living on their own |
| Basic old-age assistance | bsaoa_s | S | S | S | S | |
| Advances on alimony payments | bsaam | I | I | I | I | Data on alimony payments |
| Benefits from charity organizations | bsapu | I | I | I | I | Data on such payments |
| Housing Benefits | - | I | I | I | I | Detailed data on rent and heating expenses |
| Professional Training Benefits | - | E | E | E | E | Data on professional training & parental income |
| Subsidies for prv. old-age savings | - | E | E | E | E | Detailed data on savings |
| Home-building allowances | - | - | - | - | - | Data on housing purchases |
| Building society premiums | - | E | E | E | E | Detailed data on savings |
| Savings bonuses for employees | - | E | E | E | E | Detailed data on savings |

Notes: "-": policy did not exist in that year; "E": *excluded* from the model as it is neither included in the micro-data nor simulated; "I": *included* in the micro-data but not simulated; "PS" *partially simulated* as some of its relevant rules are not simulated; "S" *simulated* although some minor or very specific rules may not be simulated.

The simulation of taxes and social insurance contributions for Germany is limited in EUROMOD to direct taxes, i.e. the personal income tax and capital income tax, as well as mandatory contributions to the social security systems. Personal income taxation is treated in two different policies for individual and joint taxation, mainly for the sake of a clear representation. Capital income taxation is integrated into personal income taxation for the 2007 and 2008 systems, as capital was treated like any other income until 2009, except for a separate allowance. From 2009 on, capital income is simulated in a separate policy, as it is treated differently than other income from then on. More details will be presented in Section 2.6.

Social security contributions are differentiated by such contributions paid for by the employer, by employees, by self-employed, and by pensioners. Contributions paid for by the employer and by employees are simulated for regular, full- or part-time employment, as well as for marginal (or short-term) employment in the context of the so-called mini jobbers and midi jobbers, for which contribution rates differ. Contribution rates simulated for self-employed are restricted to pension insurance contributions for certain industries (education, health), where self-employed are obliged to contribute to the statutory pension insurance. For pensioners, only contributions to health insurance and long-term care insurance are relevant. More details will be presented in Section 2.5.

Table 14. Simulation of taxes and social contributions in EUROMOD

| Benefit | Variable name | Treatment in EUROMOD 2009 | 2010 | 2011 | 2012 | Main Limitations |
|---|---|---|---|---|---|---|
| **Income Taxation** | | | | | | |
| …Taxable Income | tin_s | S | S | S | S | |
| Individual Taxation | tinit_s | S | S | S | S | |
| Joint Taxation | tinjt_s | S | S | S | S | |
| Capital income taxation | tinkt_s | PS | PS | PS | PS | |
| **Social Insurance Contributions** | | | | | | |
| Employer | tscer_s | S | S | S | S | |
| to pension insurance | tscerpi_s | S | S | S | S | |
| to health insurance | tscerhl_s | S | S | S | S | |
| to long-term care insurance | tscerci_s | S | S | S | S | |
| to unemployment insurance | tscerui_s | S | S | S | S | |
| to accident insurance | tscerac_s | S | S | S | S | |
| Employee | tscee_s | S | S | S | S | |
| to pension insurance | tsceepi_s | S | S | S | S | |
| to health insurance | tsceehl_s | S | S | S | S | |
| to long-term care insurance | tsceeci_s | S | S | S | S | |
| to unemployment insurance | tsceeui_s | S | S | S | S | |
| to accident insurance | tsceeac_s | S | S | S | S | |
| Self-employed | tscse_s | S | S | S | S | Many social contributions for the self-employed are voluntary, and they are not observed. |
| to pension insurance | tscsepi_s | S | S | S | S | Pension insur. for self-employed is voluntary |
| Pensioner | tscpe_s | S | S | S | S | |
| to health insurance | tscpehl_s | S | S | S | S | |
| to long-term care insurance | tscpeci_s | S | S | S | S | |

Notes: "-" policy did not exist in that year; "E" policy is *excluded* from the model's scope as it is neither included in the micro data nor simulated by EUROMOD; "PS" policy is *partially simulated* as some of its relevant rules are not simulated; "S" policy is *simulated* although some minor or very specific rules may not be simulated.

## 2.2 Structural Changes between 2009 and 2012

Benefit rates for child benefits (*Kindergeld; bch_de*) were differentiated between the first three children and all other children until 2008. In 2009, an additional rate was introduced. From then on, rates were differentiated between the first two children, the third child, and all other children. In addition, in 2009 there was an add-on, to the general benefit rate, of 100 euros per child. This was abolished again in 2010. From 2012 on, the threshold on income earned by the child (which determines eligibility for child benefits) has been abolished and substituted by a limit on the hours worked by the child.

In 2009, there was a slight change in the benefit rate of education benefits (*BaFöG; bed_de*). From 2009, there exists an add-on to the general benefit rate for students with own children. If the recipient has an own child, aged younger than 10 years and living in the household of the student, the regular benefit rate is topped up by 113 euros. From the second child on, aged younger than 10 years, the top up is increased by an additional 85 euros. So, all in all, for the first child the top up is 113 euros and for a second child (and any further child), the top up is 198 euros.

Eligibility to sickness benefits (*Krankengeld; bhlps_de)* for self-employed was changed on 1 January 2009. Since January 2009, self-employed are only eligible to sickness benefits if they contribute to an additional health insurance, explicitly covering sickness benefits. In the simulations, the self-employed are covered until 2008, while from 2009 on, they have been excluded.

Regulations for the income allowance at the additional child benefit (*Kinderzuschlag; bchot_de*) were changed in 2009. On the one hand, the definition of income has been changed. Until 2008, parental leave benefits were not included in this income definition, while from 2009 on, they were included. On the other hand, the minimum income threshold for eligibility has been changed. Until 2008, the minimum income threshold that households need to pass to be eligible to the additional child benefits was a complex function of the needs of the parents and the children. The threshold used to vary with the number of children, the monthly rent, and for lone parents and couple parents. In 2009, this lower income threshold was replaced by a lump-sum amount of 600 euros per lone parent and 900 euros per couple. Also the fraction of own income that is withdrawn from the benefit amount was decreased in 2009, from 70% to 50%.

Taxation of capital income (*Kapitaleinkommensteuer; tinkt_de*) was changed on 1 January 2009. Until then, capital income taxation was treated like any other income, except for a separate allowance granted on income from capital. From 2009 on, capital income is taxed with a separate final withholding tax, with a flat tax rate of 25%, except for an allowance, which is different from the old one. It amounts to 801 euros per year for singles and 1,602 euros for married couples, which are exempt from capital income taxation.

In addition, from 2010 on there has been a significant change in the income tax deductions for old-age expenses. Under the new law, deductions of old-age expenses are made up of the sum of three components: one based on the contributions made to the pension insurance, one based on the contributions made to health and long-term care insurance, and one for pensioners. The first component is computed as follows: 70% of all contributions to the pension insurance (including those of the employer, but maximum 20,000Eur/year) minus the contributions of the employer are deductible. The second component consists of all contributions to health and long-term care insurance made by the employee (or self-employed, or pensioner – but not the employer!). The third component is for pensioners and is calculated in the following way: 50% of all social security contributions paid by the pensioner exceeding 4,402Eur/year are deductible.

## 2.3 Order of Simulation and Interdependencies (2009-2012)

Table 15 tabulates the order in which the single policies are simulated in EUROMOD. The order in which the policies are ranked in Table 15 equals the order in which they are simulated in the model. This order is mainly determined by interdependencies between the policies, as far as these could have been considered in the model. These interdependencies shall be briefly described in the following.

Minimum wage is simulated upfront. Right after, a preliminary simulation of contributory unemployment benefits is carried out. This enables to identify the recipients of disability benefits as individuals who are not working, do not receive unemployment benefits and do not actively search for a job. In turn, this allows simulating disability pensions, which enter the income base that determines the contributions to social security of pensioners. Next, contributions to social security systems are simulated. With the exception of the social security contributions of pensioners, these policies only condition on observed income from employment. In case minimum wage is switched on, it replaces observed employment income where relevant. The first social benefits simulated are child benefits. They are independent of any income or wealth. Then come the actual (final) simulation of contributory benefits from the unemployment insurance, i.e. unemployment benefits I, which are computed again from scratch, this time making use

of the information about social security contributions generated previously. By their contributory nature, they condition on income in past periods, but not on income in the current period.

Then come two benefits that do not condition on any of the benefits simulated so far, but that are themselves an input into benefits simulated at a later stage. Education benefits condition on income and wealth of the students as well as their parents, where observed current income is applied. Long-term care benefits from the statutory accident insurance condition on other demographic variables that are exogenous to simulation, such as health status. Sickness benefits are a function of unemployment benefits I when benefit levels are calculated.

Then, unemployment benefits II, the first means-tested benefit, are simulated. They are non-contributory benefits, conditioning eligibility on a means test, for which all benefits simulated earlier are an input, and on ability to work. Thereafter, maternity leave benefits and parental leave benefits are simulated. They are a function of employment income as well as unemployment benefits.

Table 15. EUROMOD Spine: Order of Simulation, 2009-2012

| Section | Policy | Description | Main output |
|---|---|---|---|
| (2.4.1 | takeup_de | Correction of take-up of several social benefits*(switched off in the baseline for all years)* | temp_rand) |
| 2.4.2 | minwage_de | Minimum hourly wage *(switched off in the baseline for all years)* | yem |
| 2.4.4 | bunct_de | Unemployment benefits I (ALG I) *(1st run - bunct_s used to simulate pdiss_s)* | bunct_s |
| 2.4.5 | pdiss_de | Disability pension from stat. acc. insurance (Rente gesetzliche Unfallversicherung) | pdiss_s |
| 2.5.1 | tscer_de | Employer social insurance contribution | tscer_s |
| 2.5.2 | tscee_de | Employee social insurance contribution | tscee_s |
| 2.5.3 | tscse_de | Self-employed social insurance contribution | tscse_s |
| 2.5.4 | tscpe_de | Pensioner social insurance contribution | tscpe_s |
| 2.4.3 | bch_de | Child benefits (Kindergeld) | bch_s |
| 2.4.4 | bunct_de | Unemployment benefits I (ALG I) *(2nd run - pdiss_s and tscpe_s are simulated and bunct_s can be now simulated as well)* | bunct_s |
| 2.4.6 | bed_de | Education benefits (BaFöG) | bed_s |
| 2.4.7 | bhlac_de | Long-term care benefits from statutory accident insurance (Pflegegeld) | bhlac_s |
| 2.4.8 | bhlps_de | Sickness Benefits (Krankengeld) | bhlps_s |
| 2.4.9 | bunnc_de | Unemployment benefits II and social benefits (ALG II und Sozialgeld) | bunnc_s |
| 2.4.10 | bmact_de | Maternity leave Benefits (Mutterschaftsgeld) | bmact_s |
| 2.4.11 | bplct_de | Parental leave Benefits (Elterngeld) | bplct_s |
| 2.4.12 | bsaoa_de | Old-age social assistance (Grundsicherung im Alter) | bsaoa_s |
| 2.4.13 | bsa00_de | General social assistance (Sozialhilfe) | bsa00_s |
| 2.4.14 | bchot_de | Additional child benefits (Kinderzuschlag) | bchot_s |
| 2.7 | tinkt_de | Capital income taxation (Kapitaleinkommensteuer) | tinkt_s |
| 2.6.1 | tin_de | Personal income taxation (taxable income) | tin_s |
| 2.6.2 | tinit_de | Personal income taxation (individual taxation) | tinit_s |
| 2.6.3 | tinjt_de | Personal income taxation (joint taxation) | tinjt_s |

Notes: Policies are simulated in the order in which they are listed in this table. Section refers to the section of this report, in which the simulation of the respective policy is described in more detail.

Finally, means-tested social benefits that have the scope to secure a minimum income are simulated. These are old-age social assistance, general social assistance including social benefits for children, and additional child benefits. All these benefits condition eligibility on disposable income after all other benefits are considered, especially after unemployment benefits II are considered. They mainly cover those individuals that are not eligible to unemployment benefits II because they are permanently not able to work a minimum number of hours per day, either because they are disabled, or because they are permanently injured, or because they are too old.

Taxation is simulated at the very end of the spine. Thereby, all benefits can be considered in the simulation of personal income taxation. This is necessary because some benefits belong to taxable income, while other benefits are excluded from the calculation of taxable income, but are considered at the determination of the relevant tax rate (progression clause). As a result, almost all benefits simulated are considered at income taxation.

## 2.4 Social Benefits

In the following, issues relevant for the implementation of the simulations for the social benefits will be listed. These are related to rules for eligibility (e.g. income or wealth limits) and contribution (e.g. benefit is non-contributory), classification of recipients (e.g. individuals or households), and determination of benefit duration and levels (e.g. 67% of previous earnings, a minimum of 300 euros per month, for a time of two years at maximum).

### 2.4.1 Correction of Take-up of Social Benefits

In the EUROMOD simulations, it is per default assumed that all individuals or households who are eligible for a particular social benefit actually go to the welfare offices and fully take up the simulated benefit amount. However, there is substantial empirical literature that finds evidence against full take-up of social benefits, inter alia for reasons of stigma. See for example for Germany, the recent study by Bruckmeier and Wiemers (2011) who find evidence for significant non-take-up of social assistance, evaluated for the new system of social assistance, after the significant reforms of 2005.

Thus, the policy takeup_de has been implemented to allow for corrections to the default assumption of full benefit take-up of social assistance benefits. This policy is kept switched off in the baseline simulations for all policy years. The reason is that the present model yields simulated number of recipients of social benefits that fit almost perfectly the figures provided by official statistics. However, if a user is interested in implementing a non-full take-up of social assistance benefits and comparing the results from different scenarios of take-up, this is enabled by the respective policy.

For further details on the correction of take-up of social benefits, please see EUROMOD Country Report for Germany (2012).

### 2.4.2 Minimum Wage (*minwage_de*)

There was no economy-wide general minimum wage in Germany between 2009 and 2012. The simulation of a minimum wage in EUROMOD is switched off in the baseline scenario for all years. When switched on, a parameter for an hourly minimum wage, valid for all employees, must be specified. The policy then simulates minimum earnings based on the minimum wage and assigns the greater of minimum wage and actual earnings to the individual, for all months in the base year in which the individual was employed.

### 2.4.3 Child Benefits (*bch_de*)

Child benefits are monthly non-means-tested non-taxable benefits paid to families with dependent children below an age limit. Benefit levels depend on how many children there are in the household.

- **Definitions**

The unit of analysis is the family. Families include couples and their own, as well as loose dependent children. Dependent children are biological, adopted, or foster children who live in the same household with their parents.

- **Eligibility Conditions**

There are two groups of eligible children.[4] 1) Generally, eligible children can at maximum be aged 17. 2) The age limit is extended to 24 in case children are still in tertiary education and, until 2011, in case their income did not exceed a threshold (see Income Test). In 2012, the income limit has been replaced by a limit on hours worked by the child. If the child is disabled, and has been disabled since the age of 24 at least, no age limit applies. In case of parents living separately, the one with whom the child stays most of the time, or the one who bears the larger share of the maintenance, receives the benefits.

- **Income Test**

Until 2011 (included), an income test is applied if, and only if, the child was 18 or older and not disabled. If in this case the child was still in education (*dec>0*) and has own income, the child's original income (*ils_origy*) was not allowed to exceed a threshold of 640€ per month to be eligible for child benefits. This threshold was increased to 667 euros in 2010 and stayed the same in 2011. The same threshold applies if children do not live with their parents.

- **Benefit Amount**

The benefit is paid monthly to one of the parents. In 2009, the amount was 164 (184 from 2010 on) euros for the first two children, 170 (190) euros for the third child, and 195 (215) euros for the fourth and all following children. In addition, in 2009 there was an add-on, to the general benefit rate, of 100 euros per child per year. This was abolished again in 2010.

- **EUROMOD Notes**

It is assumed that disabled children have been disabled since the age of 24 at least. Means tests and benefit assignment are simulated separately for children living with their parents and children living on their own. For children not living with their parents, it is assumed that they are first, second, or third child. For them, eligibility is not limited to single or couple households. They may rather have their own children who are eligible to child benefits, too.

### 2.4.4 Unemployment Benefits I (*bunct_de*)

Unemployment benefits I are contributory benefits, which means that eligibility and benefit amounts depend on the amount and time for that contributions were made. As contributions are not observed in the data, they are approximated by observed information.

- **Definitions**

Approximation of contribution history is applied differently for three groups: 1) those who are currently employed and not in receipt of unemployment benefits I, 2) those currently unemployed and in receipt, and 3) those unemployed, but not in receipt. Unit of analysis is the individual.

- **Eligibility Conditions**

Unemployed individuals, under the age of 65, who are generally able to work at least 15 hours per week, are entitled to unemployment benefits I in case they contributed to the unemployment insurance for at least 12 months within the two years preceding the unemployment spell, meaning they were employed during that time.

- **Income Test**

Unemployment benefits I are contributory benefits. There is no income or wealth test, in the sense of a means test, to these benefits. But see the restrictions for additional earnings from employment under Benefit Amount.

[4] Strictly speaking eligibility is related to the parents, not to the children. However, we will be speaking of eligible children, as it effectively makes no difference, given the eligible criteria are related to the children, and in the simulation benefits are first assigned to the children, too, and later aggregated at household level and assigned to the head.

- **Benefit Amount**

They amount to 60% of previous net earnings for childless individuals and to 67% for individuals with at least one child in terms of income tax law. Recipients are allowed to work up to 15 hours per week to top up benefits. Earnings from employment of up to 15 hours per week reduce the amount of benefits paid; an allowance for earnings of 165 euros per month is granted. 165 euros per month can be earned in addition to the benefit without reductions. Earnings above this allowance reduce the benefit level.

- **Benefit Duration**

The duration of entitlement to "unemployment benefits I" depends on the individual's age and number of months contributions were made in the previous 2-3 years. Generally, contributions made for 12 months entitle to six months of benefits, whereas benefits are paid for a maximum of 12 months for individuals who paid contributions for 24 months. People aged between 50 and 55 are eligible to a maximum of 15 months benefit receipt for 30 months of contributions. For individuals who are aged 55 or older, 16 months of contributions entitle to 8 months of receipt, 20 months of contributions entitle to 10 months of receipt, and 36 months of contributions entitle to 18 months. People aged 58 or older are entitled to 24 months of benefit receipt in case they contribute for 48 months.

- **EUROMOD Notes**

The main limitation for simulation of contributory unemployment benefits is the fact that the contributions history is not observed in the data. Thus, contributions made have been approximated with the number of months ever employed (*liwwh*). Benefit duration is imputed according to the number of months ever in work and the rules for duration (see Benefit Duration). All those with 36 months and more, who are aged 55 and older, get the maximum duration of 18 months imputed. However, as duration is only simulated for one year, months of entitlement are capped at the observed number of months spent in unemployment (or the number of months benefits were received, in case this is larger).

Then, the contribution history is simulated for three groups of potential recipients. Generally, observed months contributed (*liwmy*) are aggregated up over the entire qualifying period (24 months). 1) For those employed, not in a spell, and not in benefit receipt (*ils_earns>0 & lunmy_s=0 & bunct=0*), aggregated observed months are applied. This means it is assumed that they have contributed, i.e. they have been employed, over the entire last 24 months. 2) For those unemployed, currently in a spell, and in receipt (*lunmy_s>0 & bunct>0*), it is assumed that they contributed the minimum requirements for any receipt (i.e. 12 months), or more if observed so. 3) For those unemployed, currently in a spell, but not in receipt (*lunmy_s>0 & bunct=0*), it is assumed that they have not contributed the minimum requirements for any receipt and they get zero months imputed.

Then, there is a toggle, which is switched off in the default simulation. If it is switched on, replacement rates are simulated, i.e. the duration of the spell is imputed for two groups. 1) For those employed and not in benefit receipt (*ils_earns>0 & bunct=0)*, the spell is assumed to equal the observed months in work (*liwmy*). 2) For those unemployed and in receipt (*ils_earns=0 & bunct>0)*, it is assumed that the spell equals the observed spell. By default, the toggle is switched off and observed months in spell are applied for spell duration in simulation.

Based on simulated contribution histories and spell durations, benefit amounts are simulated. Eligibility in general is conditioned on minimum contributions (*liwmy_s*), age in band of minimum 18 and maximum 65, no receipt of old-age pensions (*poa*), no self-employed, and a maximum of 15 hours worked per week (*lhw*). Now the entitlement basis is applied. As it is not observed, a proxy for it, which has been generated by inverting the benefit function for several contributory benefits, is applied (*il_ntpy*, also see Section 3.4.4). This proxy is applied for all individuals.

Based on the entitlement basis, the thresholds for additional earnings from employment are considered. For those individuals earning less than the threshold (165 euros per month), the benefit amounts results from applying the respective benefit rate (60% for the childless and 67% for parents) to the entitlement basis. And, for those who earn more than the threshold, income exceeding the threshold is withdrawn. Finally, simulated benefit amounts are averaged per month, applying the simulated spell duration in months (*bunmy_s*).

### 2.4.5 Disability Pension from the Statutory Accident Insurance (*pdiss_de*)

Individuals insured in the statutory accident insurance – these are all employees -- are eligible to disability pensions from the statutory accident insurance if consequences of an accident severely reduce their earnings capacity. Contributions are paid for by the employers.

- **Definitions**

In case of a loss of the entire earnings capacity, a pension is paid that amounts to two thirds of annual individual earnings. This is assumed to be the case if individuals for whom benefit receipt is observed (*il_ntpy>0*) work zero hours per week (*lhw=0*). For those in receipt who work non-zero hours (*lhw>0*), the earnings capacity is assumed to be only partly reduced, according to the level of *lhw*. Unit of analysis is the individual.

- **Eligibility Conditions**

Recipients should fulfil the following conditions: not to be civil servants, have some level of disability, and have some working history (*liwwh>0*). Moreover, they should not be actively looking for a job (*lowas=0*), have no receipt of unemployment benefit I (*bunct_s=0*) and they should have been inactive/retiree/disabled for at least one month during the observed year (*pdimy>0*). It is assumed that they suffer from reduced earnings capacity due to an accident if the above mentioned criteria are fulfilled. Conditioning on the working history (*liwwh>0*) is a proxy for eligibility to disability pensions. It is assumed that individuals who have ever worked before have been insured by the statutory accident insurance right before the spell started.

- **Income Test**

Disability pensions are contributory benefits. There is no income or wealth test, in the sense of a means test, to receipt of these benefits.

- **Benefit Amount**

The amount of disability pensions from the statutory accident insurance depends on the degree of reduction in ability to work. This degree of reduction shall be approximated by the number of weekly hours a recipient works, while in receipt. If this is zero hours (*lhw=0*) the earnings capacity is assumed to be reduced entirely and eligible individuals receive a full pension of 67% of their entire previous-year net employment income. If they work non-zero hours (*lhw>0)* the earnings capacity is assumed to be only partly reduced and a partly pension is paid in accordance to the remaining level of earnings capacity (factor of *1-lhw/30*). It is assumed that 30 hours and more (*lhw=>30)* is full-time work, which means that recipients working 30 hours or more per week are assumed to have unaffected earnings capacity and receive a pension of zero. Furthermore, levels for the full and the partly pension are adjusted according to benefit duration, which has been approximated by the number of months recipients report to have been inactive/retiree/disabled during the observed year (*pdimy)*.

- **EUROMOD Notes**

The main problem when simulating contributory disability benefits from the statutory accident insurance is that neither the contribution history, nor the entitlement basis that determines the benefit amount, nor the degree of disability, are observed in the data. While the contribution history and the disability level have been approximated with the help of other observed information, for the entitlement basis, more needs to be done. Pre-spell net employment income has been approximated by inverting the benefit function for several contributory benefits (*il_ntpy*, also see Section 3.4.4).

### 2.4.6 Education Benefits (*bed_de*)

Education benefits are means-tested benefits for students entering higher education according to the German law for education, "*Bundesausbildungsförderungsgesetz* (*BaFöG)*".

- **Definitions**

The means tested refer to income and wealth of the students as well as their parents, and the number of students in the household who are eligible to education benefits. The unit of analysis thus is the individual as well as the household.

- **Eligibility Conditions**

All students entering higher education before the age of 30 are generally eligible to education benefits.

- **Income Test**

Education benefits are means-tested benefits. The benefit level depends on income and wealth of the recipient as well as on income of the recipient's parents and spouse. Moreover, it depends on the presence of siblings in the household as well as their age and income. The relevant income is generally the individual taxable income (*il_taxy*, added income from capital), added widows' and orphans' pensions, minus an allowance for taxes and social security contributions, minus an allowance for income-related expenses. The allowance for taxes and social security contributions differs for students and their parents. For students, it is assumed that they are not compulsorily insured by the statutory pension insurance, so that the allowance for them amounts to 12.9% of their taxable income. For their parents, it is however, assumed that they are insured by the statutory pension insurance, so that the allowance for them amounts to 21.5% of their taxable income. If actually paid taxes and social security contributions (*tis*) exceed this allowance, the actually paid amount is applied. It is however capped by a maximum amount, which is 5,100 euros per year for students and single parents, and 10,400 euros per year for couple parents. The allowance for income-related expenses corresponds to the allowance from personal income taxation (920 euros per year, see Section 2.6.1).

There are moreover lump-sum allowances on own income and parents' income. If the parents of the recipient are married, the income allowance for them is up to 1,440€ per month. For single parents, or parents married who live with a partner (not the mother or the father of the recipient), the allowance is 960€ per month. Moreover, the amount of 435€ per month is added to the income allowance of the recipient's parents for each non-eligible sibling. The student's own income allowance is 215€ per month, plus 435€ for each own child. These allowances reduce the relevant income of the recipients, their parents, and their partners. Incomes of parents and partners of married spouses, after accounting for all allowances, are considered at the benefit amount with 50% of the income only.

In addition, there is a wealth test. Wealth holdings, after subtracting allowances, are generally subtracted from the benefit amount. The assets allowance for single students amounts to 5,200€, and for a married student to 7,000€, plus 1,800€ for each own child.

In 2010, the amount of exemption for the parental income and for the recipient's income was raised. The amount of exemption for parental income (for married couples) was 1,555 euros in 2009 and was increased to 1,605 from October 2010 on. For recipients' income, the exemption amounted to 255 euros in 2009.

- **Benefit Amount**

The basic amount for students who do not live with their parents was 512 euros in 2009. This basic benefit rate is reduced if income exceeds the income thresholds (see Income Test). This basic rate includes allowances for housing expenses. The rate for housing expenses depends on the living conditions. Students living with their parents get the minimum housing rate (48 euros in 2009), while students living on their own get an increased rate (146 euros).

If actual rental costs exceed this allowance, the exceeding part, including heating costs, is covered partly (up to a maximum of 72 euros in 2009). For recipients aged 25 and older, the basic rate is topped up by a lump-sum social insurance rate (64 euros in 2009).

High school students do not need to repay any of the benefits. However, university students get half of the benefits in form of an interest-free loan that has to be paid back under certain conditions after education is finished.

From 2009, there exists an add-on to the general benefit rate for students with children. If the recipient has an own child, aged younger than 10 years and living in the household of the student, the regular benefit rate is topped up by 113 euros. From the second child on, aged younger than 10 years, the top up is increased by an additional 85 euros. So, all in all, for the first child the top up is 113 euros and for a second child (and any further child), the top up is 198 euros.

- **EUROMOD Notes**

Education benefits for students are granted for two groups of students in Germany. The first group still lives with their parents. For this group, the relevant information for determining eligibility is (partly) observed, or can be estimated, i.e. their parents' income and wealth. The second group of students does not live with their parents. This group amounts to 70% of all recipients of education benefits (Source: Statistisches Bundesamt). For them, relevant information on income and wealth of their parents is not observed. This information, however, is crucial for determining eligibility, as for many applicants eligibility is rejected because their parents have income and/or wealth above the thresholds. Therefore, income and wealth of parents for this group of students has been imputed. This is an imputation of a mean income. The imputed income is the mean after-SSC market income of married couples, aged between 44 and 57 (which is the mean age of parents with kids older than 18 +/- one SD), living in a two-person household, as observed in the EU-SILC micro data for Germany. It amounts to 4,504 euros in 2009, and 4,555 euros in 2010, and it has been indexed to CPI from there on.

At the income test, also assets of the recipients and their parents are relevant. Observed financial assets (*afc*) have been applied for this means test. The stock of assets that remains after applying all allowances has been averaged to a month (*afc*/12) in order to account for asset liquidations and make it comparable to monthly incomes. Housing expenditures have been accounted for at the means test (*xhcrt*, also see Section 3.4.6).

For the additional housing expenses that exceed the lump-sum rental allowances, heating costs are added to the actually paid rental costs (*xhcrt*), and they are added to the benefit amount up to a maximum amount. The heating costs applied are average heating costs, over household size, taken from the national microsimulation model for Germany, which is based on SOEP data, similarly as at *bunnc_de* (average heating costs amount to 104 euros in 2008, and have been kept constant from there on).

### 2.4.7 Long-Term Care Benefits from Statutory Accident Insurance (*bhlac_de*)

Long-term care benefits from the statutory accident insurance are contributory benefits that depend on the employment history of the individual (eligibility) and the degree of injury.

- **Definitions**

Degree of injury is measured in eight categories, i.e. 100% injury, 80%, 70%, 60%, 50%, 40%, 30%, and the minimum 25%. The unit of analysis is the individual.

- **Eligibility Conditions**

Eligible individuals need to be insured in the statutory accident insurance. This is the case for all employees. Employers pay their contributions. Thus, it is checked in the simulation whether individuals have ever been in work before the spell (*liwwh>0*), and it is assumed that this is a sufficient condition for eligibility. In addition, civil servants are not eligible, as they are not insured in the statutory accident insurance, but they rather have their own insurance system.

- **Income Test**

Long-term care benefits are contributory benefits. There is no income or wealth test, in the sense of a means test, to these benefits.

- **Benefit Amount**

Taking into account the degree of injury, the monthly benefit amount is determined by the percentage value of injury (see Definitions) times the maximum benefit amount. In 2009, the maximum amount was 1,186 euros per month in West Germany (1,228 and 1,240 from 2010 and 2012 respectively) and 1,029 euros in East Germany (1,075 and 1,086 from 2010 and 2012 respectively). Thus, the benefit amount in the West lies between 297 (307; 310) euros (25% of maximum amount) and 1,186 (1,228; 1,240) euros (maximum amount), and in the East between 257 (269; 272) euros and 1,029 (1,075; 1,086).

- **EUROMOD Notes**

As the degree of injury is not observed, benefit amounts are simulated differently for two groups: those in receipt and those eligible but not in receipt. This is necessary because the observed benefit amounts (*bhlac*) have been disaggregated and thereby imprecision leads to underreporting of the benefits. As a result, the number of recipients of these benefits in the micro data (*bhlac*) aggregates up to only about 57% of the number of recipients in the population from official statistics. In order to correct for this disaggregation error, receipt is also simulated for non-recipients.

For those in receipt, the degree of injury (*ddilv*) is inferred from inverting the benefit function based on the observed amount (similar to the entitlement basis, see Section 3.4.4), and the respective benefit amount is simulated. For those not in receipt, but eligible because they have been in work before the spell (*liwwh>0*), and because they report to be currently sick or disabled (*les=8*) and work zero hours (*lhw=0*), the minimum degree of injury (25%) is assumed and minimum benefits are imputed. The restriction on zero hours (*lhw=0*) is applied to help identify eligible individuals, as long-term care benefits from the statutory accident insurance are really only paid if individuals are severely injured and cannot help themselves any more.

As there is no regional information available in the micro data for Germany, an average maximum benefit amount is assumed for all recipients at the simulation. This average is a weighted average of the maximum rates for the East and the West. The weights are the respective population shares for the East (0.2152) and the West (0.7848) in 2009. The resulting average minimum benefit amount is 350 euros per month (359 and 362 from 2010 and 2012 on), and the respective maximum amount is 1,165 euros (1,195 and 1,207 from 2010 and 2012 on).

### 2.4.8 Sickness Benefits (*bhlps_de*)

Individuals insured by the statutory health insurance are entitled to sickness benefits (*Krankengeld der gesetzlichen Krankenversicherung*). Individuals privately insured can contribute to an additional insurance that entitles them to sickness benefits, too (*private Pflegezusatz- und Krankentagegeldversicherung*).

- **Definitions**

All individuals who are not civil servants are assumed to be insured either in the statutory or in a private health insurance, depending on their income. It is assumed that all individuals, for whom private insurance is simulated, also contribute to this additional health insurance. Civil servants are not entitled to these sickness benefits, as they are covered by a separate system. Unit of analysis is the individual.

- **Eligibility Conditions**

Individuals need to fulfil the status of sickness, which is checked for in the simulation by conditioning on the variable for economic status (*les=8*), i.e. individuals report being in the status “sick or disabled”. They should not be civil servants, and they should be employed for less than 12 months during the observed year (*liwmy<12*), which is supposed to indicate that there is a relevant spell of sickness. They are further categorised in either statutory or private health insurance, in self-employed and not self-employed, and in employed or unemployed. Eligibility for self-employed was changed on 1 January 2009. Since January 2009, self-employed are only eligible to sickness benefit if they contribute to an additional health insurance, explicitly covering sickness benefits.

- **Income Test**

Sickness benefits are contributory benefits. There is no income or wealth test, in the sense of a means test, to these benefits. However, assignment to statutory and to private health insurance is determined by pre-spell after-social-contributions income from employment (*il_ntpy*, also see Section 3.4.4) and the threshold for statutory health insurance.

- **Benefit Amount**

The benefit amount depends on the type of health insurance, statutory or private, and on the benefit entitlement basis, which is previous-year after-social-contributions income from employment. The minimum benefit rate for the statutory health insurance is 70% of the entitlement basis, and for the private health insurance it is 80%. This minimum rate applied to the benefit entitlement basis determines the benefit level.

The resulting benefit amount moreover differs for those employed and those unemployed. It is also different for the self-employed. Generally, the health insurance has to pay the employee share of social security contributions on the benefit amount. For those who are not self-employed, contributions to statutory pension insurance for employees (9.95%), to long-term care insurance (0.85%), and to unemployment insurance (2.10%) are paid and thereby reduce the benefit amount. For the self-employed, only contributions to statutory pension insurance are subtracted, however, the entire rate assuming the self-employed have to pay the employer's share as well (19.9%). For the unemployed, the social security contributions are covered by the health insurance, and thus benefit amounts are not reduced.

- **EUROMOD Notes**

Severity of the illness is not observed. Thus, for all entitled individuals only the minimum benefit level (70% for statutory health insurance and 80% for private health insurance) is assumed. The benefit entitlement basis is approximated differently for those employed and for those unemployed. For those employed, i.e. those who are not in receipt of unemployment benefits I (*bunct_s=0*), the general proxy for pre-spell income is applied (*il_ntpy*, also see Section 3.4.4). For those in receipt of unemployment benefits I (*bunct_s>0*), it is assumed that this is receipt equals the entitlement basis and it is applied to determine the benefit amount.

Due to the change in eligibility for the self-employed, in the simulations, the self-employed have been excluded from 2009 on.

### 2.4.9 Unemployment Benefits II and Social Benefits (*bunnc_de*)

Unemployment benefits II are means-tested benefits to cover the needs of people who are not employed and not in receipt of contributory unemployment benefits. In addition, social benefits are supposed to capture people who live together with recipients of unemployment benefits II but who are themselves not eligible to them, typically children, in order to cover their needs as well.

- **Definitions**

Unemployment benefits II are means tested with respect to income and wealth. Means are determined by the needs of the entire household (*Bedarfsgemeinschaft*). The unit of analysis thus is the household.

- **Eligibility Conditions**

All individuals aged 15 or older, but younger than 65, who are able to work for at least three hours per day are eligible for "unemployment benefits II". Students eligible to education benefits and old-age pensioners are not eligible. Unemployment is no requirement for entitlement, and there is no limitation for the hours worked. However, unemployment benefits I may be received at the same time. Children need to be aged younger than 14, or younger than 18 and permanently unable to work, to be eligible to social benefits. They need to live in households receiving unemployment benefits II.

- **Income Test**

Unemployment benefits II are means tested with respect to income and wealth of the entire household. This means that the household's income and wealth are considered for the determination of needs, except for some allowances. This is usually done by a means test with regard to income and wealth. The amount of exemption for wealth for those born after 1948 consists of a basic allowance of 750€ plus 3,100€ per child and plus the minimum of 9,750€ and the maximum of 150€ multiplied by the recipient's age and 3,100€. These rates have been constant over the years 2009 to 2012. The composition of the exemption changes for those born before 1948. For them, it amounts to a basic allowance of 750€ plus 3,100€ per child and plus the minimum of 33,800€ and the maximum of 520€ multiplied by their age and 3,100€. Depending on the number of household members the income threshold per month is calculated by the amount of the basic rates and the monthly rent including heating, with regard to household composition.

While the household's income and wealth are generally considered for the determination of needs, there are allowances granted, for income from employment. Benefits are unaffected by an additional (gross) employment income of 100 euros per month. Employment income between 101 and 800 euros (101 and 1,000 from 2012 on) reduces benefits at a rate of 80%, income between 800 and 1,200 euros (1,000 and 1,200 from 2012 on) at a rate of 90% (1,500 euros for households with children), and income above 1,200 euros is deducted at 100%. The allowance for wealth depends on the age of the adults in the household; a minimum allowance of 4,100 euros (3,100 euros since 2010) and a maximum allowance of 13,000 euros are granted.

For each child younger than 18, a wealth allowance of 4,100 euros (3,100 euros since 2010) is granted. Since mid-2010, for individuals born before 1 January 1958, a maximum allowance of 9,750 euros is granted, for those born between 1958 and 1963, 9,900 euros, and for those born between 1964 and 1993, 10,050 euros are granted.

For social benefits, the same income test as for unemployment benefits II applies.

- **Benefit Amount**

The resulting amount of benefits is determined by the number of adults and children in the household, where for the latter their age is of relevance. The basic benefit rate, which is relevant for a single household, was 351 euros per month in 2009, 359 euros in 2010, 364 in 2011, and 374 euros in 2012. In case of two adults in an eligible household, each adult older than 25 years is entitled to 90% of the basic rate. Each child aged 15-25 and able to work is entitled to 80%, and each child younger than 15 to 60% of this rate. In addition to the basic benefits, costs for housing and heating, up to a maximum amount, which depends on the size of the household, are covered in the context of "unemployment benefits II". These maximum amounts are closely aligned to the benefit rates from housing benefits. Moreover, contributions to statutory health and old-age pension insurances are paid. Benefit amounts for social benefits depend on the age of the children, and are a fixed age-dependent fraction of the regular benefit rate for unemployment benefits II.

- **EUROMOD Notes**

The income of the household that is relevant for the means test is disposable household income (*il_dispyb*), including market income from employment, pension income, and generally all benefits, except for social assistance, are considered, accounting for social security contributions, but before deduction of income tax, which is simulated at the very end of the spine.[5] The relevant disposable income excludes benefits and pensions that are not primarily supposed to cover basic needs (*bhlac_s; bhlps_s; pdiss_s; pdi00; pdiot; psuwd; psuor; boawr*). However, the income that is relevant when determining the amount of additional earnings from employment a recipient has earned is gross earnings income (*ils_earns*), where the allowances account for the respective social security contributions the recipient has paid.

[5] Here, all benefits that are simulated earlier in the spine than unemployment benefits II are applied in the simulated amount, while relevant benefits that are simulated later in the spine (*bmact_de, bplct_de, bchot_de*), or not simulated at all (*ils_pen, byr, ysv, bho, bunot, buntr*), are applied in its observed amount.

The rent that is covered in the context of unemployment benefits II is assumed to be the actual rent that is reported, but imputations have been made (*xhcrt*, also see Section 3.4.6). The maximum rents covered have been closely aligned to benefit rates from housing benefits. Calculation of maximum rents is taken from the national tax and benefit microsimulation model for Germany, which is based on SOEP data.[6] Average maximum amounts, differentiated by household size, have been applied from the national model. The maximum rent covered, excluding heating costs, amounts to 262 euros per month for a single-person household (343 for a two-person household, 4,070 for three persons, 474 for four, and 541 for five and more persons).

Heating costs have also been applied from the national model, where they have been applied from the SOEP data and estimated from household size, flat size, and region for households not reporting them. Average heating costs by household size are applied. They amount to 74 euros per month for a single household in 2009 (96 euros for two persons, 104 for three, 116 for four, and 143 for five and more persons). These amounts have been kept constant over the last years.[7]

The total amount of housing costs that is covered in the context of unemployment benefits II results from actually paid rents (*xhcrt*), up to the respective maximum amount, added the lump-sum allowance for heating costs. This maximum housing allowance also applies identically to old-age assistance (*bsaoa_de*) and to general social assistance (*bsa00_de*).

Observed financial assets (*afc*) have been applied for the means test on wealth. The wealth test is passed if household financial assets are zero after accounting for all wealth allowances. If the wealth test is not passed by the household all its members are assumed to be not eligible to unemployment benefits II. This wealth test is applied in the same way to *bsa00_de* and *bsaoa_de*. Note that it differs from the wealth applied to education benefits (*bed_de*), where the residual wealth holdings, after allowances have been accounted for, do not affect eligibility directly, but reduce the benefit amount.

At social benefits, eligibility is conditioned on receipt of unemployment benefits II. These households can have a member with income from employment (*yem>0*), because social benefits are dedicated to children who have no income from employment (*yem=0*) and live in households receiving unemployment benefits II (*bunnc_s>0*). Thereby, the same income and wealth means-test from unemployment benefits II is also implied for receipt of social benefits and thus not repeated explicitly when simulating the part related to social benefits.

### 2.4.10 Maternity Leave Benefits (*bmact_de*)

Maternity-leave benefits are contributory benefits paid for by the statutory health insurance system for six weeks before the child's birth and eight weeks thereafter in order to compensate foregone income from employment.

- **Definitions**

This time frame of benefit receipt is called the time of maternity leave, where mothers are not allowed to work by law. Receipt is related to mothers, but eligibility is related to a baby in the household. Thus, the unit of analysis is sometimes the individual and sometimes the family.

- **Eligibility Conditions**

All mothers who are employed and insured by the statutory health insurance, at the time when the time of maternity leave starts for them, are eligible to maternity-leave benefits. No contributions of a specific amount, or for a specific time, need to be made. The only differentiation that is made is between full-time and part-time employment.

[6] For documentation of the national tax and benefit microsimulation model for Germany, see Steiner, Viktor, Katharina Wrohlich, Peter Haan und Johannes Geyer (2008).

[7] Information from the national model has been applied because maximum rents and heating costs covered by unemployment benefits II could not have been estimated from the EU-SILC data due to crucial regional information missing for Germany.

- **Income Test**

Maternity leave benefits are contributory benefits. There is no income or wealth test, in the sense of a means test, to these benefits. However, there is a differentiation made at the benefit amount between part-time and full-time employment. This is done applying a proxy for pre-spell income from employment (*il_ntpy*, also see Section 3.4.4).

- **Benefit Amount**

The level of benefits amounts to a maximum of 13 euros per day, which is 385 euros per month. Benefits are reduced if employment was less than full time before the spell down to 210 euros per month. These rates have been constant over the years 2009 to 2012. These amounts are multiplied by a factor of 3.5/12 when aggregating up to year to account for the fact that maternity leave benefits are only granted for a time of 3.5 months.

- **EUROMOD Notes**

In the simulation, the identification of eligible mothers suffers from the problem that eligible mothers cannot easily be identified *before* they gave birth. Eligibility conditions on female gender (*dgn=0*), being a parent, not working (*liwmy=0*), and the presence of dependent children aged one year or younger in the family. By the latter condition, on the one hand eligible mothers that did not give birth to their first child yet are excluded, although they should be included. But, on the hand mothers who are not eligible anymore because their giving birth is already more than eight weeks ago are included, although they should be excluded. This inevitable error made in the simulation needs to be kept in mind when comparing recipient rates and aggregate amounts to external statistics.

Also the employment level before the spell is not observed, but it can be approximated by months ever in work (*liwwh*), a proxy for pre-spell income (*il_ntpy*, also see Section 3.4.4), and current receipt of unemployment benefits I (*bunct_s*). Those who have either zero pre-spell income (*il_ntpy=0*), or zero months ever in work (*liwwh=0*), or receipt of unemployment benefits I (*bunct_s>0*) are assumed to have been unemployed before the spell. For them, benefits according to part-time employment are assigned. Those with some months ever in work (*liwwh>0*), no receipt of unemployment benefits (*bunct_s=0*), and some non-zero pre-spell income (*il_ntpy>0)*, are assumed to have been employed before the spell. If their pre-spell income exceeds the average employment income of women working 30 hours per week, as observed in the data (1,563 euros per month in 2009, and 1,581 for 2010), they are assumed to have been working full-time before the spell, and benefit amounts for full-time work are imputed. In case pre-spell income is lower, part-time work is assumed and benefit amounts follow accordingly.

Resulting benefits (*bmact_s*) are allocated to the mothers in the household. This must be consistent with the allocation of parental leave benefits (*bplct_de*), so that these benefits can be withdrawn from each other.

### 2.4.11 Parental Leave Benefits (*bplct_de*)

Parental-leave benefits were implemented in 2007 and substitute the formerly applied "*Erziehungsgeld*". While "*Erziehungsgeld*" was a lump-sum transfer, parental leave benefits are contributory benefits. They are non-means-tested benefits that replace a fraction of parents' foregone net labour earnings in case they suspend employment due to the birth of a child.

- **Definitions**

Receipt can be related to mothers or to fathers because both are generally eligible to parental leave benefits. Eligibility is also related to a baby in the household. Thus, the unit of analysis is sometimes the individual, sometimes the couple of partners in the household and sometimes the family.

- **Eligibility Conditions**

Parental-leave benefits are paid – in addition to child benefits -- for a time frame of up to 12 months following the birth of the child. Benefit duration can be prolonged for another two months if parents share parental-leave time such

that each of them suspends work for at least two months. Alternatively to suspension, part-time work of up to 30 hours per week is allowed.

- **Income Test**

Parental leave benefits are contributory benefits. There is no income or wealth test, in the sense of a means test, to these benefits.

- **Benefit Amount**

The minimum level of parental-leave benefits is 300 euros per month, which is paid in case the recipient was unemployed before the child's birth or net income was below 300 euros. The maximum benefit level is 1,800 euros per month, which is paid if net income was 2,770 euros or more. In between, benefits generally amount to 67% of net income, considerably more for low income and slightly less for high incomes. These rates have been constant over the years 2009 to 2012.

- **EUROMOD Notes**

Eligibility is conditioned in the simulation on number of months in work during the observed year to be less than 12 (*liwmy<12*). Thereby an error is inevitable, because it is not reported which part of these months out of work actually belong to a spell of parental-leave benefit receipt.

Moreover, it is not observed who of the two parents is currently in receipt of benefits, the mother, or the father, even in case a receipt of the couple if observed. Therefore, the simulation differentiates between the cases that the mother works more hours than the father and the opposite situation. It is assumed that in case the mother works more hours (*lhw*) the joint income of the spouses is the relevant income for benefit entitlement, while in case the father works more hours, it is his income only that is relevant. This accounts for the fact that the mother is in receipt of parental-leave benefits in any case, whereas the father can opt to take the father months or not. The respective relevant pre-spell income is determined by the general proxy for pre-spell income for contributory benefits (*il_ntpy*, also see Section 3.4.4).

Mothers working zero hours (*lhw=0*) with a pre-spell income below 300 euros per month get a minimum benefit amount of 300 euros per month assigned, while those with pre-spell income above 300 euros get the regular rate of 67% of their pre-spell income if it is greater than the minimum amount, but at maximum they get the maximum amount of 1,800 euros. In any case, maternity-leave benefits received are deducted from parental-leave benefits.

Mothers working non-zero hours (*lhw>0*), but less than the maximum allowed number of hours (*lhw<=30*), get benefits assigned according to their pre-spell income. The standard rate is applied (67%), within the range of minimum and maximum benefit amounts, and maternity-leave benefits received are deducted.

If mothers work more than the maximum hours allowed (*lhw>30*), but the fathers work less than maximum, benefits are assigned to the fathers. The pre-spell income of the fathers is relevant in this case. Benefit amounts are assigned accordingly, within minimum and maximum range, and maternity benefits are accounted for.

Generally, parental-leave benefits are simulated after maternity-leave benefits in the EUROMOD spine, in order to account for the fact that maternity-leave benefits are deducted from parental-leave benefits in case of receipt for both.

### 2.4.12 Social Assistance for Old-age and for Reduced Work Ability (*bsaoa_de*)

Social assistance for old-age and for reduced ability to work ensures the basic needs for living for older people and for those individuals who are permanently fully incapacitated for work.

- **Definitions**

Old-age social assistance and social assistance for reduced work cover individuals who are not eligible to unemployment benefits II because they are not able to work at least three hours per day. The unit of analysis is the household.

- **Eligibility Conditions**

Individuals should have either 65 years of age or more, or they should be 18 years or older and permanently unable to work at least three hours per day to be eligible to old-age social assistance or social assistance for reduced work. Generally, recipients cannot receive income from unemployment benefits II. Thus, eligibility is conditioned on no in receipt of either unemployment benefits II (*bunnc_s=0).*

Social assistance for reduced ability to work conditions in addition on age at least 18 but not older than 65, being disabled, not working *(lhw=0 & liwmy=0*), and on household composition. However, old-age social assistance in addition conditions on age at least at statutory pension age (65).

- **Income Test**

There is a means test on income and wealth for eligibility to old-age social assistance and social assistance for reduced work ability. There are allowances for income and wealth, which depend on household composition and the age of household members. The income allowances are calculated by the amount of the basic rates and the monthly rent, including heating, with regard to the number of household members. These allowances for income are the same as for unemployment benefits II (*bunnc_de*, see Section 2.4.9).

The relevant household income is calculated as follows: disposable income, excluding social assistance and minimum parental-leave benefits; minus a 30% allowance on earned income, up to 50% of basic benefit rate, and excluding benefits and pensions that are not primarily supposed to cover basic needs (*bhlac_s; bhlps_s; pdiss_s; pdi00; pdiot; psuwd; psuor; boawr*).

The amount of exemption for wealth for singles born after 1948 is 1,600€ (base rate) per month. For households with more than one individual, there is an additional 614€ per adult (except for the head of household) and 256€ per child added to the basic rate. For those born before 1948, the base rate increases up to 2,600€. The basic benefit rate for old-age assistance is closely related to the basic rate from unemployment benefits II.

- **Benefit Amount**

There is a regular benefit rate, which is the same regular rate as for unemployment benefits II (351 euros per month in 2009). The exact benefit amount of social assistance for old-age and reduced work ability is a function of this regular rate and the number of adults and children in the household, as well as the rent paid.

Amounts of old-age social assistance are different for single households and for couple households. Generally, the head of the household gets the full basic rate (351 euros in 2009) and the partner of the head 90% of this rate. Housing expenditures (*xhcrt*) are also covered, but only up to a maximum amount, which depends on the household size and is closely aligned to benefit rates from housing benefits. In addition heating costs are covered.

Amounts of social assistance for reduced ability to work are differentiated for singles and couples without children, families with children, and multiple adult households without children. Generally, if there is someone in the household eligible, the household head gets the basic rate (351 euros in 2009); the partner of the head gets 90% of this rate, and each of the children gets a reduced rate which is determined for the age category to which the children belong. Other adults in the household that are not partner of the head also get the full rate. Housing expenditures are accounted for in the same manner as for unemployment benefits II (see *bunnc_de*).

- **EUROMOD Notes**

The income of the household that is relevant for the means test is disposable household income (*il_dispyd*). The same income variable as at *bunnc_de* has been applied. It includes market income from employment, pension income, and generally all benefits, except for other benefits in the context of social, accounting for social security contributions, but before deduction of income tax, which is simulated at the very end of the spine. It excludes benefits and pensions that are not primarily supposed to cover basic needs (*bhlac_s; bhlps_s; pdiss_s; pdi00; pdiot; psuwd; psuor; boawr*).

The rent that is covered in the context of social assistance is assumed to be the actual rent that is reported, but imputations have been made (*xhcrt*, also see Section 3.4.6). The same maximum amounts as at unemployment benefits II (*bunnc_de*) apply. Also the same approximations to heating costs and to maximum rents covered as under *bunnc_de* have been applied for *bsaoa_de*.

Observed financial assets (*afc*) have been applied for the means test on wealth. The wealth test is passed if household financial assets are zero after accounting for all wealth allowances. If the wealth test is not passed by the household all its members are assumed to be not eligible to unemployment benefits II (see Section 2.4.6).

It is not observed in the data whether the individual is actually able to work at least three hours per day or not. This information shall thus be approximated in the simulation by the conditions: not actively looking for a job (*lowas=0*), having worked for zero hours per week (*lhw=0*) and spent zero months in employment during the year (*liwmy=0*).

### 2.4.13 General Social Assistance (*bsa00_de*)

Individuals who are not able to work at least three hours per day – either because they are aged 65 or older, or because they are aged 18-65 and physically not able to work --, and who are not covered by social assistance for old-age and reduced work ability, are entitled to general social assistance. This shall secure a minimum income for everybody.

- **Definitions**

These benefits are means tested with respect to income and wealth and they are determined by the needs of the entire household. Thus, unit of analysis is the household.

- **Eligibility Conditions**

Recipients of general social assistance need to be unable to work at least three hours per day. Recipients need to be aged between 18 and 65, and they cannot receive income from any of the following benefits: education benefits (*bed_s=0*), unemployment benefits II (*bunnc_s=0*), and social assistance for old-age and reduced work ability (*bsaoa_s=0*).

- **Income Test**

These benefits are means tested with respect to income and wealth and they are determined by the needs of the entire household. This means that the household's income and wealth are considered for the determination of needs, except for allowances. The allowances for income and wealth depend on household composition and the age of household members. Allowances are generally very similar to the ones as at social assistance for old-age and reduced work ability (*bsoao_de*, see 2.4.12).

The relevant household income is calculated as follows: disposable income, excluding social assistance and minimum parental-leave benefits, minus a 30% allowance on earned income, up to 50% of basic benefit rate, and excluding benefits and pensions that are not primarily supposed to cover basic needs (*bhlac_s; bhlps_s; pdiss_s; pdi00; pdiot; psuwd; psuor; boawr*).

The amount of exemption for wealth for singles born after 1948 is 1,600€ (base rate). For households with more than one individual, there is an additional 614€ per adult (except for the head of household) and 256€ per child added to the basic rate. For those born before 1948, the base rate increases up to 2,600€. Again, the income threshold is calculated

by the amount of the basic rates and the monthly rent including heating with regard to the number of household members. These rates have been constant over the years 2009 to 2012.

- **Benefit Amount**

There is a regular benefit rate, which is the same regular rate as for unemployment benefits II (351 euros per month in 2009). The exact benefit amount of general social assistance is a function of this regular rate and the number of adults and children in the household, as well as the rent paid. They are the same as for social assistance for reduced ability to work (*bsaoa_de*).

Benefit amounts are differentiated for singles and couples without children, families with children, and multiple adult households without children. Generally, if there is someone in the household eligible, the household head gets the basic rate (351 in 2009 euros); the partner of the head gets 90% of this rate, children older than 18 get 80%, and younger children are classified into 3 age categories that determine the level of the benefit. Other adults in the household that are not partner of the head also get the full rate. Housing expenditures are accounted for in the same manner as for old-age social assistance (see *bsaoa_de*).

- **EUROMOD Notes**

The income of the household that is relevant for the means test is disposable household income (*il_dispyd*). The same income variable as at *bunnc_de* has been applied. It includes market income from employment, pension income, and generally all benefits, except for other benefits in the context of social, accounting for social security contributions, but before deduction of income tax, which is simulated at the very end of the spine. It excludes benefits and pensions that are not primarily supposed to cover basic needs (*bhlac_s; bhlps_s; pdiss_s; pdi00; pdiot; psuwd; psuor; boawr*).

The rent that is covered in the context of social assistance is assumed to be the actual rent that is reported, but imputations have been made (*xhcrt*, also see Section 3.4.6). The same maximum amounts as at unemployment benefits II (*bunnc_de*) apply. Also the same approximations to heating costs and to maximum rents covered as under *bunnc_de* have been applied for *bsaoa_de*.

Observed financial assets (*afc*) have been applied for the means test on wealth. The wealth test is passed if household financial assets are zero after accounting for all wealth allowances. If the wealth test is not passed by the household all its members are assumed to be not eligible to unemployment benefits II (see Section 2.4.6).

### 2.4.14 Additional Child Benefits (*bchot_de*)

Additional child benefits are social benefits that are supposed to help families, in which parents receive income and child benefits covering their own needs according to “unemployment benefits II”, but not the needs of the dependent children entirely.

- **Definitions**

The unit of analysis is the family, defined as at the simulation of child benefits.

- **Eligibility Conditions**

To be eligible, dependent children need to be eligible to child benefits (*bch_s>0*), be aged 25 or younger, and in addition be unmarried and live in the same household with their parents. Note how this condition varies from the eligibility condition at child benefits, where dependent children may live in an own household.

- **Income Test**

The level of the additional child allowance depends on the children’s needs and the household‘s income and wealth. It is reduced if household income exceeds the parents’ needs, or if the household holds wealth exceeding an allowance.

There is an income test on eligibility. Disposable household income needs to fall between two thresholds, such that households fulfil minimum income requirements, but do not exceed at maximum level. Generally, income must cover the parents' needs, but not the needs of the children, so that households receiving only general social assistance, or unemployment benefits II are usually not eligible for the additional child benefits.

For the period 2009-2012, this lower income threshold of the income test is a lump-sum amount of 600 euros per lone parent and 900 euros per couple. The respective upper limit is the lower limit plus the number of children multiplied by the maximum benefit amount (140 euros per month). Each of the lower and upper limits is topped up by an additional allowance for housing expenses. These are based on the actual rent paid (*xhcrt*) multiplied by a factor lower than one, which varies by number of children (it is 0.7553 in case of one child, 0.6068 for two children, 0.5071 for three, 0.4355 for four, and 0.3817 in case of five children).

These factors are different for couple parents (0.832 for one child, 0.7123 for two children, 0.6227 for three, 0.5531 for four, and 0.4975 for five children). Apart from that, income thresholds are determined in the same manner for couple parents.

The income of the household that needs to fall within in the lower and upper limits is disposable household income, after social contributions and including simulated benefits, but before income taxes. It explicitly excludes child benefits, housing benefits, maternity-leave benefits, and parental-leave benefits.

- **Benefit Amount**

The maximum amount of these benefits is 140 euros per month and entitled child. It is paid if households pass the income test. It is reduced by the family's income as far as it exceeds the lower threshold for benefit eligibility, by a fraction of 50%. It is further reduced by children's own income, market or replacement income, and if households hold wealth exceeding certain allowances, which are the same as for general social assistance.

- **EUROMOD Notes**

When benefit amounts are simulated, receipt is conditioned on receipt of child benefits (*bch_s>0*), and on the relevant household income falling within the relevant income range. In case this income test is passed, the basic benefit rate (140 euros) is assigned for each dependent child in the household. Relevant assets, after accounting for allowances, and averaged per month, are subtracted from benefit amounts.

## 2.5 Social Contributions

Generally, social contributions to all insurance systems have been simulated for most of the social groups. The relevant contribution rates for the single insurance systems are tabulated in Table 16. In Table 16, the entire contribution rates are displayed. These are, however, often shared between employers and employees. Therefore, subsequent tables show contribution rates to the respective system, differentiated by the single social groups.

Table 16. Social Security: Contribution Rates[1] and Ceilings

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Statutory pension insurance** (*gesetzliche Rentenversicherung*) | | | | |
| Contribution rate | 19.9 | 19.9 | 19.9 | 19.6 |
| Assessment ceiling (western Germany), euros per month | 5,400 | 5,500 | 5,500 | 5,600 |
| Assessment ceiling (eastern Germany) , euros per month | 4,550 | 4,650 | 4,800 | 4,800 |
| Assessment ceiling (average, weighted by census population shares) | 5,216 | 5,318 | 5,350 | 5,429 |
| **Statutory health insurance** (*gesetzliche Krankenversicherung*) | | | | |
| Contribution rate | 15.2 | 14.9 | 15.5 | 15.5 |
| Assessment ceiling, euros per month (*Beitragsbemessungsgrenze*) | 3,675 | 3,750 | 3,712.5 | 3,825 |
| Threshold for compulsory insurance, euros per month (*Versicherungspflichtgrenze*) | 4,050 | 4,163 | 4,125 | 4,237.5 |
| **Statutory long term care insurance** (*soziale Pflegeversicherung*) | 1.95 | 1.95 | 1.95 | 1.95 |
| Employees above 23 years, born after 1940, w/o children (additionally) | 0.25 | 0.25 | 0.25 | 0.25 |
| Saxony (additionally, in exchange for one more holiday) | 1.00 | 1.00 | 1.00 | 1.00 |
| **Statutory unemployment insurance** (*ges. Arbeitslosenversicherung*) | 2.80 | 2.80 | 3.00 | 3.00 |
| **Statutory accident insurance** (*gesetzliche Unfallversicherung*) | 1.60 | 1.60 | 1.60 | 1.60 |

Notes: [1] Contribution rates refer to the entire rate paid, i.e. the rate paid for by the employer, plus the rate paid for by the employee.

Table 17 tabulates contribution rates to the statutory pension insurance over the years 2009 to 2012, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 17. Social contributions: Statutory Pension Insurance (Rates in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Employer Contribution Rate | | | | |
| Regular Employment (and Midijobs) | 9.95 | 9.95 | 9.95 | 9.80 |
| ...Minijobs | 15.00 | 15.00 | 15.00 | 15.00 |
| Employee Contribution Rate | 9.95 | 9.95 | 9.95 | 9.80 |
| Self-employed (in certain services) Contribution Rate[1] | 19.00 | 19.00 | 19.00 | 19.00 |
| Pensioner Contribution Rate | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: [1] This is the contribution rate to statutory pension insurance that has been assumed in the simulation for the self-employed in health and education services.

Table 18 tabulates contribution rates to the statutory health insurance over the years 2009 to 2012, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 18. Social contributions: Statutory Health Insurance (Rates in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Employer Contribution Rate | | | | |
| Regular Employment (and Midijobs) | 7.15 | 7.00 | 7.30 | 7.30 |
| ...Minijobs | 13.00 | 13.00 | 13.00 | 13.00 |
| Employee Contribution Rate | 8.05 | 7.90 | 8.20 | 8.20 |
| Self-employed Contribution Rate[1] | 15.90 | 15.90 | 15.90 | 15.90 |
| Pensioner Contribution Rate | 8.05 | 7.90 | 8.20 | 8.20 |

Notes: [1] This is the contribution rate to statutory health insurance that has been assumed in the simulation for the self-employed who have income from self-employment below the threshold for statutory health insurance.

Table 19 tabulates contribution rates to the statutory long-term care insurance over the years 2009 to 2012, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 19. Social contributions: Statutory Long-term Care Insurance (Rates in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Employer Contribution Rate | | | | |
| Regular Employment (and Midijobs) | 0.9750 | 0.9750 | 0.9750 | 0.9750 |
| Minijobs | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Employee Contribution Rate | | | | |
| Regular Rate | 0.9750 | 0.9750 | 0.9750 | 0.9750 |
| Additional Contribution Rate (for childless older 23) | 0.2500 | 0.2500 | 0.2500 | 0.2500 |
| Self-employed Contribution Rate[1] | - | - | - | - |
| Pensioner Contribution Rate | | | | |
| Regular Rate | 1.9500 | 1.9500 | 1.9500 | 1.9500 |
| Additional Contribution Rate (for childless older 23) | 0.2500 | 0.2500 | 0.2500 | 0.2500 |

Notes: [1] Long-term care insurance has not been simulated for the self-employed.

Table 20 tabulates contribution rates to the statutory unemployment insurance over the years 2009 to 2012, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 20. Social contributions: Statutory Unemployment Insurance (Rates in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Employer Contribution Rate | | | | |
| Regular Employment (and Midijobs) | 1.40 | 1.40 | 1.50 | 1.50 |
| ...Minijobs | 0.00 | 0.00 | 0.00 | 0.00 |
| Employee Contribution Rate | 1.40 | 1.40 | 1.50 | 1.50 |
| Self-employed Contribution Rate[1] | - | - | - | - |
| Pensioner Contribution Rate | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: [1] Statutory unemployment insurance has not been simulated for the self-employed.

Table 21 tabulates contribution rates to the statutory accident insurance over the years 2009 to 2012, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 21. Social contributions: Statutory Accident Insurance (Rates in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Employer Contribution Rate | | | | |
| Regular Employment (and Midijobs) | 1.60 | 1.60 | 1.60 | 1.60 |
| ...Minijobs | 0.00 | 0.00 | 0.00 | 0.00 |
| Employee Contribution Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Self-employed Contribution Rate[1] | - | - | - | - |
| Pensioner Contribution Rate | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: [1] Statutory accident insurance has not been simulated for the self-employed.

Employees and employers are obliged to pay statutory social insurance contributions from gross wages and salaries, unless gross income exceeds certain thresholds, which allows employees to contract out of statutory health and pension insurance. Social insurance contributions are paid as fixed shares of gross income up to a contribution assessment ceiling. Gross income above this ceiling is disregarded. Employees who earn more than the assessment ceiling for statutory pension insurance may opt out of statutory pension insurance completely. Concerning statutory health insurance, a different threshold, i.e. the threshold for compulsory health insurance, determines who may opt out. Employees who earn salaries above this threshold may choose private health insurance instead. Private health insurance premiums do not depend on gross income, but mostly on age, gender, and prior health conditions.

Contributions have been simulated for statutory pension insurance, compulsory statutory health insurance, statutory long-term care insurance, statutory unemployment insurance, and statutory accident insurance. Contributions were differentiated for four groups: employers, employees, self-employed and pensioners. Contributions to private health insurance could not be simulated precisely, as they do not depend on income, but rather on individual characteristics, like health status, age, and individual-specific illness risks. In the simulations, average contributions (observed in the SOEP micro data) to private health insurance, differentiated by employees, self-employed, and pensioners, have been imputed.[8]

Civil servants are not covered by compulsory social insurance and are not obliged to pay contributions. The federal or state government provides financial assistance (approximately 50% to 80% of the expenses) in cases of illness, birth, long-term care and death and a retirement pension. Usually civil servants have a private health insurance to insure against health costs not covered by the government's financial assistance. However, social insurance contributions for civil servants have not been simulated.

### 2.5.1 Employer Social Contributions (*tscer_de*)

Generally, in case of employees, all social contributions are split equally between employees and employers. Exceptions are statutory health insurance, where the employer's contribution rate is 0.9 percentage points lower, and long term care insurance, where employees, who are 23 years of age or older and who do not have children, have a 0.25 percentage points higher contribution rate. Statutory accident insurance is paid by employers only. Employers' contribution rates to the respective insurances are tabulated in Table 22.

[8] The with-group distribution of contributions to private health insurance is relatively homogeneous over age-groups so that a further differentiation of contributions by age groups does not appear to deliver much more relevant variation.

Table 22. Employers' Social Security Contribution Rates (in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| 1. Pension social insurance (*tscerpi_s)* | 9.950 | 9.950 | 9.950 | 9.800 |
| 2. Compulsory statutory health insurance *(tscerhl_s)* | 7.150 | 7.000 | 7.300 | 7.300 |
| 3. Statutory long-term care insurance *(tscerci_s)* | 0.975 | 0.975 | 0.975 | 0.975 |
| 4. Statutory unemployment insurance *(tscerui_s)* | 1.400 | 1.400 | 1.500 | 1.500 |
| 5. Statutory accident insurance *(tscerac_s)* | 1.600 | 1.600 | 1.600 | 1.600 |
| 6. Compulsory statutory health insurance (Minijob) *(tscerhl_s)* | 13.000 | 13.000 | 13.000 | 13.000 |
| 7. Statutory pension insurance (Minijob) *(tscerpi_s)* | 15.000 | 15.000 | 15.000 | 15.000 |
| **Total** *(tscer_s)* | **21.075** | **20.925** | **21.325** | **21.175** |
| **Total (Minijob)** *(tscer_s)* | **28.000** | **28.000** | **28.000** | **28.000** |

For mini jobs, employers have to pay contributions to statutory health and pension insurance. In 2009, the employer paid a lump sum contribution rate of 30.77%, which was raised to 31.08% in 2010 and to 30.88% in 2012. It consists of health insurance (13ppt), pension insurance (15ppt), a lump sum for payroll tax, solidarity surcharge, and church tax (2ppt), and certain levies (0.77ppt in 2009, 1.18ppt in 2010 and 0.88ppt in 2012). No contributions to the long term care insurance and the unemployment insurance have to be paid in mini jobs. For midi jobs, employers pay their standard contribution rates, comprised of statutory health, long-term care, pension, and unemployment insurance.

Contributions were simulated on the basis of *yem*, i.e. observed income from employment, adjusted for the actual number of months of employment during the year (*yemmy*). Unit of analysis is the individual. Eligibility for all insurances conditions on not being a civil servant and having income below the respective thresholds for compulsory statutory insurance (also see Section 1.4 for more details on these thresholds). In case of private health insurance, i.e. when income exceeds the threshold for statutory health insurance, employers' contributions are zero because employees pay the entire rate themselves.

### 2.5.2 Employee Social Contributions (*tscee_de*)

Employees' contribution rates to the respective insurances are tabulated in Table 23. As explained above, employees do not need to contribute to the statutory accident insurance, because employers pay the entire rate. This is similar with social contributions in mini jobs.

For midi jobs, employee's social insurance contributions are faded in until they reach the full rates at a gross wage of €800. Fading-in of social contributions is determined by population-average social contribution rates (factor: 0.7472 in 2009; 0.7585 in 2010; 0.7435 in 2011 and 0.7491 in 2012).

Simulation proceeds in a similar manner to employers' contributions. Again, contributions were simulated on the basis of *yem*, i.e. observed income from employment, adjusted for the actual number of months of employment during the year (*yemmy*). Unit of analysis is the individual. Eligibility for all insurances conditions on not being a civil servant and having income below the respective thresholds for compulsory statutory insurance (also see Section 1.4 for more details on these thresholds). In case of private health insurance, an average contribution is imputed for all employees, for whom income exceeds the threshold. The imputed mean contribution is the average contribution to private health insurance, paid for by employees in the SOEP data.

Table 23. Employees' Social Security Contribution Rates (in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| 1. Compulsory statutory pension insurance (*tsceepi_s)* | 9.9500 | 9.9500 | 9.9500 | 9.8000 |
| 2. Compulsory statutory health insurance *(tsceehl_s)* | 8.0500 | 7.9000 | 8.2000 | 8.2000 |
| 3. Statutory long-term care insurance *(tsceeci_s)* | 0.9750 | 0.9750 | 0.9750 | 0.9750 |
| 4. Additional LTC contribution: childless older 23 *(tsceeci_s)* | 0.2500 | 0.2500 | 0.2500 | 0.2500 |
| 5. Statutory unemployment insurance *(tsceeui_s)* | 1.4000 | 1.4000 | 1.5000 | 1.5000 |
| 6. Statutory accident insurance *(tsceeac_s)* | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 7. Contributions factor for fading-in at Midi Jobs *(tsceehl_s)* | 0.7472 | 0.7585 | 0.7435 | 0.7491 |
| **Total (tscee_s)** | **20.6250** | **20.4750** | **20.8750** | **20.7250** |

### 2.5.3 Self-Employed Social Contributions (*tscse_de*)

The self-employed are not covered by most of the statutory social insurances. Contributions to long-term care insurance, to unemployment insurance, and to accident insurance are entirely voluntary for the self-employed, and it cannot be assumed that self-employed opt for such insurances. Also, statutory health insurance is generally not compulsory for the self-employed in Germany, and most of the self-employed choose private health insurance. However, every individual in Germany is obliged to contribute to any health insurance, so that also the self-employed have to contribute to either of the two. Moreover, the self-employed are not generally obliged to contribute to compulsory pension insurance. However, certain groups of self-employed are obliged to contribute to statutory pension insurance. Compulsory pension insurance applies for self-employed teachers without employees, nurses, midwives, artists, publicists, and craftsmen.

Thus, only contributions to the statutory pension insurance and to statutory as well as private health insurance have been simulated for the self-employed. Mandatory contributions to the statutory pension insurance have been limited to those specific groups obliged to contribute, i.e. eligibility to pension insurance contribution is restricted to working either in education services, or in health services (*lindi*=10 or *lindi*=11), assuming that all income from self-employment in these services is subject to mandatory contributions to the statutory pension insurance. It is assumed that those obliged to contribute have to pay the entire rate (19.9% from 2009 to 2011, 19.6% in 2012).

The self-employed have in general been identified by their income, rather than their labor status. This means simulations are based on income from self-employment (*yse*). Thereby, there may be individuals who pay contributions on both their pension income (*il_pen*) and on their income from self-employment (*yse*), but always in relation to respective income. However, eligibility is restricted to not reporting labor status employee (*les=3*), as the employees already pay contributions on their income from employment (*yem*).

Table 24. Self-employed Social Security Contribution Rates[1] (in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| 1. Compulsory statutory pension insurance (*tscsepi_s)* | 19.9 | 19.9 | 19.9 | 19.6 |
| 2. Compulsory statutory health insurance (*tscsehl_s*) | 15.2 | 14.9 | 14.9 | 14.9 |
| **Total** *(tscse_s)* | **35.1** | **34.8** | **34.8** | **34.5** |

Notes: [1] These are the contribution rates to statutory pension insurance and to statutory health insurance that have been assumed in the simulation for the self-employed (in health and education services only, for pension insurance). Long-term insurance, unemployment insurance, and accident insurance have not been simulated for the self-employed.

Self-employed with income from self-employment (*yse*) below the threshold for statutory health insurance, who do not report to be employees or civil servants, are assumed to contribute *voluntarily* to the statutory health insurance. They have to pay double the rate of employees as they have to pay the employer's share, too. For them, the income base that

determines the contribution is the sum of income from self-employment, income from capital, and income from renting and leasing. Since 2009, there is a minimum and a maximum amount for this income (in 2009, it was 958 and 3,750 euros per month, respectively).

Self-employed with income from self-employment (*yse*) *above* the threshold for statutory health insurance, who do not report to be employees or civil servants, are assumed to opt for private health insurance. In private health insurance, contributions do not depend on income, but on individual characteristics, like health status, age, and individual-specific illness risks. In the simulations, average contributions to private health insurance by the self-employed have been imputed. These averages are taken from the SOEP micro data.

Contribution rates for self-employed in the statutory systems are tabulated in Table 24. Income thresholds and contributions have *not* been adjusted according to the actual number of months spent in employment (*yemmy*) during the year, in order to account for the fact that income from self-employment is distributed highly unevenly over the year. Unit of analysis is the individual.

### 2.5.4 Pensioner Social Contributions (*tscpe_de*)

Pensioners only have to contribute to the health insurance and to long-term care insurance. Depending on their pension income, they are assumed to be either insured compulsorily in the statutory health and thereby also the long-term care insurance, or in the respective private insurances (see the thresholds above). If pensioners are insured in the statutory insurances, they have to pay 8.2% for health insurance and 1.95% for long-term care insurance in 2012. Accordingly to employees, childless pensioners, older than 23 and younger than 67, have to pay an add-on of 0.25% to long-term care insurance. The rates are tabulated in Table 25.

Pensioners, with income from public pensions (*ils_pen*) exceeding the threshold for statutory health insurance, are assumed to opt for private health insurance. As for employees and the self-employed, average contributions made by pensioners in the SOEP data have been imputed as contributions to private health insurance for the pensioners.

Table 25. Pensioners' Social Security Contribution Rates (in %)

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| 1. Compulsory statutory health insurance *(tscpehl_s)* | 8.05 | 7.90 | 8.20 | 8.20 |
| 2. Statutory long-term care insurance *(tscpeci_s)* | 1.95 | 1.95 | 1.95 | 1.95 |
| 3. Additional LTC contribution: childless older 23 *(tscpeci_s)* | 0.25 | 0.25 | 0.25 | 0.25 |
| **Total** *(tscpe_s)* | **10.25** | **10.10** | **10.40** | **10.40** |

Simulations condition on not being a civil servant, assuming that this implies that pensioners have not been a civil servant earlier in life. Income thresholds and contributions are adjusted according to the actual number of months spent in retirement during the year. Unit of analysis is the individual.

## 2.6 Personal Income Tax

Income tax is levied on the income of natural persons. Tax on income from dependent employment is collected from persons in dependent employment at source via payroll tax. However, these pre-payments on income are not final, so that usually income tax is declared at the end of the year, where pre-payments from payroll tax are considered, but also other sources of income that are not related to dependent employment come into play.

The simulation of personal income tax is divided into three policies. In the first policy (*tin_de*), taxable income is derived, and in the following two policies (*tinit_de* and *tinjt_de*), the tax schedule function is applied to individual and respectively joint taxation.

### 2.6.1 Taxable Income (*tin_de*)

In this policy, taxable income is derived. First of all, parameters for the tax schedule, as well as for allowances and deductions are defined. Then, income from the various sources, as far as it is taxable, is collected. Unit of analysis when deriving taxable income is the individual. In case relevant parameters differ by individual and joint taxation (namely capital income), these components of taxable income are added later in the respective policy.

- **Tax Base**

Income from employment, from self-employment, from property,[9] from other sources, and income in kind is entirely taxable and thus added up as observed (*il_taxy*). Since 2005, income from pensions is only taxable with a pre-defined part, which depends on the year of entrance into retirement in case of private pensions and on the age at entrance into retirement in case of statutory pensions, and it remains constant, conditional on these two. For income from private pensions, it is assumed that all pensioners entered retirement in the year 2009. For income from statutory old-age pensions, it is assumed that all pensioners entered regular retirement at the age of 65. These assumptions lead to errors in many cases, but some assumptions must be made, because year and age at entrance into retirement are not observed in the data. Under these assumptions, the taxable fraction of pensions, from statutory as well as private pension insurances (*il_pens*), for the observed cohort of pensioners, is 58% for non-civil servants. For civil servants, the fraction of pensions that is tax exempt is 33.6%, with a maximum threshold at 2,520 euros per year (as of 2009). It follows "taxable income before allowances".

- **Tax Allowances**

Then, various allowances and deductions, which are assessed at the individual level, are deducted from "taxable income before allowances". They are listed in Table 26.

Table 26. Personal Income Tax: Allowances (2009-2012)

| Allowances | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| - Tax allowance for elderly persons: tax-exempt income share | 33.6 | 32.0 | 30.4 | 28.8 |
| - Tax allowance for elderly persons: tax-exempt income threshold | 1 596 | 1 520 | 1 444 | 1 368 |
| - Tax allowance for agriculture and forestry: level | 670 | 670 | 670 | 670 |
| - Tax allowance for agriculture and forestry: income threshold | 30 700 | 30 700 | 30 700 | 30 700 |
| - Tax allowance for single parents (per lone parent) | 1 308 | 1 308 | 1 308 | 1 308 |
| - Tax allowance for children (per child) | 3 012 | 3 504 | 3 504 | 3 504 |
| - Deduction of special expenses: alimonies: maximum | 13 805 | 13 805 | 13 805 | 13 805 |
| - Deduction of special expenses: income: income-related expenses | 920 | 920 | 1 000 | 1 000 |
| - Tax-exemption of pensions for civil servants: share | 33.6 | 32.0 | 30.4 | 28.8 |
| - Tax-exemption of pensions for civil servants: maximum (level) | 2 520 | 2 400 | 2 280 | 2 160 |
| - Deduction of special expenses: Old-age provision: basic allowance [1] | 3 068 | n/a | n/a | n/a |
| - Deduction of special expenses: Old-age provision: high-income allowance[1] | 2 001 | n/a | n/a | n/a |
| - Deduction of Special Expenses: Alimonies: minimum 36 euros lump sum | 36 | 36 | 36 | 36 |

Notes: [1] Only until 2009.

[9] Income from property is income from renting and leasing of non-owner occupied housing. This has been subject to personal income tax in all the years throughout 2007 to 2010. The change at the taxation of capital income does not apply to income from property.

There is an allowance for income-related expenses. Typical expenses that fall into this category would be expenditure for commuting to work. There is a lump-sum allowance of 920 euros per year (1,000 euros per year from 2011 on) that is applied in case income from employment (*yem*) exceeds 920 euros (1,000 from 2011 on) and the tax unit does not claim higher expenses.

EUROMOD Notes: A claim of higher expenses is not observed in the data, which is why the lumps-um allowance is assessed wherever it applies.

There is an allowance for deduction of expenditures for alimonies. The lump-sum minimum allowance is 36€ per year, which applies in case no higher expenses are claimed. Higher expenses are assessed if they have been reported in terms of maintenance payments (*xmp*), but only up to a maximum of 13,805 euros.

Then, there is an allowance for special expenses. Until 2009 (included), contributions made for old-age provision were deductible up to specific thresholds. These regulations differ for employees and pensioners. They have been subject to changes in the course of the Retirement Income Act in 2005. From then on, either the old 2004-law or the new 2005-law was applied, depending on which of the two was more profitable for the tax unit. In the model, for years 2007-2009 it is assumed that for all tax units, the old 2004-law is more profitable.[10] For employees, there is a basic allowance of 3,068€ per year, which is reduced by 16% of income from dependent employment (*yem*). This allowance is applied if *yem* amounts to a maximum of 19,175 euros. If *yem* is greater than 19,175 euros, the maximum allowance of 2,001€ per year is applied. In addition, there is a minimum allowance, which is a function of *yem* and the respective policy year. The minimum allowance amounts to 1,500 euros. For the self-employed, there is no lump-sum allowance of special expenses. It is assumed that they can deduct all their social security contributions (*tscse_s*), up to a maximum of 20% from total employment earnings. For pensioners, the allowance for special expenses is different for those with lower and those with higher contributions. If contributions below 4,402 euros per year have been made, all contributions (to the health and long-term care insurance) actually made are deductible. From contributions exceeding this threshold, 50% can be deducted, but 1,334 euros at maximum.

From 2010 on, the deductions of old-age expenses have been reformed. They are now made up of the sum of three components: one based on the contributions made to the pension insurance, one based on the contributions made to health and long-term care insurance, and one for pensioners. The first component is computed as follows: 70% of all contributions to the pension insurance (including those of the employer, but maximum 20,000Eur/year) minus the contributions of the employer are deductible. The second component consists of all contributions to health and long-term care insurance made by the employee (or self-employed, or pensioner – but not the employer!). The third component is for pensioners and is calculated in the following way: 50% of all social security contributions paid by the pensioner exceeding 4,402Eur/year are deductible.

There is a tax allowance for elderly persons (*Altersentlastungsbetrag*; for people aged 64 and older) who are still working. It consists of a fraction of their income from employment that is tax-exempt (33.6% in 2009, and 32.0% in 2010, 30.4% in 2011 and 28.8% in 2012) and a threshold for this allowance (1,596 euros in 2009, 1,520 euros in 2010).

Then, there is a tax allowance for tax-payers in the agriculture and forestry sector. It amounts to 670 euros per year, but it is only granted in case total income from employment does not exceed 30,700 euros per year. This allowance was constant over the years.

Finally, there is a single parents' tax allowance, which is granted for single parents with at least one child in the household eligible to child benefits. The allowance amounts to 1,308 euros per year for the single-parent tax payer and it was constant between 2009 and 2012. The tax allowance for civil servants consists of the afore-mentioned 33.6% of their pension that is tax-exempt, up to a maximum of 2,520€ per year (in 2009).

Accounting for all these allowances and deductions, "taxable income" follows.

[10] The old 2004-law is more profitable if the basic lump-sum allowance for old-age provision deductions is greater than actual expenses. This is the case if actual expenses are lower than 1,500 euros per year and lower than 11% of gross employment income.

### 2.6.2 Individual Taxation (*tinit_de*)

In this policy sheet, the tax function is applied to the case of individual taxation. Generally, the simulation of the tax function is structured as follows:

1) Firstly, the relevant average tax rate is determined for all individuals who are subject to individual taxation, by applying taxable income and further accounting for progression clause (by adding related benefits to taxable income). Taxable income including benefits is put into the schedule, and a tax burden is returned. This, however, is not the final burden, it only determines the rate. The resulting average tax rate -- applied to taxable income, *excluding benefits* – determines the relevant tax burden. This is the tax burden, before accounting for the child allowance.

2) Secondly, the child allowance is accounted for, in case it applies. It applies if the individual has at least one dependent child in the household that is eligible for child benefits (see Section 1.3.5 for eligibility criteria). The child allowance reduces taxable income if it applies. The tax burden is derived again. Again, progression clause must be accounted for, i.e. benefits are considered when the tax rate is determined, but they are excluded from the actually taxed income.

3) Now, a higher-yield test is undertaken in order to determine which of the two is more profitable for the tax unit, the application of the child allowance, or the receipt of child benefits. The reduction of tax burden resulting from the application of the allowance is compared to the annual receipt of child benefits for all eligible dependent children of the tax unit. If child benefits are more profitable, the child allowance is not applied. In case the child allowance is more profitable, it is applied and the sum of received child benefits is added to the tax burden (also see below at Tax Allowances). The child allowance is usually more profitable for the high-income individuals.

4) Next, tax burdens for the two groups, the childless and individuals with children are assembled in the variable *tinit_s*.

5) Then, the solidarity surcharge is computed (variable *txc_s*).

6) Finally, the solidarity surcharge is added to the previously computed tax burden, which is saved in the variable *tinit_s*. This is the relevant tax burden for each individual, and an average tax rate follows.

- **Tax Unit**

Individual taxation has been simulated for all individuals who are either not married or who are married but do not live with a partner in the same household. The unit of analysis thus is the individual, in the entire policy. There is no need to allocate any income, allowance, or tax burden among partners, as each of them is taxed entirely individually, if subject to individual taxation.

- **Tax Exemptions**

There are a couple of exemptions in German income tax law. As described in Section 1.2.2, a specific element of the German income tax law is the progression clause. Even though not included in the tax base, most of the contributory benefits are included in the base used to determine the tax bracket of the progressive income tax schedule. In this way these incomes may increase the income tax rate used for the other income sources that are subject to the income tax.

Progression clause is implemented in the simulation of individual taxation. The contributory benefits that are subject to progression clause are added to taxable income, and the resulting income determines the relevant tax bracket and rate. This rate in turn is, however, applied to taxable income, excluding the contributory benefits.

- **Tax Allowances**

Besides the allowance that have already been introduced in Section 2.6.1, there is a tax allowance for children, which is granted for parents instead of child benefits in case this grant is more beneficiary for the tax payers than the child

benefits. This allowance amounts to 3,012 euros per year *and child* in 2009. It was raised to 3,504 euros in 2010 and has stayed constant ever since. Since 2000, it includes an allowance for child care. The child allowance is not allocated among non-married parents. Each of the parents is eligible to the entire child allowance.

EUROMOD Notes: The child allowance needs specific treatment in the simulation. Due to the higher yield test, i.e. the check whether the child allowance is more beneficiary for the tax payers than the child benefits, income taxation needs to be simulated twice, once with and once without the child allowance. At individual taxation, the entire child allowance is considered at each parent filing individual taxation.

- **Tax Base**

Income from six different sources is summed up for each individual. After loss compensation and several allowances and deductions are considered, taxable income, i.e. the tax base, is taxed according to a progressive tax schedule. Table 10 shows in more detail how taxable income is determined. Income from single components is added up and certain expenditures are credited against income, as well as certain allowances are granted. This has been described in detail in Section 2.6.1. In this policy (*tinit_de*), in addition capital income is added, and the relevant taxable income results.

EUROMOD Notes: Losses are not observed in the data. Thus, they are assumed to be zero, or negligibly small, such that they can be neglected in the simulation. Also any other specific extraordinary expenses that are not observed in the data are assumed to be negligible and are not considered in the simulation.

- **Tax Schedule**

The tax schedule from the personal income taxation in Germany has progressive elements (see Table 27). Due to a basic tax-free allowance (7,834 euros per year in 2009 and from 2010 to 2012 8,004 euros per year) and several tax brackets beyond this allowance, the entire schedule has a progressive effect.

Table 27. Personal Income Tax Schedule (2012)

| Bracket | Lower limit (for $Y$) | Upper limit (for $Y$) | Marginal Tax Rate (%) | Tax Burden (TAX) |
|---|---|---|---|---|
| 1 | 0 | 8,004 | 0 | $TAX = 0$ *(tax-free allowance)* |
| 2 | 8,005 | 13,469 | 14-24 | $TAX = (912.17*Z_1 + 1\,400)*Z_1$<br>$Z_1 = (Y - 7\,992)/10\,000$ |
| 3 | 13,470 | 52,881 | 24-42 | $TAX = (228.74*Z_2 + 1\,400)*Z_2 + 1038$<br>$Z_2 = (Y - 13\,464)/10\,000$ |
| 4 | 52,882 | 250,000 | 42 | $TAX = 0.42*Y - 8\,172$ |
| 5 | 250,001 | - | 45 | $TAX = 0.45*Y - 15\,694$ |

Taxable income falls into five different tax brackets. There was a basic tax allowance of €7,834 in 2009, which was increased in 2010 up to €8,004. Within the progressive tax schedule, the lowest marginal tax rate is at 14% and the highest at 45%. The latter applies to a taxable income above €250,001. The only flat areas, where the tax rate is constant, are in this highest bracket and in the second highest bracket (starting at 52,152 euros), where a tax rate of 42% applies. Up to a marginal tax rate of 42%, the tax rate increases continuously and is determined by two different equations that apply within the two brackets (see Table 27).

This tax schedule is the base for all simulations, i.e. it applies to the determination of the relevant tax rate when accounting for progression clause, either with or without accounting for the child allowance. It also applies identically to individual and to joint taxation. At the latter it applies to the mean income of the spouses. This means that the bracket thresholds are, loosely speaking doubled in case of joint taxation.

EUROMOD Notes: Several elements of the tax schedule (e.g. $Z_1$ and $Z_2$) are computed in temporary variables during the simulation (in the form of *int_##_s*). These are only applied within the tax schedule at the computation of the tax burden, and have no further function in the simulation.

- **Tax Credits**

There are no explicit tax credits in German income tax law. Any allowances and deductions are only applied as far as taxable income is greater than zero. There is no such case that taxable income can be negative and a tax credit is refunded.

### 2.6.3 Joint Taxation (*tinjt_de*)

In the German income tax system, married couples are taxed jointly with full income splitting, i.e. the tax function is applied to half of the sum of the spouses' taxable incomes, and then the resulting tax amount is doubled. In the simulation (*tinjt_de*), joint taxation has been implemented. It is assumed that all married couples, i.e. those who report to be married and live together with a partner, opt for joint taxation. Married couples can only be better off or indifferent when choosing joint taxation, but never be worse off than when choosing individual taxation. For all other individuals, individual taxation has been simulated.

In this policy sheet (*tinjt_de*), the tax function is applied to the case of joint taxation. Generally, the simulation of the tax function is structured in the same way as for individual taxation, some detailed differences apply:

1) First, the relevant average tax rate is determined for all married couples, by applying taxable income and again accounting for progression clause (by adding related benefits to taxable income). Now, the crucial difference to individual taxation is that for married couples their mean income is applied, i.e. their taxable incomes, including benefits from progression clause, and after accounting for all allowances, are summed up over the two spouses and divided by two. This is the relevant taxable income of the couple. This taxable income is put into the schedule, and a tax burden is returned. Again, this is not the final burden, it only determines the rate. The resulting average tax rate -- applied to taxable income, *excluding benefits* – determines the relevant tax burden. This tax burden is multiplied by two in order to account for the fact that only half of the spouses' income is put into the schedule. This is the relevant tax burden of the couple, before accounting for the child allowance.

2) Secondly, the child allowance is accounted for, in case it applies. It applies if the married couple has at least one dependent child in the household that is eligible for child benefits (see Section 1.3.5 for eligibility criteria). The amount of the allowance is doubled for married spouses (also see below at Tax Allowances). The child allowance reduces taxable income if it applies. The tax burden is derived. Again, progression clause must be accounted for, i.e. benefits are considered when the tax rate is determined, but they are excluded from the actually taxed income.

3) Thirdly, the higher-yield test is undertaken in order to determine which of the two is more profitable for the tax unit, the application of the child allowance, or the receipt of child benefits. This is done analogously to individual taxation.

4) Then, the resulting tax burden is allocated among the two married spouses, according to their taxable income. This is the relevant tax burden for each married spouse, at the individual level, i.e. assigned to each spouse.

5) Next, the solidarity surcharge is computed (variable *txc_s*). Analogously to the regular tax burden, it is first computed at the couple level and then allocated among the two married spouses according to their taxable income. It is then added to the regular tax burden.

6) Finally, tax burdens (including the solidarity surcharge) for the two groups of spouses, childless couples and couples with children, are assembled and added to the tax burden of those taxed individually (*tin_s)*. Again, an average tax rate can be calculated.

- **Tax Unit**

Generally in joint taxation, the unit of analysis is the couple of married spouses. This is necessary to account for the fact that for married spouses, incomes are summed up and tax burdens in turn allocated. However, when the schedule is actually applied to the mean income of the spouses, it only needs to be applied to the head of the household, as the relevant taxable income of the married couple (*temp_11_s*) has been assigned to the head. Thus, for the simulation of the schedule, the unit of analysis technically is the individual, i.e. the household head.

EUROMOD Notes: Generally, the head of the household of a married couple need not necessarily be one of the spouses of the couple. In multi-generational households, there can be more than one married couple. In the data for Germany, however, there is no household with more than one married couple. As a consequence, the simplification of assigning taxable incomes of the married couple to the household head is appropriate.

- **Tax Exemptions**

As for individual taxation, the benefits that are subject to progression clause are generally exempt from income tax. Also at joint taxation, progression clause is implemented in the simulation.

- **Tax Allowances**

Generally, in the context of the child allowance, the same rules apply to a married couple, as for individual taxation. However, the amounts of the allowance are doubled for married spouses. It amounts to 6,024 euros per year *and child* in 2009. It was raised to 7,008 euros in 2010 and has stayed constant ever since. Since 2000, it includes an allowance for child care.

EUROMOD Notes: Also at joint taxation, the child allowance needs specific treatment in the simulation. Due to the higher yield test, i.e. the check whether the child allowance is more beneficiary for the tax payers than the child benefits, income taxation needs to be simulated twice, once with and once without the child allowance.

- **Tax Base**

Firstly, for each spouse separately, income from six different sources is summed up, and several allowances and deductions are accounted for (already in policy *tin_de*, also see Table 10). This income is then summed up over the two married spouses and the average income is applied. This is the relevant taxable income for the couple, which is the tax base.

- **Tax Schedule**

The same tax schedule, as for individual taxation, also applies to joint taxation (see Table 27). At the latter it applies to the mean income of the spouses. This means that the bracket thresholds are, loosely speaking doubled in case of joint taxation.

EUROMOD Notes: Again, several elements of the tax schedule (e.g. $Z_1$ and $Z_2$) are computed in temporary variables during the simulation (in the form of *int_##_s*). These are only applied within the tax schedule at the computation of the tax burden, and have no further function in the simulation.

- **Tax Credits**

There are also no explicit tax credits that apply to joint taxation in German income tax law.

## 2.7 Capital Income Taxation

Since 2009 there is a final withholding tax on capital with a flat tax rate of 25%.[11] This rate applies above a saver's tax allowance, which amounts to €801 for single persons – for couples, it is doubled. The saver's tax allowance has stayed constant for the period 2009-2012.

For years previous to 2009, capital income taxation was simulated in the context of personal income taxation, i.e. in the policies *tinit_de* and *tinjt_de*, because the capital income was treated as any other income. From 2009 on, there is a separate policy for capital income taxation, namely *tinkt_de*.

### 2.7.1 Tax Unit

The tax unit for capital income taxation is the same as the unit for personal income taxation. This holds for all the years 2009-2012. It is again assumed that married couples choose joint taxation. Thus, capital income for married couples is joint income and accordingly, married couples get granted double the tax-free allowance on capital income.

### 2.7.2 Exemptions

There are no exemptions for capital income taxation. All income that is considered capital income is subject to capital income taxation. This holds for interest income from savings accounts or bonds, as well as for dividends and other pay-outs. It also holds for gains from price arbitrage sales of assets.

### 2.7.3 Tax Allowances

There is a basic allowance for income from capital, which was subject to changes over the years (see Table 28). Income from the investment of capital is tax exempt as far as it falls below this threshold. For married couples, the double of this allowance is granted.

Table 28. Capital Income Taxation: Basic Allowance (2009-2012)

| Allowances | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| - Singles | 801 | 801 | 801 | 801 |
| - Married Couples | 1,602 | 1,602 | 1,602 | 1,602 |

### 2.7.4 Tax Base

The tax base is all income from capital. This is interest income from savings accounts or bonds, as well as from dividends and other pay-outs. Also gains from price arbitrage sales of assets, e.g. when stocks are bought at a lower price than they are sold, falls under capital income.

### 2.7.5 Tax Schedule

From 2008 on, the tax rate is a flat rate of 25%.

[11] The rate of 25% excludes the solidarity surcharge of 5.5% on the tax burden. The effective rate would be 26.375% (excluding church taxes of 8% or 9%, depending on confession). However, church taxes have not been simulated in EUROMOD.

### 2.7.6 Tax Credits

There are no tax credits for capital income taxation.

# 3. DATA

The underlying data base consists of the German contribution to the European Union Statistics on Income and Living Conditions (EU-SILC). This data set is in the following described in some detail. The quality of the sample is addressed in terms of under-reporting, non-response, and the target population captured by grossing-up weights. Adjustments made to the data for a consistent treatment in EUROMOD, as well as assumptions and imputations made are listed.

## 3.1 General Description

The German contribution to the EU-SILC is collected by the national statistical office for Germany (*Statistisches Bundesamt*), under the label "*LEBEN IN EUROPA*". Every year about 14,000 households are contacted by postal mail, and participation in this survey is voluntary. When the survey was started in 2005, the sampling design applied was a combination of quota samples and stratified random samples. The quota samples have been subsequently replaced by stratified random samples, so that the surveys in 2008 and 2010, i.e. the reference surveys underlying EUROMOD, are fully based on stratified random samples. Households are recruited in random samples from an access panel. The access panel consists of a standing pool of households that have been recruited from the German census (*Mikrozensus*). The German census consists of a 1% sample of the total German population. "*LEBEN IN EUROPA*" is much smaller; it only consists of about 0.03% of the population. The random samples of "*LEBEN IN EUROPA*" are stratified by residence (federal state), household composition, social status of the household head, and net household income.

Due to the specific sampling design of "*LEBEN IN EUROPA*", every additional survey year consists of an "old" sample and a "new" sample. Three quarter of the additional sample stem from the old sample, which is taken from the previous-year survey. The remaining quarter makes up the new sample, which is drawn as a random sample from the standing access panel. As a result, each household will be followed for a maximum of four years in this kind of rotating panel. The researcher, however, cannot follow the same households over time.

Some major facts about the data base are summarized in Table 29. The national SILC data, collected under "*LEBEN IN EUROPA*", have been harmonized by the national statistical office to fulfil the comparability requirements of EU-SILC, elaborated and monitored at Eurostat. The German contribution to EUROMOD is entirely based on the User Data Base (UDB), provided by Eurostat, in which national data has been harmonized (*EU-SILC_UDB_c10 ver 2010-1*; after data manipulations, we labeled the input data base used for *EUROMOD DE_2010_a1*). This was the only source of micro data that has been utilized for the development of the German contribution to EUROMOD. There was no possibility for the national developer team to get any access to the national German SILC data (before harmonization) at the German statistical office at all.

The period of collection was April 2010 to November 2010. The reference period, over which households reported incomes and employment status, was the entire year 2009. For other information, such as social status, household composition, or living conditions, the reference period is the timing of the interview. The survey consists of stratified random samples, which have fully replaced the formerly collected quota samples by 2008. The assessment unit is individuals aged 16 or older, living in private households in Germany. The target population of "*LEBEN IN EUROPA*" is the population living in private households in Germany, except for people in institutions, i.e. for example soldiers living in military caserns, or old people living in nursing homes. A household usually consists of individuals living together and sharing major expenses for daily living. Typically, sub-tenants, guests, au-pair people, and domestic staff do not belong to the household. As a result, the UDB data base consists of 27,906 individuals, living in 13,079 households. 23,531 of these individuals are aged 16 or older.

Table 29. EUROMOD database description

| | |
|---|---|
| EUROMOD database | DE_2010_a1 |
| Original name | EU-SILC_UDB_c10 (ver 2010-1) |
| Provider | Eurostat |
| Year of collection | 2010 |
| Period of collection | April 2010 to November 2010 |
| Income reference period | Year 2009 |
| Sampling | Stratified random samples (since 2008) |
| Unit of assessment | Individuals aged 16 and older, living in private households in Germany |
| Coverage | Private households[1] |
| Sample size | 27,906 individuals in 13,079 households |
| Non-Response rate | 21.65% for the overall sample and 11.41% for the new sub-sample (household level) |

Notes: [1] This covers the entire population living in private households in Germany, except for people in institutions, i.e. for example soldiers living in military caserns, or old people living in nursing homes.

The response rate for households recruited in Germany for the 2010 sample is 21.65% for the overall sample and 11.41% for the new sub-sample. It accounts for both the rate of response at contacted addresses and at household interviews (also see Section 3.2.1). This means that 21.65% of households who have been contacted for the previous survey have not participated again, and 11.41% of those households that have been contacted for the new survey actually declined. For more methodological details, see Statistisches Bundesamt (2012) or Eurostat (2012).

## 3.2 Sample Quality and Weights

In the following, the quality of the sample will be covered. Unit non-response will be evaluated by means of various response rates, population grossing-up weights will be introduced, and finally item non-response and under-reporting will be addressed.

### 3.2.1 Non-Response

Response rates will be differentiated by the response level, i.e. address response rates and individual or household responses. Rates are furthermore calculated for the longitudinal and the cross-sectional sample elements, i.e. for the old sample of households that have already been interviewed in the previous year, and the new sample of households that are drawn from the access panel and interviewed for the first time in this survey.

Not all addresses that have been drawn from the registries have turned out to be actually valid, in a sense that the targeted households were living at the respective address. This is because households could move flats without updating the information at the registries. They would register at the local authority in the district they are moving to, without letting the authority in their old district know. As a result, the address response rate in the "*LEBEN IN EUROPA*" survey is significantly lower than 100%. For the 2010 survey, the address response rate for the overall sample was 87.98% and for the new sub-sample 93.43%. These rates are significantly lower than the average address response rate over all EU countries, and they are actually the second lowest of all the 27 countries.

Moreover, participation in the "*LEBEN IN EUROPA*" survey is voluntary, not like in the census where it is mandatory. As a result, a couple of households that could successfully be contacted did not respond to the questionnaire. These household response rates are 89.05% for the overall sample and 94.82% for the new sample. The respective response rates at the individual level are 99.34% for the overall and 99.43% for the new sub-sample.

The overall response rate, for individuals or households, results from these two response rates. The overall household response rate accounts for both the rate of response at contacted addresses and at household interviews. It is calculated from: (number of addresses successfully contacted / number of valid addresses contacted) * (number of completed household interviews / number of eligible households at contacted addresses). This overall rate at the household level is 21.65% for the overall sample and 11.41% for the new sub-sample. The overall response rate for individuals follows

accordingly. It amounts to 22.17% for the overall sample and 11.92% for the new sub-sample. All response rates calculated here refer to Eurostat (2012) – 2010 Comparative EU Intermediate Quality Report – Version 3 – October 2012.

### 3.2.2 Weights

Grossing-up weights have been generated in order to infer from information in the sample to the targeted population. A double-calibration technique has been applied to the construction of individual-level weights and household-level weights. This double-calibration technique ensures that both the target population of individuals as well as of households is fulfilled by the same grossing-up weight variable. As a result, this weight is identical for each person in one household (DB090=RB050). It can at the same time be applied as an individual weight, aggregating up to the target population of individuals, and as a household weight, aggregating up to the target population of households. The latter can technically be achieved by conditioning on household observations in the sample, by which the weight variable is only counted once for each household, as opposed to the aggregation of individuals where it is counted as many times as there are household members.

Furthermore, there are two other grossing-up variables. One variable accounts for the population of individuals aged 16 or older (PB040). It can be applied to aggregate up to this respective target population. This variable is missing for all other individuals. Then, there is another weight for the population of children aged younger than 12 years (RL070). It can also be used accordingly to aggregate up to this respective target population, and it is missing for all other individuals, aged 12 and older.

Table 30. Descriptive Statistics of the Individual/Household Grossing-up Weight (dwt=DB090=RB050)

| | |
|---|---|
| Number of observations with non-missing weights | 27,978 |
| Mean | 2,889.9 |
| Median | 2,827.8 |
| Maximum | 8,236.9 |
| Minimum | 108.4 |
| Max/Min | 75.9 |
| Decile 1 | 1,454.6 |
| Decile 9 | 4,361.9 |
| Dec 9 / Dec1 | 3.0 |

The respective target population refers to the respective population of individuals and households, as it is captured by the German census (*Mikrozensus*) of the respective survey year. The degrees of freedom at the selection of stratification variables that have been applied for the generation of grossing-up weights to the respective target population has been limited by the restrictions resulting from the double-calibration techniques. The number of resulting combinations that were operationally feasible in an optimization algorithm was limited, as a consequence. Each combination had to fulfil both the number of individuals in the population as well as the number of households. Finally, the variables that have been chosen to determine the stratification of both populations are household composition, social status of the household head, and net household income. Thus, the stratification variable residence (federal state), which also determines the random sample, has been excluded from the construction of weights. Furthermore, the weights for the population of individuals aged 16 and older as well as the children have been generated in separate calibration approaches (for more methodological details, see Statistisches Bundesamt (2008).

Aggregating up the original 27,978 individuals, from the survey, amounts to 80,853,338 individuals in the target population. This population has been slightly reduced in EUROMOD for consistency between demographic variables and income variables that refer to the previous year. Children born after the income reference year (2009) and before the interview (April - November 2010) have been excluded from the data set. This drops 72 individual observations, but leaves the number of households unaffected.

After dropping these 72 babies born in the interview year from the EUROMOD simulations, 27,906 individuals living in 13,079 households remain in the 2010 survey. Aggregated up to the population, they cover 80,612,701 individuals, living in a total of 39,718,716 households. Consequently, the target population of individuals aged 16 or older remains unaffected by dropping these babies at 23,687. Descriptive statistics on the variable for the grossing-up weight from the 2010 SILC data base are provided in Table 30.

### 3.2.3 Item Non-Response and Under Reporting

Item non-response has been addressed at the clearing up of the raw data in "*LEBEN IN EUROPA*". The fraction of households with incomplete or missing information in the 2010 survey varies over the various income components, between 0% and 47%. The fraction of individuals with incomplete or missing income information varies between 0% and 100% over the income components. At the variable for gross household income (HY010), the fraction of households with missing information was 0.2%, and at the variable for net household income (HY020), this fraction was 0.4%.

Item non-response at the various income components, but also at other variables, has been corrected for by means of various statistical imputation methods. In case information was missing only for some of all household members (partial unit non-response), the reported household income has been multiplied by a household-specific correction factor. In case of item non-response, missing information has been imputed by the means of either deductive imputation, or statistical imputation. This has been complemented by gross-net converting approaches, applying tax and social security regulations, also in terms of regression analysis (see Statistisches Bundesamt, 2008).

Under reporting shall be briefly addressed by comparing average amounts and grossed-up aggregate amounts of some major income components to other external micro data. The figures are tabulated for all micro data sets under comparison in Table 31. More on this can be found in Chapter 4, in terms of external validation of EU-SILC data and EUROMOD simulation results.

Income from employment (*yem*), on average over all individuals, amounts in EU-SILC for Germany to 13,051 euros per year for 2009 (28,124 euros per year if the average is taken over all individuals with positive earnings), and in the German Socio-Economic Panel (SOEP) to 12,595 euros (25,853 euros if computed conditional on positive earnings). The compared results are quite close. The aggregate amount of income from employment, when grossed-up to the population, is almost identical in SILC and the SOEP. It amounts to 1,052.049bn euros per year in SILC and to 1,027.346bn euros in SOEP, both for the income reference year 2009. It is slightly lower in the household budget survey for Germany (EVS): 978.144bn euros. However, this figure refers to the income reference year 2008.[12]

Table 31. Reporting of Incomes in SILC and other Micro Data (per year)

| | Uncond. Mean (euros) | Cond. Mean* (euros) | Uncond. Median (euros) | Cond. Median* (euros) | Aggregate (bn. euros) |
|---|---|---|---|---|---|
| Income from Employment (yem) | (per individual) | (per individual) | (per individual) | (per individual) | (in the population) |
| SILC (for 2009) | 13,051 | 28,124 | 0 | 25,000 | 1,052.05 |
| SOEP (for 2009) | 12,595 | 25,853 | 0 | 22,800 | 1,027.35 |
| EVS (for 2008) [1] | n/a | n/a | n/a | n/a | 978.144 |
| Disposable Household Income (ils_dispy) | (per household) | (per household) | (per household) | (per household) | (in the population) |
| SILC (for 2009) | 31,224 | -- | 25,725 | -- | 1,239.97 |

[12] The household budget survey for Germany (EVS) is only available all five years, with 2008 being the most recent available cross section. As it is a household survey, no average per individual for income from employment is available.

| | | | | | |
|---|---|---|---|---|---|
| SOEP (for 2009) | 32,669 | -- | 26,649 | -- | 1,397.04 |
| EVS (for 2008) [1] | 35,071 | -- | 28,492 | -- | 1,382.09 |

Notes: * Conditional on positive earnings. [1] Household budget survey (EVS) only available every five years; 2008 most recent cross section.

Disposable household income, following the EUROMOD concept (*ils_dispy*, also see Table 36), on average over all households, amounts to 31,224 euros per household in SILC for 2009 (median 25,725 euros), and to 32,669 euros in SOEP for 2009 (median 26,649 euros). On population aggregate, it amounts to some 1,239.971bn euros per year in SILC and to some 1,397.043bn euros in SOEP, both again for 2009. The comparable figure in the EVS 2008 is 35,071 euros per household (median 28,492 euros) and 1,382.090bn euros for the aggregate. However, the EVS figures all refer again to the income reference year 2008.

## 3.3 Data Adjustment

The data have been cleared up such that within household relations are coherent, i.e. assuring that young children are not living on their own and that family relations are consistent. Variables for the identification number of the person, of the household, and if applicable of the mother and the father in the household have been adjusted accordingly. However, these adjustments were only of minor relevance in case of Germany.

For reasons of consistency between demographic variables at the time of the interview and income variables that refer to the previous year, age has been assigned at the beginning of the interview year. As a consequence, children born after the income reference year (2009) and before the interview (April-November 2010) have been excluded from the data set. This drops 72 individual observations, but leaves the number of households unaffected.

## 3.4 Imputations and Assumptions

In this section, the reference time period is described, the relation between gross and net incomes is explained, and a correction for non-take-up of some social benefits applied in EUROMOD for Germany is introduced. In addition, disaggregation techniques applied to disentangle harmonized UDB benefit data are described, an approach of approximation of the benefit entitlement basis for contributory benefits is illustrated, and the imputation of housing costs, as well as other imputed variables is briefly addressed.

### 3.4.1 Time Period

The time over which the micro data for "*LEBEN IN EUROPA 2010*" has been collected was April 2010 to November 2010. Demographic information has been reported with reference to the time of the interview. This refers to information at the individual level, such as marital status, social status, and education, as well as at the household level, such as tenure status, household composition, and living conditions. For reasons of consistency between demographic variables at the time of the interview and income variables referring to the previous year, age has been assigned at the beginning of the interview year.

The reference period, over which households reported incomes, was the entire previous year 2009. This relates to any monetary information, on income from all sorts of sources (employment income, retirement income, capital income, private transfers, and social benefits), as well as any expenditures reported (taxes on income and social security contributions and expenditures for housing).

The reference period for labour market information is two-fold. There is information that refers to the time of the interview, such as number of hours usually worked per week in the main job, if the person is actively looking for a job, if the person has ever worked before, the person's current employment status, as well as the type of occupation, the position in the job, and the industry of employment. Then there is information that refers to the income reference

period, i.e. the entire previous year, such as employment activity by month, reported in the number of months spent in full-time work, part-time work, unemployment, retirement, studying, or inactivity. Then there is information that refers to a longer period, such as the number of months ever spent in work (as an employee or self-employed), which has been reported as of the time of the interview and which refers to the entire working life.

All monetary information on incomes and expenditures has been converted into monthly averages in EUROMOD, regardless of the actual number of months of receipt. This means that, as the reference period usually is the entire previous year, incomes and expenditures have been assumed to be received, respectively paid, continuously and at the same rate throughout the entire year. No additional information on the number of times a particular income or benefit has been received throughout the year could have been exploited.

### 3.4.2 Gross Incomes

The UDB data for Germany contain information about the sum of direct taxes and social security contributions paid during the income reference period (*tis*). This includes, for the direct taxes, personal income taxes, payroll taxes, church taxes, and solidarity surcharge. For the social security contributions, it includes contributions to statutory pension insurance, statutory and private health insurance, statutory and private long-term care insurance, and unemployment insurance. There is no single information on any of these components available in the data.

For most of the income variables, there is only information on the pre-tax values available in the SILC data for Germany. Respective net variables are either empty or identical to the gross variable. Only in case of several social benefits at the individual level (PY090, PY100, PY110, PY120, PY130), for some observations, the net variables are filled in and differ from respective gross variables. For these observations, a gross-to-net conversion has been undertaken, i.e. taxes and social security contributions have been imputed. However, in EUROMOD simulations, only gross (pre-tax) information is applied, no net variables are used. Also the aggregate information on taxes and social contributions paid (tis) is only used for validation of EUROMOD simulations, but it is not used in the simulations and does not affect them.

### 3.4.3 Correction for Non-Take-up of Benefits

The default in the EUROMOD simulations assumes full take-up of social benefits. () The policy takeup_de has been implemented to allow for corrections to the default assumption of full benefit take-up of social assistance benefits. This policy is kept switched off in the baseline simulations for all policy years. The reason is that the present model yields simulated number of recipients of social benefits that fit almost perfectly the figures provided by official statistics. However, if a user is interested in implementing a non-full take-up of social assistance benefits and comparing the results from different scenarios of take-up, this is enabled by the respective policy. For more details on the implementation, see EUROMOD Country Report for Germany (2012).

### 3.4.4 Disaggregation of Harmonized Benefit Data

In the framework of the UDB data, information on individual-/household-level benefit receipt and amounts, as reported in the national data for "*LEBEN IN EUROPA 2010*", has been aggregated to broader benefit categories, for the sake of harmonization across countries. For Germany, this aggregate UDB data from Eurostat was the only source of micro data that could have been used for simulation. There has been no possibility to validate disaggregation or simulation effort with the national data (before harmonization) at all.

However, in order to simulate policies of the single social benefits, individual-/household-level information on receipt and amounts of the single benefits is indispensable. Thus, the national EUROMOD team for Germany has made some effort to disaggregate the broader benefit categories in the UDB data into its original benefits, at the individual-/household-level. Generally, the procedure was to infer eligibility and benefit amounts from observed information on individual/household characteristics, current activity, and receipt of aggregate benefits. In addition, for contributory benefits, the benefit function has been inverted in order to infer the benefit entitlement basis (also see Section 3.4.5).

In more detail, firstly, each of the single benefits had to be assigned to one of the broader UDB categories. This means that we had to decide whether for example pensions from the statutory accident insurance, as they are reported in the original national data, are more likely to be aggregated to old-age benefits, or to sickness benefits, or to disability benefits.[13] By that way, all the single benefits categories reported in the original data were assigned to one of the following aggregate categories: pensions from private plans, unemployment benefits, old-age benefits, survivors' benefits, sickness benefits, disability benefits, education related allowances, family/children related allowances, social exclusion, and housing allowances. This has been done according to Table 32.

So far, this only relates to categorising the benefits. Now in the second step, it comes to actually disentangling the aggregate micro benefit data at the individual/household level. Therefore, eligibility and amounts have to be assigned, while only receipt and amount of the broader aggregate benefits is known. This has generally been done with the help of observed information on individual characteristics (like age, gender, marital status, and health status), on current activity (months spent in retirement, work, unemployment, and education), on employment (employment status, industry, weekly hours worked, search activity, employment income), on household characteristics (household composition, presence and number of children), on benefit receipt for aggregate benefits, on benefit regulations (eligibility, rates, and maximum and minimum amounts), and on the little that is known on work history (months ever in work).

However, in many cases, this observed information was not sufficient to determine eligibility and amounts perfectly. In these cases, we generally proceeded following two approaches, often in a combination of the two: 1) assigning aggregate benefits to exactly one of the disaggregated benefits, in case this was possible, assuming only one of the aggregate benefits is received at a time. However, this assumption can well be violated so that some error is inevitable with this approach. But, often this was the only possible approach when benefits depend on (unobserved) contributions. For example, old-age pensions were assumed to be either for civil servants, or for public service, or for farmers, or for self-employed, or for employees (according to labour status), but not to more than one of these for the same individual. 2) Where possible, eligibility and amounts of disaggregated benefits have been determined directly, i.e. by inferring from observed information, or say imputing the benefit. For example, child benefits are non-contributory in Germany. Eligibility and amounts only depend on the age of the child. Programming this benefit can be done directly, and it already comes close to simulating it for current law. The difference being that here the benefit entitlement basis is not yet simulated; it is either observed (at means tested benefits), or it is unobserved (at contributory benefits), or there is none because benefits are universal (e.g. child benefits). These approaches shall be clarified in the following when disaggregation procedures are described in detail for the single aggregate benefit categories.

For income from employment (yem), there has been no need to disaggregate because none of the single components has been simulated. Income from employment consists of the single components: wages and salary from main and second jobs, severance pay from last job, 13th and 14th month wages, Christmas bonuses, holiday payments, profit sharing, other special incomes, bonuses to cover work-related travel expenses related to public transport, and military or civil service payments.

Similarly, there has been no need for disaggregation at income from rent (ypr), which only consists of income from rental of a property or land, and at income from capital (yiy), which only consists of income from interest, dividends, or profit from capital investments in unincorporated business. This means that these benefits have been treated as compound benefits in the simulations. This is relevant for income from rent at personal income taxation (policies tin_de, tinit_de, tinjt_de), where it has been assumed that this income is entirely taxable under income from rent. Similarly, income from capital has been assumed at income taxation to be entirely taxable, apart from any allowances for capital income, where applicable.

[13] There was no way to get documentation on this aggregation from the national statistical office for Germany and we were not able to fully verify our assignments of the single benefits to the broader categories, but we rather had to rely on our good guesses and on some oral statements from office staff on a few specific variables.

Table 32. Disaggregation of Harmonized Benefit Data

| Income source | EU-SILC variable | Name of tax-benefit instrument (in English and national language) |
|---|---|---|
| Pension from private plans | PY080G | |
| | | Regular income from private old-age pensions and life, inability to work, or accident insurances (Rente aus der privaten Vorsorge durch Lebens-, Renten-, Berufsunfähigkeits- oder Unfallversicherung) |
| | | Benefits from private long-term care insurances or daily sickness allowances from private health insurances (Leistungen aus privater Pflegezusatz- oder Krankentagegeldversicherung) |
| Unemployment benefits | PY090G | |
| | | Unemployment benefits I (Arbeitslosengeld I) |
| | | Unemployment benefits II (Arbeitslosengeld II, kein Sozialgeld) |
| | | Benefits for business start-ups (Förderung der Existenzgründung: Ich-AG, Überbrückungsgeld) |
| | | Benefits for re-training (Umschulungszuschüsse) |
| | | Severance pay (Kurzarbeitergeld, Schlechtwettergeld, Wintergeld, Konkursausfallgeld, Umschulungsgeld, u.ä.) |
| | | Benefits for early retirement (Vorruhestandsgeld) |
| Old-age benefits | PY100G | |
| | | Old-age pension of statutory pension insurance (Altersrente der gesetzlichen Rentenversicherung) |
| | | Old-age pension for civil servants (Pension, Altersruhegehalt) |
| | | Pension for employees in public service (Rente der Zusatzversorgungskassen des öffentlichen Dienstes) |
| | | Pension from employer schemes (Werks- bzw. Betriebsrente) |
| | | Pension schemes for self-employed, freelancers, and farmers (Rente berufsständischer Versorgungswerke, landwirtschaftlicher Alterskassen und Landabgaberenten) and Supplements to old-age pension insurance contributions for farmers (Zuschüsse der landwirtschaftlichen Alterskassen) |
| | | Old-age pension from a foreign country (Auslandsrente) |
| Survivors' benefits | PY110G | |
| | | Rente/Pension fuer Hinterbliebene (Witwen-, Waisenrente/-pension) |
| Sickness Benefit | PY120G | |
| | | Sickness benefits from the statutory health insurance (Krankengeld der gesetzlichen Krankenversicherung) |
| Disability benefits | PY130G | |
| | | Pension from the statutory accident insurance (Rente der gesetzlichen Unfallversicherung) |
| | | Long-term care benefits from the statutory accident insurance (Pflegegeld) |
| | | Pensions for reduced ability to work from the statutory or employer pension insurance (Erwerbsminderungs- oder Berufsunfähigkeitsrente der gesetzlichen oder betrieblichen Rentenversorgung) |
| | | Pensions for disability to work for civil servants (Pension aufgrund von Dienstunfähigkeit) |
| | | Benefits for war victims and burden sharing (Lastenausgleichsrente, Rente der Kriegsopferversorgung) |
| Education related allowances | PY140G | |
| | | Education and professional training benefits, scholarships (BaföG, Stipendium, Berufsausbildungsbeihilfe) |
| Income from rent | HY040G | |
| | | Gross income from rental of a property or land (Bruttoeinkünfte aus Vermietung und Verpachtung, vor Abzug von Steuern und ohne Betriebskosten) |
| Income from capital | HY090G | |
| | | Gross income from interest, dividends, or profit from capital investments in unincorporated business (Q50 from HH-Questionaire: Bruttoeinkünfte aus Wertanlagen: Zinsen, Dividenden und Gewinne -- vor Abzug von Steuern) |
| Family/children related allowances | HY050G | |
| | | Maternity-leave benefits (Mutterschaftsgeld) |
| | | Parental-leave benefits (Erziehungsgeld) |
| | | Child benefits (Kindergeld) |
| | | Additional child allowances (Kinderzuschlag, nicht des öffentlichen Dienstes) |
| Social exclusion | HY060G | |
| | | Social benefits (Sozialgeld) |
| | | Social assistance (Sozialhilfe, laufende Hilfe zum Lebensunterhalt) |
| | | Means-tested basic old-age assistance (Bedarfsorientierte Grundsicherung im Alter oder bei Erwerbsminderung) |
| | | Advances on alimony payments (Unterhaltsvorschuss) |
| | | Benefits from non-profitable charity organizations (Geldleistungen von Wohlfahrtsorganisationen, z.B. AWO) |
| Housing allowances | HY070G | |
| | | Housing benefits (Wohngeld, ohne Wohngeld in Verbindung mit Arbeitslosen-/Sozialgeld) |
| | | Housing benefits under unemployment benefits II and social assistance (Wohngeld in Verbindung mit Arbeitslosen-/Sozialgeld) |

Pensions from private plan (*ypp*) have been disaggregated to two components by the following procedure.

1. Firstly, the observed aggregate benefit amount is assumed to be non-pension income for all non-pensioners. Thus, for all non-pensioners, it is assumed to be referring to "Private long-term care insurances or daily sickness allowances from private health insurances".

2. Secondly, for all pensioners, the observed benefit is assumed to be entirely referring to "Regular income from private old-age pensions".

Unemployment benefits (*bun*) have been disaggregated into six components by the following procedure.

1. Firstly, observed benefit amount is assumed to be entirely referring to "Benefits for early retirement" for individuals who are pensioners, or sick or disabled, or inactive, or report "other" employment status if they report either full-time "pensioner" or some months "pensioner" and some months "in work" and at the same time are aged between the minimum age for early retirement (55) and one year younger than regular retirement age (64).

2. Secondly, the observed aggregate benefit amount is assumed to be entirely referring to "unemployment benefits II (ALG II)" for individuals who have not been assigned early retirement benefits and who do not report "unemployed" or who report exactly the basic benefit rate for ALG II. Benefits are also assigned for all individuals who do report "unemployed" if also report not to be "actively searching for a job" (in order to disentangle ALG II from ALG I). In addition ALG II is assigned to all individuals who report "unemployed" and 12 months spent in unemployment if they have ever been in work fewer months than the median months among the unemployed.

3. Thirdly, observed benefits are assigned to "unemployment benefits I (ALG I)" for those who report "unemployed", and 12 months spent in unemployment, and "actively searching for a job", and have at least been employed 12 months in their life (eligibility criterion for ALG I), and are aged younger than regular retirement age (65), and are currently working less than 15 hours a week (threshold for ALG I receipt), and earn less than 165 euros per months from employment (maximum additional earnings threshold for ALG I), and are not in receipt of ALG II.

4. Then, observed benefits are assigned to "severance payments" for all individuals who report "unemployed", and less than 11 months spent in unemployment (proxy for short-term character of these benefits), and are not in receipt of ALG II.

5. Next, observed benefits are assigned to "benefits for business start-ups" for individuals who report "self-employed", and who are aged at least as old as the retirement age, and are not in receipt of ALG II.

6. Then, observed benefits are assigned to "benefits for re-training" for individuals who do not report "self-employed", and who are aged at least as old as the retirement age, and are not in receipt of ALG II. Also the remaining residual is assigned to these benefits.

7. Finally, some ex-post corrections based on the magnitude of and compatibility among the benefits has been carried out. By way of example, individuals that after the previous procedure were assigned to receive (non-contributory) unemployment benefit II, but the magnitude of the benefit was well above the minimum-income threshold, were in this step "ex-post" reclassified to being recipient of (contributory) unemployment benefit I. This last step in the disaggregation procedure was not necessary for SILC2008 data. However, the particular situation in which the German labour market was in 2009 has made it necessary when preparing the data of SILC2010. For further details, please see sections 4.1.1 and 4.1.2.

Old-age pensions (*poa*) have been disaggregated into six components by the following procedure.

1. Firstly, "old-age pensions for civil servants" have been simulated, applying the time ever employed, an average monthly pension (from pension statistics for 2009), and a factor regulated in pension law that determines the pension for each year spent in full-time civil-service employment. The observed benefit amount is assumed to be entirely referring to "old-age pensions for civil servants" if it falls in a band of +/- 35% of the simulated amount (chosen such that the aggregate fit is good), and if the individual is not working in the agricultural sector.

2. Secondly, "Pensions for employees in public service" are simulated. Civil servants usually get these benefits on top of their pensions. Thus it is assumed that they are already included in the simulated old-age pensions for civil servants. The share of these benefits from total pensions for civil servants has been estimated to be about 17% (from SOEP and EVS micro data). This share is assigned to the same group that receives 1) and it has been subtracted from 1).

3. Thirdly, the observed benefit amount is assumed to be entirely referring to "Old-age pensions for self-employed and farmers" for individuals who are not civil servants, and who work either in the agricultural sector, or who do not work in the agricultural sector, but report "self-employed". Benefits are also assigned who report "pensioner" and have positive income from self-employment that is greater than average in the group of self-employed.

4. Then, observed benefits are assigned to "Old-age pensions from the statutory pension insurance" for individuals who report "pensioner", and who are not civil servants, and who do not work in the agricultural sector, and who are in not in receipt of any other old-age pension.

5. Then, observed benefits are assigned to "Old-age pensions from employer schemes" for individuals who report "employee", and who are not civil servants, and who do not work in the agricultural sector, and who are not in receipt of any other old-age pension. For those individuals who remain with zero benefits, it is assumed that benefits are included in old-age statutory pensions under 4) and they have been subtracted from 4) at a share of 9% (estimated from SOEP and EVS data).

6. Finally, observed benefits are assigned to "Old-age pensions from a foreign country" if individuals are foreigners and they do not receive income from any other old-age pension. It is also assigned if individuals report "unemployed", or "student", or "sick or disabled", or "inactive", or report "other" employment status, and they do not receive any other old-age pension.

Disability benefits (*pdi*) have been disaggregated into five components by the following procedure.

1. Firstly, a preliminary proxy for pre-spell employment income has been estimated. A linear regression for employment income (*yem*) on demographic variables (quadratic in age; gender; marital status; education; number of months in work; civil servant; sector; industry) has been estimated, conditional on the group of employees. The prediction for the entire population has been applied as a preliminary proxy for pre-spell employment income.

2. Secondly, "Pensions from the statutory accident insurance" have been simulated, applying the proxy, and the benefit rate of 67% from pre-spell earnings. Benefits have been assigned for individuals who are not civil servants, and who are sick or disabled, and who have ever been employed before, and who are not actively looking for a job, and who are not in receipt of unemployment benefits I. Full-time and part-time work is accounted for, approximated by current hours worked. At maximum, observed compound benefits are assigned.

3. Thirdly, "Long-term care benefits from the statutory accident insurance" have been simulated, again applying the benefit rate of 70% from pre-spell earnings and the proxy for pre-spell earnings. Benefits have been assigned for individuals who are not civil servants, and who are sick or disabled, and who have ever been employed before, and who are not actively looking for a job, and who are not in receipt of unemployment benefits I. Full-time and part-time work is accounted for, approximated by current hours worked. At maximum, observed compound benefits, minus pensions from the statutory accident insurance, are assigned. Thereby, it is allowed that individuals receive both pensions from the statutory accident insurance and long-term care benefits from the statutory accident insurance.

4. Then, the observed benefit amount is assumed to be entirely referring to "Pensions for disability to work for civil servants" for individuals who are civil servants, either in pension age or not.

5. Then, the observed benefit amount is assumed to be entirely referring to "Pensions for reduced ability to work" for individuals who are not civil servants, and who report either "employee", or "self-employed", or "pensioner", or "unemployed", or "inactive", or "sick or disabled", and at the same time are neither in receipt of pensions from the statutory accident insurance, nor long-term care benefits from the statutory accident insurance.

6. Finally, the residual benefits from the compound disability benefits are assumed to be entirely referring to "Benefits for war victims and burden sharing".

Family benefits *(bfa)* have been disaggregated into maternity-leave benefits, parental-leave benefits, child benefits, and additional child allowances.

1. Firstly, for maternity-leave benefits, the fixed benefit amount is imputed if there is a child in the household aged less than one year, and the mother has ever been in work before (eligibility). This rate is differentiated by

part-time and full-time employment and unemployment, according to the labour status. Benefits are capped at the observed aggregate amount.

2. Then, parental-leave benefits are imputed in a similar manner if a child aged one year or younger is present and parents work less hours than the benefit threshold. A fixed benefit rate is applied to current earnings (as a proxy for pre-spell earnings) and the amount is again capped at the observed aggregate amount.

3. Then, child benefits are imputed, depending on the age of the children and its education status, again capped at observed family benefits.

4. Finally, additional child benefits are assigned for each child in a household that receives unemployment benefits II, but these do not cover the needs of the children (approximated by the distribution of these benefits).

Benefits for social assistance (*bsa*) have been disaggregated into five components by the following procedure.

1. Firstly, the observed benefit amount is assumed to be entirely referring to "Social benefits for children (*Sozialgeld*)" for children aged younger than 18, who live in a household that is recipient of unemployment benefits II.

2. Secondly, the observed benefit amount is assumed to be entirely referring to "General social assistance" for individuals who are aged between 18 and 65, and who report "sick or disabled", and who are not in receipt of unemployment benefits II.

3. Thirdly, the observed benefit amount is assumed to be entirely referring to "Means-tested old-age assistance and assistance for reduced ability to work" for individuals who are in retirement age and not in receipt of unemployment benefits II. They are also assigned to individuals who are aged between 18 and 65, and who do not report "sick or disabled", and who have ever been employed before, and are currently working non-zero hours, and who are not in receipt of unemployment benefits II.

4. Then, the observed benefit amount is assumed to be entirely referring to "Advances on alimony payments" for individuals who are single parents with children aged younger than 12 years, and who report either "divorced", or "widowed", or "living separately", and who are at the same time neither in receipt of general social assistance, nor of means-tested old-age assistance and assistance for reduced ability to work.

5. Finally, the residual benefits from the compound social assistance benefits are assumed to be entirely referring "Benefits from non-profitable charity organizations".

Housing benefits (*bho*) have been disaggregated into those benefits paid under the framework of both unemployment benefits II and social assistance, and those housing benefits paid in the framework of the separate benefit relating to the "*Wohngeldgesetz*". The disaggregation mechanism used here is very simple in that it allocates the benefit to one or the other category depending on whether households are recipients or not of unemployment benefits II or social assistance. If households are recipients of these benefits, then it is assumed the housing benefits are also paid under the framework of unemployment benefits II or social assistance.

Some rules have been applied in general to all disaggregated benefits: At maximum, the total aggregate benefit amount has been assigned, and it is assured that all disaggregated amounts sum up to the respective reported aggregate benefit amount. Thereby, for each aggregate, all sub-component benefits have been adjusted successively, as long as this constraint was not fulfilled.

For some benefits, there has been no need for any disaggregation. There has been no need to disaggregate survivors' pensions (*psu*). They only consist of pensions for widows and orphans, from any scheme. Also sickness benefits (*bhl*) have not been disaggregated. They only consist of sickness benefits from the statutory health insurance. Similarly, education benefits (*bed*) have been treated as a compound benefit, which consists of education and professional training benefits and scholarships. It has been assumed that these benefits all relate to the social education benefits

from the "*Bundesausbildungsförderungsgesetz*" (*BaFöG*). In the next section, another approach that was applied in order to help disaggregate the benefits is described.

### 3.4.5 Approximation of Benefit Entitlement Basis

The benefit entitlement basis is essential for simulations of benefit receipt and amounts in the framework of EUROMOD. For most of the contributory benefits that have been simulated, the benefit entitlement basis is some past, usually pre-spell income, often the after-social-contributions income from employment. The problem for the simulations is that past income from employment is not observed. But, this information can be inferred from benefit receipt under certain conditions. An attempt in this direction has been made in order to be able to simulate any contributory benefits at all.

For contributory benefits, the benefit function can be inverted to infer the entitlement basis if all parameters of the function, except for the entitlement basis, are known. This does not hold for most pensions, as for pensions both the income level, on which contributions have been made, and the duration of contributions are unknown. As a consequence, this procedure has not been applied to any old-age pensions. However, for most other contributory benefits, the duration of contributions is not so important, and only the income level needs to be approximated. In this case, inversion of the benefit function yields a proxy for the necessary information.

This procedure can, of course, only be applied for individuals for whom a spell is observed, because otherwise benefit receipt is unobserved, so that the benefit amount is also unknown, and thus more than one parameter of the benefit function is unknown. However, as for most of the contributory benefits that have been simulated the entitlement basis is very similar (pre-spell after-social-contributions income from employment), an average of all approximated bases, over all contributory benefits, can be generated, and thereby a proxy for the entitlement basis results, also for individuals who are not in receipt of a specific contributory benefit, if they are in receipt of any simulated contributory benefit.

Contributory benefits that contribute to the generation of this proxy are: unemployment benefits I, sickness benefits from statutory health insurance, sickness benefits from private health insurance, long-term care benefits from statutory accident insurance, parental-leave benefits, and disability pensions from statutory accident insurance.

For unemployment benefits I, the number of months benefits were received has been considered. The benefit function has been differentiated by individuals with kids and without kids, and by individuals earning additional income from employment. For the latter group, it has also been considered that they are only allowed to earn additional income up to a threshold. The relevant income for this threshold considers taxes and social security contributions paid, as well as a lump-sum allowance for earnings-related expenses.

For sickness benefits from statutory health insurance, sickness benefits from private health insurance, long-term care benefits from statutory accident insurance, parental-leave benefits, and disability pensions from statutory accident insurance, the benefit function has been simply inverted, conditional on benefit receipt.

An average over all approximated benefit bases has been generated, at the individual level. For those individuals who report "employee", but for whom the proxy evaluates to zero because they are not in receipt of any of the contributory benefits, current earnings, deflated from 2009 to 2008 (by growth rate of employee income from national accounts), have been applied. This has also been done for individuals with a zero proxy who do not report "employee", but who earn positive income from employment. For those with zeros who do not report "employee" and who earn zero income from employment, estimated wages (*yivwg*) and current hours (*lhw*) have been applied.

### 3.4.6 Imputation of Tax Deductions/Allowances

In the first implementation of EUROMOD (EM) for Germany, within the context of the latest framework contract (EUROMODupdate2, program release 6.0), the simulation of personal income taxation accounts for tax allowances and tax deductions, only in a very basic way. In this release, the scope of simulating deductions from taxable income

for expenses that are work related or related to child care, for example, is significantly limited because relevant information on expenditures is not observed in the EU-SILC data. Therefore, in many cases, simplifying assumptions have been made, which imply that individuals either do not declare any tax deductions at all, or that lump-sum minimum allowances apply, in case eligibility for allowances is observed but the actual amount deducted is not. As a result, aggregate allowances and deductions are under-simulated and, in turn, aggregate taxable income as well as aggregate simulated tax liabilities from personal income taxation are significantly over-simulated (by almost 20 percent) in EUROMOD, compared to (preliminary) external figures from official tax statistics for Germany.[14]

## Imputation Strategy

Against this background, the national developer team for Germany has conducted an add-on work package in the context of the EUROMODupdate2 project, in order to improve on the quality of the simulation of personal income taxation for Germany. The strategy is to utilize information from external data on the frequency and the amount of tax allowances and tax deductions actually applied by tax payers. The official income tax statistics for Germany are a suitable data source providing detailed information on the several relevant types of allowances and deductions. Information from the tax statistics for the population of tax payers are imputed into the EU-SILC micro data and used in the EUROMOD simulation of personal income taxation, as a kind of proxy for the allowances and deductions that are not observed in the sample of individuals in the EU-SILC micro data.

In order to account for the heterogeneity in the frequency and the amount of tax allowances and deductions across the distribution of taxable income, micro data from the income tax statistics are utilized. Micro data from the income tax statistics (FAST*: Faktisch anonymisierte Daten aus der Lohn- und Einkommensteuerstatistik*) is available every three years, with a lag of about six years. The team of national developers at DIW Berlin has access to the latest available micro data of FAST for 2004. Moreover, aggregate information from the official tax statistics for 2007 will be used for validation. It is assumed that the distribution of deductions did not change significantly between the years of the tax statistics for which micro data is available (2004) and the respective policy years simulated. This assumption could be validated in an update of this project in 2013, once micro data from FAST for 2007 becomes available, which is expected to be the case in spring 2013. In other words, imputations are done for all policy systems (2007 to 2012) based on the FAST 2004. Next year, once FAST 2007 is available, the validation of the imputations for 2007 will be possible. However, imputations for 2008 to 2012 will naturally have to wait until other FAST waves become available, or at least until aggregate information from the official tax statistics is published for these years.

The empirical strategy involves imputing allowances and deductions, for each relevant type of allowance and deduction, by means of regression imputation, where the heterogeneity in the distribution of the allowances and deductions is captured conditional on an appropriate income concept and relevant socio-demographics that are available in both the FAST and the EU-SILC data sets. As most of the tax deductions are significantly more relevant in the upper deciles of the income distribution, whereas in the lower deciles typically lump-sum allowances apply, this approach captures a great part of the heterogeneity in this distribution of deductions and allowances across the population of tax payers. Given a probability for the frequency of the allowances and deductions, mean amounts observed in the tax statistics are imputed into the EUROMOD simulations, at the household (i.e. tax unit) level and conditional on the relevant income concept, which is typically defined to be the sum of taxable income from all sources, i.e. before applicable allowances and deductions.

## Imputation Methodology

The strategy is to impute information of the amounts of relevant tax allowances and deductions at the tax unit level from the *FAST* micro data into the SILC micro data. The latest available micro data of *FAST* is from 2004. This has been used to impute allowances into the SILC data for 2008 as well as 2010. SILC data for 2008 are underlying

[14] Aggregate income tax revenue simulated in EM for Germany in 2007 amounts to 230 bn euros, excluding solidarity surcharge. The respective preliminary figure from official income tax statistics, which is also reported in the EUROMOD country report for Germany 12/2011, is 193 bn euros. It is preliminary in the sense that it does not include all tax filings yet. In the finite figures from official tax statistics for 2007, the income tax revenue amounts to 211 bn euros. As a result, EUROMOD still over-simulates income tax liabilities by about 9 percent.

EUROMOD in the version F6.0+, which is the latest version currently available to the public. Given that programming of tax and benefit policies has already been finalized for this EUROMOD version, imputed allowances can already be validated to the *FAST* data for the imputations into SILC 2008. To have a consistent comparison in years, instead of *FAST* 2004, we will apply aggregate results from the official income tax statistics for 2007 (which *FAST* 2007 will be based upon) for validation. On the contrary, for SILC 2010, this is not yet possible at the time being, as EUROMOD is currently being updated to the SILC 2010 in the case of Germany. Imputations have been conducted for the SILC 2010 data and are currently processed in the simulations of the 2009 to 2012 policy systems, but imputation results are not included in this section.

Imputations from the *FAST* 2004 data into the SILC 2008 and 2010 data have been conducted by methods of regression imputation. Generally, the regressions for deductions and allowances have been estimated on the *FAST* data, and the coefficient estimates have been used for the prediction into the SILC data, 2008 as well as 2010. The regressions have been estimated separately by several groups of relevant types of allowances.

Relevant deductions and allowances have been grouped into these seven groups:

1) Expenses related to income from employment (commuting, two households, others): *tintaee*
2) Expenses related to other income (mostly pension income): *tintape*
3) Special expenses for alimonies (that do not fall under extraordinary expenses): *tintasp*
4) Other special expenses (e.g. church taxes): *tintaox*
5) Extraordinary expenses for alimonies (that do not fall under special expenses): *tintadp*
6) Extraordinary expenses for childcare: *tintace*
7) Other extraordinary expenses: *tintals*

Probabilities for positive allowances and conditional amounts of allowances have been estimated with a function of income as the main explanatory variable. The relevant income concept varies across the seven groups. For groups 1) and 2), income from respective source is relevant, whereas for groups 3)-7), the sum of taxable incomes from all sources is relevant (see below for details).

The imputation strategy follows a two-stage regression imputation approach. At the first stage, the probability of positive expenses in each of the seven groups is estimated (Probit estimator). In case of groups 1) and 2), the first-stage estimation is not needed, as expenses are positive for each tax unit in the data that has positive respective income, filled either with actual expenses or with a lump-sum amount. The imputation is thus undertaken for each tax unit that has positive respective income in the SILC data. In case of groups 3)-7), probability estimates will be used at the imputation.

At the second stage, conditional on positive expenses in the group, linear OLS regressions have been estimated, only for conditional observations (log-expenses on the left-hand side) and separately for each group of expenses as well as separately for groups of joint or individual taxation rules. The explanatory variables that have been applied in regressions at both stages and that are applied at the imputations (the Z-variables) include:

a. Income
    i. functional form: quadratic-log
    ii. definition: varies over the groups
        1. Gross income from dependent employment (for group 1)
        2. Other income, such as pension income (for group 2)
        3. Sum of income from all sources (for groups 3 to 7)
b. Socio-demographic characteristics (of the male in case of couples taxed jointly)
    i. Age
    ii. Social status (employee, self-employed, pensioner, unemployed, non-employed, student)
    iii. Number of children in the household

Regressions have been estimated at the level of tax units. This implies that jointly taxed couples represent a single observation. No selection correction has been undertaken at the second stage estimation (identical Z-variables at both stages).[15]

The regressions at the first and the second stage deliver coefficient estimates, which in turn are used to predict probabilities and conditional amounts, given the same explanatory variables with similar distributions, into the SILC data. As a result, average imputed probabilities for the seven groups of expenses and average conditional amounts as well as aggregate amounts (weighted by household weights) can be evaluated by the two groups of jointly and individually taxed units. This shall be done in the section following the next one.

### Implementation in EU-SILC and EUROMOD

Tax deductions and allowances are imputed into SILC and used in EUROMOD as input variables. They are not simulated as separate policies, nor are they connected to any simulated income. They will not change if simulated incomes change. This approach has been chosen since the imputed deductions and allowances are typically related to market incomes, which are not simulated in EUROMOD, and not to income from any benefits.

Thus, tax deductions and allowances have been imputed *before* the input data is loaded within EUROMOD, i.e. at the stage where the EU-SILC input data are prepared. In the case of Germany, UDB data for EU-SILC need to be disaggregated, in case of several compound benefit variables.[16] After this has been done, and before the EUROMOD input data set is outputted, tax deductions and allowances are imputed.

The resulting variables for special expenses (*tintaox* + *tintasp* + *tintapv*; imputed) and extraordinary expenses (*tintadp* + *tintace* + *tintals*; imputed) are then available in EUROMOD. They are uprated to policy years later than 2007 by the default uprating factor (CPI). They are then applied in the simulation of personal income taxation (tin_s, where several tax parameters and income from sources are defined) to account for allowances and deductions at the tax unit level.

### Description of Imputation Results

This section provides some descriptive statistics on the imputation results. Table 33 shows average (unconditional) amounts per tax unit and average probabilities for the relevant tax allowances and deductions. For the imputation into SILC, groups 5), 6), and 7) have been grouped together (tinta01_s), as they are simulated under similar eligibility conditions. EUROMOD simulations that underlie these results assume limited take-up of social benefits; see EUROMOD Country Report for Germany (2012) for details.

For groups 1) to 4), generally average annual amounts of the allowances and deductions are roughly of double size for tax units that are subject to joint taxation, as a result of the mechanical effect that income and allowances of spouses are added together for the tax unit in case of joint taxation. Probabilities are of similar size for groups 1) to 3), whereas the probability of positive other special expenses is almost twice as large among jointly taxed couples. For the aggregate group of 5), 6), and 7), the probability is even more than twice as large in case of joint taxation, while the average amount is of similar size. The probability of positive expenses on "3) special expenses for alimonies" is 100 percent for both groups, as these expenses include a lump-sum amount that applies to all tax units.

[15] A selection correction appears unnecessary in this application, as the main interest lies on the fit of the regressions instead of the causal interpretation of single coefficient estimates.
[16] See *Section 3.4.4*. for further details.

Table 33. Imputations for Tax Allowances and Deductions[1]

| | Amount per TU (Unconditional) (in Euros per year) | | Probability (in per cent) | |
|---|---|---|---|---|
| | IT | JT | IT | JT |
| **Relevant Tax Allowances and Deductions:** | | | | |
| 1) Expenses related to income from employment (tintaee) | 1,534 | 2,780 | 55.0 | 61.4 |
| 2) Expenses related to other income (tintape) | 111 | 209 | 29.6 | 34.0 |
| 3) Special expenses for alimonies (tintasp) | 84 | 171 | 100.0 | 100.0 |
| 4) Other special expenses (tintaox) | 628 | 1,180 | 37.1 | 63.5 |
| 5) + 6) + 7) Extraordinary expenses (tintadp + tintace + tintals = tinta01) | 1,919 | 1,882 | 12.1 | 29.1 |

Notes: [1] From FAST 2004 data into EU-SILC 2008 data. In prices of 2007 (EUROMOD income reference year).

The imputed probabilities as well as amounts per tax unit fit relatively closely the observed numbers in the *FAST* data. This holds in general for mean values by individually-assessed and jointly-assessed tax units, as well as to a lesser degree across the distribution of taxable income. On the one hand, by the nature of how the imputations have been constructed, i.e. based on linear regressions that control for tax units and income, the mean amount of deduction observed, given the income, shall correspond to the mean imputed, if the underlying income distributions are identical. On the other hand, the latter condition is not perfectly fulfilled with the SILC and the *FAST* data. This is because lower incomes are relatively under-represented in the FAST, as some individuals with incomes below the tax-free allowance do not file income taxes, whereas higher incomes are relatively over-represented because incomes of the self-employed and income from business activity is better represented in *FAST*. Given these deviations between the income distributions in the two data sets, there systematically result some deviations in the observed and imputed amounts, across the income distribution. In the upper tails of the income distribution, deductions imputed in SILC are lower on average than observed in *FAST*, whereas in the lower tails, they are only slightly higher on average. The over-estimation in the lower tails is small because low-income households typically have zero taxable income so that over-imputation of deductions does not change the fact that their taxable income is zero. As a result, the effects of these deviations in the low tails of the income distribution on disposable incomes simulated in EUROMOD should be negligible.[17] The under-estimation of deductions in the upper tails of the income distribution, however, could contribute to an under-simulation of disposable incomes in EUROMOD when compared to SILC.

## Comparison to Official Tax Statistics

Table 34 compares aggregate amounts for the population of tax units in 2007 between SILC imputations and official tax statistics (each for policy years 2007). Incomes from the single sources as well as relevant allowances and deductions that have been imputed are listed. Income from dependent employment, after accounting for relevant related expenses, matches very closely between imputed SILC figures and the tax statistics.[18] The imputation of relevant expenses related to employment income (*tintaee*), in terms of aggregate amounts, is only slightly lower than in official statistics.[19]

For the other sources of income, there are significant deviations between SILC imputations and *FAST*. These are relatively smaller for income from self-employment and income from capital. It can be expected that incomes from

[17] If there is over-simulation of disposable income in the lower tails of the income distribution in EUROMOD when compared to SILC, this is more likely related to the simulation of means-tested benefits.

[18] Note that these numbers for income from dependent employment, *after* expenses, correspond to the 1,004 bn euros reported for employment income (*yem*) in EUROMOD Country Report for Germany (2012), for 2007, *before* relevant expenses have been deducted.

[19] Note that the latter is taken from the FAST micro data for 2004. It has been uprated to 2007 prices by the growth rate in employment income from national accounts. On the contrary, all other figures from the tax statistics in Table 34 relate to published aggregate amounts for 2007. *FAST* micro data for 2007 are not yet available.

these sources are generally underestimated in SILC compared with official tax statistics because the latter capture the very rich households at the top of the income distribution more precisely.

Table 34. Comparison of Taxable Incomes between SILC Imputations and Official Tax Statistics[1]

| Billion Euros per year | SILC (2008) | Tax Statistics (2007) |
|---|---|---|
| **Incomes by Sources and Relevant Allowances/Deductions:** | | |
| **Income from sources:** | | |
| Income from Dependent Employment (after relevant related expenses) | 949.8 | 944.0 |
| Relevant expenses related to employment income (tintaee; imputed) | 54.5 | 58.0[2] |
| Income from self-employment | 142.2 | 189.1 |
| Income from renting and leasing | 24.0 | 10.9 |
| Income from capital | 20.0 | 29.3 |
| Other income (after relevant related expenses) | 164.2 | 41.0 |
| **Sum of income from all sources** | 1,334.6 | 1,208.7 |
| Special expenses (tintaox + tintasp + tintapv; imputed) | 121.6 | 116.9 |
| Extraordinary expenses (tintadp + tintace + tintals; imputed) | 16.4 | 10.3 |
| **Taxable Income** | 1,134.1 | 1,060.4 |
| Income taxes | 216.9 | 211.0 |

Notes: [1] EU-SILC 2008 data, with reference year 2007, and Official Income Tax Statistics (2007) from Federal Statistical Office for Germany. In prices of 2007 (EUROMOD income reference year). In the case of EUROMOD, special expenses and extraordinary expenses based on the conducted imputations. [2] Figure from FAST micro data for 2004; uprated to 2007 prices by the growth rate in employment income from national accounts.

Deviations are relatively greater for income from renting and leasing as well as other income. Income from renting and leasing is probably heavily over-estimated in SILC because relevant expenses of home-owners related to these incomes that can be deducted are neglected in the simulations (e.g. for maintenance). These could not have been imputed into SILC as they could not have been identified separately in the tax statistics.

Other income (after imputed relevant related expenses) is also heavily over-estimated. Over-estimation of other income in similar degrees is also observed for the national microsimulation model for Germany (STSM), which uses SOEP micro data. It is probably related to over-estimation of pensioners filing income taxes compared to official statistics. On the one hand, this might be related to tax evasion, which has been a known problem in Germany among pensioners in recent years. On the other hand, it could be related to many pensioners not obliged to file income taxes if they can verify in advance that their taxable income is below the tax-free allowance because e.g. their pension income is low and they do not have income from any other source.

As a result, the sum of income from all sources is slightly over-estimated in SILC, by some 10 percent. Now, this deviation is slightly reduced by the imputations for special expenses (*tintaox + tintasp + tintapv*; imputed) and extraordinary expenses (*tintadp + tintace + tintals*; imputed). Both are slightly over-estimated after imputation into SILC. This is likely related to deviations in the distributions of the Z-variables of the imputations between *FAST* and EU-SILC, in particular income from several sources. The deviations are not significant in absolute terms, with 4.7 bn euros for special expenses and 6.1 bn euros for extraordinary expenses.

As a consequence, taxable income is slightly over-estimated in SILC (1,134 bn euros) compared to the official tax statistcs (1,060 bn euros), by 7 percent. Finally, and most importantly, since this was the major purpose of these imputations, simulated income taxes now match official statistics quite closely in aggregate amounts. In the tax

statistics, aggregate income taxes (excluding solidarity surcharge of 5.5 per cent) sum up to 211 bn euros.[20] They are simulated at 217 bn euros in EUROMOD so that only a slight over-simulation remains.

Considering the fact that income taxes used to be over-simulated by about 10 percent (when applying the new external value), whereas now they are over-simulated by less than 3 percent, it can be concluded that the project of imputing tax allowances and deductions from micro data on official tax statistics at the tax unit level into SILC has been quite successful in terms of reducing the over-simulation of income taxes. Further avenues for future projects could involve adjustments at the goodness of fit relating other sources of income, such as income from renting and leasing or other income, in order to further reduce the remaining over-estimation of taxable income and to fulfill similarly close simulations of tax liabilities in future EUROMOD policy systems, in particular in case the quite heavy mismatches at several income sources are do not balance out in such a way they do for the 2007 system.

### 3.4.7 Other Imputed Variables

Housing expenditures (*xhcrt*) have been imputed for the EUROMOD simulations. Observed housing costs in the EU SILC data are underreported compared to official German consumption survey data (EVS). Therefore, housing expenditures have been imputed in the simulations. Firstly, the flat size is estimated from the reported number of rooms, assuming an average room in a rented flat has 25 square meters and in an owned flat or house 27.3 square meters, as reported in the EVS data. Then, an OLS regression of monthly rent paid, including imputed rents for owner-occupiers, on flat size is estimated, separately for renters and owners. The estimated coefficient is imputed in the SILC data and monthly rent is predicted from flat size. This predicted rent is imputed for all renters, while for the owners, observed imputed rents are applied.

Holdings of financial assets have been imputed, inferring them from the observed income from capital (*yiy*). It has been assumed that income from capital has been received as an average rate of return on the stock of financial assets. As a proxy for this rate of return, an average interest rate has been applied. This is the annual average of monthly rates for the year 2010 of the interest rate on deposits for households, with maturity of 1-2 years.[21] It evaluates to 1.948%. Inverting the rate of return function, applying the calibration for the rate, returns the stock of financial assets, on average for the year 2009.

Regional information on residence is missing in the German part of the UDB SILC data (DB040). There has been no possibility to apply any other information that was helpful to impute the missing regional information. As a result, no imputation for the regional information has been implemented.

## 3.5 Updating

In order to account for changes in incomes, benefit amounts, and expenditures over time, monetary variables have been uprated from the reference year (2009) to the respective policy year in EUROMOD (2010, 2011, and 2012). Such changes may occur because prices or wages change, or people change the number of hours they work, or employment rates change. Benefit amounts may change because prices/wages changes and benefits may be indexed to price/wage changes, while expenditures may change because of changes in the prices to rent a flat or because households change their spending patterns.

While uprating of monetary variables could have been implemented to account for changes in aggregate incomes (taken from national accounts) and average per-recipient benefit amount (taken from SOEP micro data for respective years), the setup of the simulations did not allow for any changes in the recipient rates. If households, or individuals, have not been in receipt of a particular benefit during the reference period, they will also be non-recipients after benefit amounts have been uprated. In other words, benefit amounts have been uprated, conditional on receipt. As a

[20] Note that the aggregate amount for income taxes from official statistics for 2007 (211 bn. euros) is now somewhat greater than reported in the EUROMOD Country Report for Germany (193 bn. euros). This is because the latter was a preliminary figure where many late filers have not been included yet. The former now is the final figure.
[21] See ECB, MFI interest rates: http://sdw.ecb.europa.eu/browse.do?node=2018774.

consequence, recipient rates are unaffected by uprating, for all benefits. This is of particular relevance, for example, for contributory unemployment benefits, in case these are subject to changes in recipient rates in times of significant fluctuations on labour markets, such as during the years 2010, 2011, and 2012, and has to be kept in mind when applying simulation results. This also holds for any non-monetary variables. They have not been uprated. Information on the number of months spent in unemployment, for example, has been applied for all policy year, as it has been reported for the base year.

Applied uprating factors are tabulated in Table 35. The default uprating factor is changes in the CPI (consumer price index). The default factor has been applied in all cases where no other appropriate uprating factor could have been found. This is mainly the case for the last policy year simulated, as for many of the variables no information for 2012 has been available yet.[22] For wages and income from employment, a more detailed uprating procedure has been applied.

Wages and income from employment have been uprated by the respective information from national accounts (growth in gross wages and growth in employee income per employee), conditional on the industry. Industries have been grouped such that groups correspond to the definition of the industry variable in EU-SILC (*lindi*).[23] Consequently, uprating of wages (*yivwg*) and employment income (*yem*) has been conditioned on the industry variable (*lindi*). This procedure has also been applied to the proxy for the entitlement basis of contributory benefits (*yxy*, also see Section 3.4.5). However, the uprating factor for this proxy is the growth in employment income (*yem*), lagged by one year.

Income variables for which passing (i.e. disaggregated enough) information could be taken from national accounts (*yds*), have been uprated according to that information. All other income variables have been uprated by the default factor (*yse, yiy, ypr*). This has also been done with many of the benefit variables, where comparable information in the SOEP was applicable (*bhlps, bunct, bunnc, bch, bsa00, bsaoa, bho, pdiss, bhlac, boawr, poass, poacs, psu*). For all other benefits, the default uprating factor (CPI) has been applied.

For income taxes (*tin*) and the sum of income taxes and social security contributions (*tis*), growth in the aggregate population sum from national accounts has been applied. For financial capital holdings (*afc*), growth in aggregate net wealth of private households, taken from the national bank (*Deutsche Bundesbank)* has been applied. Housing expenditures have been uprated by the CPI component that relates to the price index for rents (*xhc, xhcrt, xhcmomi, xhcot*). Aggregate benefit variables (*yemse, bun, bfa, bsa, pdi, poa*) have been uprated by an average uprating factor, over the uprating factors of all the respective components.

[22] Information from the national accounts has been available up to the reference year 2010. The SOEP data has been available up to the wave 2010. The income reference period in this wave is the entire previous year, 2009. There is also some information on incomes from the current year (2010) reported, this has however not been applied for uprating, as it is not consistently comparable to the information based on the reference period that cover an entire year.

[23] It has been checked that the distribution of the industry variable from the data (*lindi*) is relatively similar to the distribution of industries in the national accounts.

Table 35. Updating Factors

| Index | Income Source / Index Type | 2009 to 2010 | 2009 to 2011 | 2009 to 2012 |
|---|---|---|---|---|
| default | CPI (consumer price index) | 1.0112 | 1.0364 | 1.0549 |
| yivwg | INC : Imputed value : Wage/Salary | 1.0239 | 1.0548 | 1.0735 |
| | INC : Empl. (not applicable detailed industry) | 1.0239 | 1.0548 | 1.0735 |
| | INC : Empl. (agriculture and fishing) | 1.0296 | 1.0388 | 1.0571 |
| | INC : Empl. (mining, manufacturing and utilities) | 1.0451 | 1.0846 | 1.1037 |
| | INC : Empl. (construction) | 1.011 | 1.0376 | 1.0559 |
| | INC : Empl. (wholesale and retail) | 1.0209 | 1.0388 | 1.0572 |
| | INC : Empl. (hotels, restaurants) | 1.0209 | 1.0388 | 1.0572 |
| | INC : Empl. (transport and communication) | 1.034 | 1.0699 | 1.0888 |
| | INC : Empl. (financial intermediation) | 1.0153 | 1.0386 | 1.0569 |
| | INC : Empl. (real estate and business activities) | 1.0278 | 1.0683 | 1.0871 |
| | INC : Empl. (public administration and defence) | 1.0149 | 1.0455 | 1.0639 |
| | INC : Empl. (education) | 1.0149 | 1.0455 | 1.0639 |
| | INC : Empl. (health and social work) | 1.0149 | 1.0455 | 1.0639 |
| | INC : Empl. (other) | 1.0219 | 1.0477 | 1.0662 |
| yem | INC : Empl. (general) | 1.0233 | 1.0576 | 1.0763 |
| | INC : Empl. (not applicable detailed industry) | 1.0233 | 1.0576 | 1.0763 |
| | INC : Empl. (agriculture and fishing) | 1.028 | 1.0377 | 1.056 |
| | INC : Empl. (mining, manufacturing and utilities) | 1.0465 | 1.0904 | 1.1096 |
| | INC : Empl. (construction) | 1.0095 | 1.0394 | 1.0578 |
| | INC : Empl. (wholesale and retail) | 1.0173 | 1.0399 | 1.0582 |
| | INC : Empl. (hotels, restaurants) | 1.0173 | 1.0399 | 1.0582 |
| | INC : Empl. (transport and communication) | 1.0332 | 1.0719 | 1.0908 |
| | INC : Empl. (financial intermediation) | 1.0123 | 1.0393 | 1.0576 |
| | INC : Empl. (real estate and business activities) | 1.0212 | 1.0659 | 1.0847 |
| | INC : Empl. (public administration and defence) | 1.0153 | 1.047 | 1.0655 |
| | INC : Empl. (education) | 1.0153 | 1.047 | 1.0655 |
| | INC : Empl. (health and social work) | 1.0153 | 1.047 | 1.0655 |
| | INC : Empl. (other) | 1.0221 | 1.0478 | 1.0663 |
| yxy | INC : Empl. (general) | 1.0016 | 1.0255 | 1.0565 |
| | INC : Empl. (not applicable detailed industry) | 1.0016 | 1.0255 | 1.0565 |
| | INC : Empl. (agriculture and fishing) | 1.0022 | 1.0318 | 1.0411 |
| | INC : Empl. (mining, manufacturing and utilities) | 0.9744 | 1.0184 | 1.0568 |
| | INC : Empl. (construction) | 1.0376 | 1.0489 | 1.0765 |
| | INC : Empl. (wholesale and retail) | 0.9954 | 1.0162 | 1.0341 |
| | INC : Empl. (hotels, restaurants) | 0.9954 | 1.0162 | 1.0341 |
| | INC : Empl. (transport and communication) | 1.0089 | 1.0432 | 1.0794 |
| | INC : Empl. (financial intermediation) | 1.0013 | 1.0166 | 1.0399 |
| | INC : Empl. (real estate and business activities) | 1.0115 | 1.0396 | 1.0805 |
| | INC : Empl. (public administration and defence) | 1.0332 | 1.0486 | 1.0802 |
| | INC : Empl. (education) | 1.0332 | 1.0486 | 1.0802 |
| | INC : Empl. (health and social work) | 1.0332 | 1.0486 | 1.0802 |
| | INC : Empl. (other) | 1.0332 | 1.0486 | 1.0802 |
| kfb | IN KIND : Fringe Benefit | *default* | *default* | *default* |
| yse | INC : Self Employment | *default* | *default* | *default* |
| ypp | INC : Private Pension | *default* | *default* | *default* |
| bhlps | BENEFIT/PENSION : Private long-term care insurance | *default* | *default* | *default* |
| yiy | INC : Investment | *default* | *default* | *default* |
| ypr | INC : Property | *default* | *default* | *default* |
| ypt | INC : Private Transfers | 1.0000 | 1.0000 | 1.0000 |
| yot | INC : Other | 1.0000 | 1.0000 | 1.0000 |
| yds | INC : Disposable | 1.0298 | 1.0633 | 1.082 |
| tpr | TAX : Property tax | *default* | *default* | *default* |
| tad | TAX : Repayments/Receipts | *default* | *default* | *default* |
| tis | TAX : Income tax and SICs | 1.0011 | 1.0657 | 1.0845 |

| | | | | |
|---|---|---|---|---|
| bed | BEN/PEN : Education | *default* | *default* | *default* |
| bun | BEN/PEN : Unemployment | aggregate | aggregate | aggregate |
| ysv | INC : Severance pay | *default* | *default* | *default* |
| bunct | BEN/PEN : Unemployment I | *default* | *default* | *default* |
| bunnc | BEN/PEN : Unemployment II | *default* | *default* | *default* |
| bunot | BEN/PEN : for business start-ups | *default* | *default* | *default* |
| buntr | BEN/PEN : for re-training | *default* | *default* | *default* |
| byr | BEN/PEN : for early retirement | *default* | *default* | *default* |
| bhl | BEN/PEN : Health | *default* | *default* | *default* |
| bhl01 | BEN/PEN : Health (statutory) | *default* | *default* | *default* |
| bfa | BEN/PEN : Family | aggregate | aggregate | aggregate |
| bmact | BEN/PEN : Maternity leave | *default* | *default* | *default* |
| bplct | BEN/PEN : Parental leave | *default* | *default* | *default* |
| bch | BEN/PEN : Child | *default* | *default* | *default* |
| bchot | BEN/PEN : Additional child | *default* | *default* | *default* |
| bsa | BEN/PEN : Social Assistance | aggregate | aggregate | aggregate |
| bsa00 | BEN/PEN : General Social Assistance | *default* | *default* | *default* |
| bsaoa | BEN/PEN : Old-age Social Assistance | *default* | *default* | *default* |
| bsaap | BEN/PEN : Social Assistance (alimony payments) | *default* | *default* | *default* |
| bsaco | BEN/PEN : Social Assistance (non-profitable charity) | *default* | *default* | *default* |
| bho | BEN/PEN : Housing | *default* | *default* | *default* |
| pdi | BEN/PEN : Disability | aggregate | aggregate | aggregate |
| pdiss | BEN/PEN : Disability (statutory accident) | *default* | *default* | *default* |
| bhlac | BEN/PEN : Disability (long-term care accident) | *default* | *default* | *default* |
| pdi00 | BEN/PEN : Disability (reduced work) | *default* | *default* | *default* |
| pdiot | BEN/PEN : Disability (civil servants) | *default* | *default* | *default* |
| boawr | BEN/PEN : Disability (war victims) | *default* | *default* | *default* |
| poa | BEN/PEN : Old Age | aggregate | aggregate | aggregate |
| poass | BEN/PEN : Old Age (statutory) | *default* | *default* | *default* |
| poacs | BEN/PEN : Old Age (civil servants) | *default* | *default* | *default* |
| poapu | BEN/PEN : Old Age (public service) | *default* | *default* | *default* |
| poa00 | BEN/PEN : Old Age (employer schemes) | *default* | *default* | *default* |
| poaps | BEN/PEN : Old Age (self-employed) | *default* | *default* | *default* |
| poaab | BEN/PEN : Old Age (foreign country) | *default* | *default* | *default* |
| psu | BEN/PEN : Survivors | *default* | *default* | *default* |
| kivho | IN KIND : Imputed value : Housing | *default* | *default* | *default* |
| afc | ASSETS : Financial Capital | 1.0622 | 1.0762 | 1.0952 |
| xmp | EXPENDITURE : Maintenance Payment | *default* | *default* | *default* |
| xpp | EXPENDITURE : Private Pension (voluntary) | *default* | *default* | *default* |
| xhc | EXPENDITURE : Housing cost | 1.0105 | 1.0239 | 1.04201 |
| xhcrt | EXPENDITURE : Housing cost : Rent | 1.0105 | 1.0239 | 1.04201 |
| xhcmomi | EXPENDITURE : Housing cost: Mortgage (interest+capital) | 1.0105 | 1.0239 | 1.04201 |
| xhcot | EXPENDITURE : Housing cost : Other | 1.0105 | 1.0239 | 1.04201 |
| tintace | TAX: Income tax: Tax allowance (childcare) | *default* | *default* | *default* |
| tintadp | TAX: Income tax: Tax allowance (extr. expenses alimonies) | *default* | *default* | *default* |
| tintadt | TAX: Income tax: Tax allowance : deposit interests | *default* | *default* | *default* |
| tintaee | TAX: Income tax: Tax allowance (income from employment) | *default* | *default* | *default* |
| tintals | TAX: Income tax: Tax allowance (extraordinary expenses) | *default* | *default* | *default* |
| tintaox | TAX: Income tax: Tax allowance (special expenses) | *default* | *default* | *default* |
| tintape | TAX: Income tax: Tax allowance (pension income) | *default* | *default* | *default* |
| tintasp | TAX: Income tax: Tax allowance (special exp. alimonies) | *default* | *default* | *default* |
| yiyot | INCOME : Investment : other | *default* | *default* | *default* |

Notes: *default* indicates that variable has been uprated by the default uprating factor (CPI). Aggregate benefits have been uprated by average growth in the underlying components (aggregate).
Sources: CPI: Eurostat / Harmonized Indices of Consumer Prices (HICP) http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/data/database; National accounts: Statistisches Bundesamt (2012) - Volkswirtschaftliche Gesamtrechnungen, Inlandsproduktberechnung - detailierte Jahresergebnisse 2011. Financial assets: Deutsche Bundesbank (2012) - Ergebnisse der Gesamtwirtschaftlichen Finanzierungsrechnung für Deutschland 2006-2011.

# 4. VALIDATION

In this chapter validation of the simulations is undertaken. Firstly, validation is conducted on aggregate figures. For example, aggregate numbers of recipients of a particular benefit are compared to aggregate figures from external statistics. The same is done for aggregate amounts of benefits paid to recipients. Then, validation is conducted with respect to the income distribution, where several measures for income inequality as well as poverty are computed for the simulated micro data and compared to external figures. Finally, some health warnings for interpretation of the simulation results are given.

## 4.1 Aggregate Validation

In this section, simulation results are validated with respect to aggregate figures, in terms of numbers of recipients or contributors, as well as total amounts of euros received or spent in the population of recipients and contributors. First of all, the concepts of disposable household income in EUROMOD and in the EU-SILC data are compared in Table 36.

There are no major differences between the definitions of disposable income in EUROMOD and in the EU-SILC data (see Table 36). Almost all income components listed in Table 36 are included in both income concepts. There are two exceptions. On the one hand, disposable income in EUROMOD does not include fringe benefits (*kfb*), such as for example company cars, while the EU-SILC concept does include them. On the other hand, disposable income in EU-SILC does not include incomes from private pension plans, which are however included in the EUROMOD income concept. Apart from these two deviations, the concepts of disposable household income in EUROMOD and in EU-SILC are identical.

Note moreover that some variables listed for the EUROMOD concept in Table 36 are aggregate variables. That means they have been harmonized for the UDB micro data set, and have been disaggregated again by the national team in the context of the EUROMOD simulations (also see Section 3.4.4 for more details). As a consequence they consist of several income components, some of which have been simulated in EUROMOD and some not. These variables are income from private pension plans (*il_ppen*), old-age pensions (*poa*), disability pensions (*pdi*), unemployment benefits (*bun*), family and children related benefits (*bfa*), social assistance (*bsa*) and housing benefits (*bho*).

In Table 36, these variables are only listed in its aggregate form and the single income components are left out. This is the reason why the EUROMOD variables in Table 36 are all listed with the respective label for the non-simulated variables (i.e. omitting the _s), although many of them, or many of their components, have actually been simulated in EUROMOD. Also see Section 3.4.4 for more details on the exact composition of the aggregate income and benefit variables and its components.

Income taxes and social security contributions are only observed as a total in EU-SILC (variable *HY140G*). In EUROMOD, however, income taxes are simulated for income in general (*tin*) and income from capital (*tinkt*). Also social security contributions are simulated, differentiated by social status, for employees (*ils_sicee*), for the self-employed (*ils_sicse*), and for pensioners (*ils_sicpe*). Repayments/receipts for tax adjustments (*HY145N*) as well as property taxes (*tpr*) are observed in EU-SILC, while they have not been simulated in EUROMOD.

The composition of disposable household income in EUROMOD does not change over the policy years 2009, 2010, 2011, and 2012.

Table 36. Components of Disposable Household Income

| | EUROMOD [2009-2012] | EU-SILC [2009] |
|---|---|---|
| Disposable household income | ils_dispy | HY020 |
| Employee cash or near cash income | yem | PY010G |
| Fringe benefits (company cars, etc.) | -- | PY021G |
| Cash benefits or losses from self-employment | yse | PY050G |
| Pension from individual private plans | il_ppen | PY080G* |
| Income from Capital (interests, dividends, etc.) | yiy | HY090G |
| Income from rental of a property or land | ypr | HY040G |
| Other income (Income received by people aged under 16) | yot | HY110G |
| Regular inter-household cash transfer received | ypt | HY080G |
| Regular inter-household cash transfer paid | xmp | HY130G |
| Old-age benefits | poa | PY100G |
| Disability benefits | pdi | PY130G |
| Unemployment benefits | bun | PY090G |
| Education related allowances | bed | PY140G |
| Survivor' benefits | psu | PY110G |
| Sickness benefits | bhl | PY120G |
| Family/children related allowances | bfa | HY050G |
| Social exclusion | bsa | HY060G |
| Housing allowances | bho | HY070G |
| Social security contributions (employees) | ils_sicee | HY140G |
| Social security contributions (self-employed) | ils_sicse | HY140G |
| Social security contributions (pensioners) | ils_sicpe | HY140G |
| Income taxes | tin | HY140G |
| Income taxes on capital income | tinkt | HY140G |
| Repayments/receipts for tax adjustments | -- | HY145N |
| Property taxes | tpr | HY120G |

Notes: Some variables in EUROMOD (namely il_ppen, poa, pdi, bun, bfa, bsa, bho) are aggregate variables. They consist of several components, some of which have been simulated in EUROMOD and some not.
*Pension from individual private plans is equal to PY080G (ypp), however, excluding Private long-term care insurances or daily sickness allowances from private health insurances (bhlps, which is a disaggregated variable based on ypp and considered as non-pension income given to all non-pensioners).
Source: For EU-SILC, Eurostat (2010) – EU-SILC 065 (2010 operation) – Description of Target Variables: Cross-sectional and longitudinal, 2010 operation (Version February 2010).

### 4.1.1 Validation of Incomes Inputted into the Simulation

Firstly, the number of people in and out of the labour force in the population is compared for the EU-SILC data (which for these variables is identical to EUROMOD) and external data from employment agencies. The number of employed people includes people employed in jobs where full social security contributions have to be paid (*sozialversicherungspflichtige Beschäftigung*) as well as people in marginal employment (*geringfügige Beschäftigung*), such as mini and midi jobs. The number of unemployed people includes those who are registered as unemployed at the employment agencies – as actively searching for a job – and those who are unemployed but not registered as actively searching ("*Stille Reserve*"). Figures for the latter group have been estimated for the period 2009-2012 in Institut für Arbeitsmarkt- und Berufsforschung (2012).

The figure for employed people from the EU-SILC micro data for 2009 is slightly bigger than the corresponding figure from employment agencies, and the figure from EUROMOD matches almost perfectly the external source.

Table 37. Number of People in and out of Labour in the Population

| | Input dataset (I) | External Source (II) | | | | Ratio (I/II) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| Employed | 36,353,109 | 34,714,062 | 35,129,165 | 35,355,114 | 36,006,541 | 1.047 | 1.035 | 1.028 | 1.010 |
| Unemployed | | | | | | | | | |
| only registered | n/a | 3,414,545 | 3,238,421 | 2,975,823 | 2,843,000 | n/a | n/a | n/a | n/a |
| all | 4,750,515 | 4,434,545 | 4,258,421 | 4,275,823 | 3,952,000 | 1.071 | 1.116 | 1.111 | 1.202 |

Notes: For the input data, number of employed and unemployed derived from months spent in employment and unemployment, averages over all months. For external data from employment agencies, only people registered as unemployed are reported (only registered). "All" includes estimations for the unemployed that are not registered. Number of employed includes people employed in jobs where full social security contributions have to be paid (*sozialversicherungspflichtige Beschäftigung*) as well as people in marginal employment (*geringfügige Beschäftigung*), such as mini and midi jobs.
Sources: Bundesagentur für Arbeit (2012) – Beschäftigungsstatistik: Sozialversicherungspflichtig Beschäftigte nach ausgewählten Merkmalen – Zeitreihe; Bundesagentur für Arbeit (2012) – Beschäftigungsstatistik: Geringfügig entlohnte Beschäftigte nach ausgewählten Merkmalen – Zeitreihe; Bundesagentur für Arbeit (2012) – Arbeitslosigkeit im Zeitverlauf, Arbeitsmarkt in Zahlen, Jahreszahlen (http://statistik.arbeitsagentur.de). Institut für Arbeitsmarkt- und Berufsforschung (2012) – Arbeitsmarktprognose 2012: Der Aufwärtstrend flacht ab, IAB-Kurzbericht 03/2012.

The figure for unemployed people from the EU-SILC micro data for 2009 is also slightly bigger than the corresponding external figure. However, this figure must be compared to the number of all unemployed people, those registered as unemployed at employment agencies and those not registered. While there have only been about 3.4m unemployed people registered at employment agencies as actively searching for a job, there have been another almost 1.2m unemployed people not registered (estimated in Institut für Arbeitsmarkt- und Berufsforschung, 2012). The latter group consists of people who are registered at the agencies, but who are not actively looking for a job because they are participating in employment programs ("*Stille Reserve in Maßnahmen*"), and of people who are not registered at agencies ("*Stille Reserve im engeren Sinne*"), the former group having twice the size of the latter group in 2009 and 2010. If these two groups are taken into account the number of unemployed people is slightly greater in EU-SILC than the external figure for 2009 and the gap widens for later years.

Both the number of employed people and the number of unemployed people have been calculated in the EU-SILC data from information on the number of months spent in employment and unemployment over the entire year 2009. This information has been averaged over all months in 2009 and has been aggregated up to the population.

Now, the components of market income in the EU-SILC data shall be validated, with respect to the number of recipients as well as the aggregate total incomes received in the population in a year. Table 38 tabulates the number of recipients for each component of market income, as it has been defined in EU-SILC for 2009, and compares it to figures from external statistics.

The sum of all components of market income, minus expenditures for alimony payments (*xmp*), is defined to be "original (market) income" in EUROMOD. About 60 thousand people receive some market income. There are no comparable figures for this specific income definition from external sources. The number of individuals receiving positive income from employment (*yem*) is slightly lower in EUROMOD (37,417), and thus also in EU-SILC, than in external figures (40,193), which here is the GSOEP, like for most of the components of original income (see Table 38). This difference

has stayed almost constant from 2009 to 2010.[24] For 2011 and 2012, there has been no information available yet on any component of market income from a comparable external source, which would typically be a micro data set in the context of the number of individuals receiving a particular component of market income.

Table 38. Components of Market Income -- Number of Recipients (in thousands)

| | Variable Name in EM | Input database (I) | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Original Income** | *ils_origy* | 60,282 | -- | -- | -- | -- | -- | -- | -- | -- |
| Employment Inc. | *yem* | 37,417 | 40,193 | 39,767 | -- | -- | 0.931 | 0.941 | -- | -- |
| Self-empl. Inc. | *yse* | 3,468 | 3,997 | 4,160 | -- | -- | 0.834 | 0.802 | -- | -- |
| Priv. Pension Inc. | *il_ppen* | 795 | 677 | 642 | -- | -- | 1.175 | 1.240 | -- | -- |
| Capital Income | *yiy* | 49,884 | 53,778 | 56,355 | -- | -- | 0.928 | 0.885 | -- | -- |
| Property Income | *ypr* | 5,670 | 6,944 | 7,641 | -- | -- | 0.817 | 0.742 | -- | -- |
| Private Transfers | *ypt* | 2,419 | 2,845 | 3,133 | -- | -- | 0.850 | 0.772 | -- | -- |
| Other Income | *yot* | 258 | -- | -- | -- | -- | -- | -- | -- | -- |
| Fringe Benefits | *kfb* | 2,732 | -- | -- | -- | -- | -- | -- | -- | -- |
| Imputed Rents | *kivho* | 32,877 | 30,717 | 32,681 | -- | -- | 1.070 | 1.006 | -- | -- |

Notes: Number of households for *ypt*. For all other variables, number of individuals.
Sources: EU-SILC 2010 and own simulations based on EUROMOD. For external figures: micro data from GSOEP (*yem, yse, yiy, il_ppen, ypr, ypt, kivho*).

For income from self-employment (*yse*), the number of recipients in EU-SILC is slightly lower than that in the external data. As for income from private pensions (*il_ppen*), there is some variation over time; however, the overall fit still appears to be acceptable. Income from capital (*yiy*) is received by slightly less individuals in EU-SILC (49,884) than in GSOEP (53,778), but the ratio is close to 93% and is largely constant over time. This is similar for income from letting property (*ypr*), with the only difference that the under-coverage with respect to recipients in the EU-SILC is slightly larger, the ratio being around 82% for 2009 and 74% for 2010.

Income from private transfers (*ypt*) is presented in Table 38 in terms of numbers of households receiving this income component, as it has been reported at the household level. This number is slightly lower in EU-SILC than in the external data. Unfortunately there is no external data against which the number of individuals receiving other income (*yot*) or fringe benefits (*kfb*) can be validated. Other income includes mainly income from children aged 16 and younger. But, it may also capture other income components that have not been reported elsewhere and that may significantly vary between the data sets. The same holds for fringe benefits, which consist for example of company cars. The number of individuals for who rents have been imputed (*kivho*) because they are owner-occupiers is very similar in EU-SILC and in GSOEP.

[24] As all the components of market income have not been simulated in EUROMOD, the number of recipients remains constant throughout all simulated years. Thus, the number of recipients for the input database is only displayed for 2009 in Table 38.

The respective aggregate amounts for the components of market income are displayed in Table 39. All market income, after alimony payments have been subtracted, sums up to some 1,223bn euros in the population captured by EU-SILC. Some 1,052bn of it relates to income from dependent employment (*yem*). This figure matches fairly well the corresponding number from external sources (1,037bn), which in this case again is the GSOEP. The ratio for this variable also remains very close to one for the years it has been uprated. Again, no external figures have been found for any aggregate sum of the components of market income.

Table 39. Components of Market Income – Aggregate Amounts (in bn. euros per year)

| | Variable Name in EM | Input (I) | Uprated Input (I) | | | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Orig. Income** | *ils_origy* | 1,223.34 | 1,251.46 | 1,291.39 | 1,313.98 | -- | -- | -- | -- | -- | -- | -- | -- |
| Empl. Inc. | *yem* | 1,052.10 | 1,078.39 | 1,114.32 | 1,133.97 | 1,036.52 | 1,045.86 | -- | -- | 1.015 | 1.031 | -- | -- |
| Self-emp. Inc. | *yse* | 101.28 | 102.41 | 104.96 | 106.84 | 155.24 | 147.18 | -- | -- | 0.652 | 0.696 | -- | -- |
| Prv. Pen. Inc. | *il_ppen* | 3.88 | 3.92 | 4.02 | 4.09 | 4.72 | 4.82 | -- | -- | 0.822 | 0.813 | -- | -- |
| Capital Inc. | *yiy* | 39.79 | 40.24 | 41.24 | 41.98 | 37.00 | 41.39 | -- | -- | 1.075 | 0.972 | -- | -- |
| Property Inc. | *ypr* | 24.82 | 25.10 | 25.72 | 26.18 | 50.80 | 56.22 | -- | -- | 0.489 | 0.446 | -- | -- |
| Prv. Transfers | *ypt* | 12.33 | 12.33 | 12.33 | 12.33 | 9.84 | 10.40 | -- | -- | 1.253 | 1.186 | -- | -- |
| Other Income | *yot* | 240 | 240 | 240 | 240 | -- | -- | -- | -- | -- | -- | -- | -- |
| Fringe Benef. | *kfb* | 11.17 | 11.29 | 11.57 | 11.78 | -- | -- | -- | -- | -- | -- | -- | -- |
| Imputed Rent | *kivho* | 144.54 | 146.15 | 149.80 | 152.47 | 88.93 | 89.85 | -- | -- | 1.625 | 1.627 | -- | -- |

Sources: EU-SILC 2010 and own benefit disaggregation. For external figures: micro data from GSOEP (*yem, yse, yiy, il_ppen, ypr, ypt, kivho*).

For some other income components, the rate of coverage is significantly less than 100%. This is the case for income from private pensions (*il_ppen*), income from self-employment (*yse*) and property income (*ypr*). For the latter two, this corresponds to the under-coverage of the number of recipients (Table 38). In the case of private pensions, the number of recipients is slightly over-captured, while the aggregate amount is slightly under-captured (at least in 2009 and 2010), but both rates are relatively close to 100%.

The remaining income components are each significantly over-covered in the EU-SILC. For imputed rents (*kivho*), this again corresponds to the over-coverage of the number of recipients documented earlier, although over-coverage of aggregate amounts is even greater. However, for private transfers (*ypt*), the over-coverage of aggregate sums does not correspond to the over-coverage of the number of recipients.

Now it comes to the taxes and benefits that have not been simulated in EUROMOD. Actually, most of them are benefits, and only one is a tax, namely property taxes (*tpr*). They are all available in the model and they are also outputted from it, but they are not altered by the model simulations. They are passed through the model and come out of it just like they have been put into it. Therefore, figures on recipients and aggregate amounts just reflect the coverage of these variables in the EU-SILC data. Numbers of recipients are tabulated and compared to external data in Table 40.

Many of these benefits are minor benefits. Only a small group of people in the population receives them. As a consequence, there is not much external information on recipients for many of these benefits. In many cases, it is difficult to find a comparable benefit in external data that fits the exact definition of the respective variable in EU-SILC. In official statistics, they are often aggregated under some compound benefit. Micro data often is not reported in such detail to find a comparable variable. However, external data for many benefits have not been found. This is why many of the columns in Table 40 are empty, while some of them are filled in for selected years (often 2009) only.

Benefits are tabulated in the aggregate variables, i.e. the variables they been grouped by in the UDB data, as well as the disaggregate variables, in which they have been originally reported in the national SILC data. For more methodological details on how the disaggregate variables have been derived, see Section 3.4.4. None of the old-age benefits has been simulated. Unfortunately, there is no external information available to validate the aggregate variable for old-age pensions (*poa*) and some of its components (*poa00, poapu, poaps, poaab*). However, official statistics are available for the most important disaggregated old-age benefits, i.e. the ones from statutory pension insurance (*poass*), which are covered fairly well in terms of number of recipients, with about 93%. Old-age benefits for civil servants (poacs) appear to be significantly over-covered in SILC data as compared to official statistics (ratio of about 138%). These discrepancies could well be due to the disaggregation procedure described in Section 3.4.4.

Most of the disability benefits are also not simulated. There is not much external information on the number of their recipients. They are somewhat under-captured in disaggregate EU-SILC for disability benefits for war victims (*boawr*). Survivor's benefits (*psu*) on the opposite are significantly over-covered in the EU-SILC. Among the unemployment benefits, only the minor ones have not been simulated. The fit in number of recipients of these benefits between EU-SILC and official statistics is very weak and direct consequence from the disaggregation procedure. The unsatisfactory results from the disaggregation procedure are rooted in the exceptional situation of the German labour market in 2009 and the important role played by otherwise minor unemployment benefits in the years of economic crisis. This can be clearly seen in the evolution of official statistics on recipients of short-term work compensations (*Kurzarbeitergeld*, main component of the severance payments) over the years 2009 to 2012 (1,144tsd in 2009, 503tsd in 2010 and 148tsd in 2011, source: Statistical Yearbook 2012). Against this background, severance payments *(ysv*) and re-training (*buntr*) benefits are significantly over-estimated in SILC as compared to official statistics (ratios between 134% to 230%), whereas benefits for business start-ups (*bunot*) and benefits for early retirement (*byr*) are strongly under-estimated (rations between 3% and 18%).

There is not much information on the number of recipients of the minor benefits from social assistance, and it seems that the number of households receiving housing benefits is about 1.6 times as large in the EU-SILC, than in official statistics. This is, again, due to the aggregation of housing benefits in SILC2010. As explained in Section 3.4.4, housing benefits have had to be disaggregated because of strong discrepancies between the SILC definition and the definition used in German official statistics: in SILC, housing benefits also include rental allowances obtained under (non-contributory) unemployment benefits II (*bunnc_de*), whereas strictly speaking (according to German official statistics) households receiving unemployment benefits II (*bunnc_de*) are not eligible to housing benefits, but get a rental allowance included in the unemployment benefits. The disaggregation procedure has significantly diminished but not removed the discrepancy.

Table 40. Non-Simulated Taxes and Benefits -- Number of Recipients (in thousands)

| | Variable Name in EM | Input database (I) | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Pensions** | *ils_pen* | 20,737 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Old-Age Benefits** | *poa* | 18,205 | -- | -- | -- | -- | -- | -- | -- | -- |
| Employer schemes | *poa00* | 15,724 | -- | -- | -- | -- | -- | -- | -- | -- |
| Civil Servants | *poacs* | 1,993 | 1,440 | 1,458 | -- | -- | 1.384 | 1.367 | -- | -- |
| Public Service | *poapu* | 1,993 | -- | -- | -- | -- | -- | -- | -- | -- |
| Self-Employed | *poaps* | 142 | -- | -- | -- | -- | -- | -- | -- | -- |
| Stat. Pens. Insur. | *poass* | 15,625 | 16,819 | 16,980 | 17,022 | -- | 0.929 | 0.920 | 0.918 | -- |
| Foreign Country | *poaab* | 347 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Disability Benef.** | *pdi* | 2,112 | -- | -- | -- | -- | -- | -- | -- | -- |
| Stat. & Employer | *pdi00* | 902 | -- | -- | -- | -- | -- | -- | -- | -- |
| Civil Servants | *pdiot* | 8 | -- | -- | -- | -- | -- | -- | -- | -- |
| War Victims | *boawr* | 145 | 181 | 169 | 147 | -- | 0.801 | 0.858 | 0.986 | -- |
| **Survivor Pension** | *psu* | 1,187 | 871 | 943 | 780 | -- | 1.362 | 1.259 | 1.521 | -- |
| **Unempl. Benefits** | *bun* | 7,182 | -- | -- | -- | -- | -- | -- | -- | -- |
| Business Start-Ups | *bunot* | 5 | 145 | 154 | 136 | -- | 0.035 | 0.033 | 0.037 | -- |
| Re-Training | *buntr* | 106 | 74 | 61 | 57 | -- | 1.432 | 1.738 | 1.860 | -- |
| Severance Pay | *ysv* | 2,371 | 1,772 | 1,031 | -- | -- | 1.338 | 2.300 | -- | -- |
| Early Retirement | *byr* | 62 | 461 | 380 | 336 | -- | 0.134 | 0.163 | 0.184 | -- |
| **Social Assistance** | *bsa* | 1,167 | -- | -- | -- | -- | -- | -- | -- | -- |
| Social Benefits | *bsaot* | 106 | -- | -- | -- | -- | -- | -- | -- | -- |
| Alimony Pay | *bsaam* | 39 | 152 | -- | -- | -- | 0.257 | 0.257 | -- | -- |
| Non-Prof. Charity | *bsapu* | 334 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Housing Benefits** | *bho* | 1,603 | 1,004 | 1,055 | -- | -- | 1 597 | 1 519 | -- | -- |
| **Property Taxes** | *tpr* | 18,128 | -- | -- | -- | -- | -- | -- | -- | -- |

Notes: Number of individuals for: ysv, psu, poa00, boawr, poaab, poass, poacs, poapu, poaps, poa. For all other variables, number of households.
Sources: EU-SILC 2010 and own benefit disaggregation . For external figures: Official statistics (ysv, bunot, buntr, byr, bho, boawr, poass, poacs, psu) as well as micro data from GSOEP (bsaam for 2009).

Aggregate amounts for the non-simulated taxes and benefits are compared between EU-SILC and external sources in Table 41. Euros received over an entire year by the whole population of benefit recipients are displayed. There is a little bit more information available on total sums paid for these benefits in external data, compared to the number of recipients. Often official statistics report aggregate amounts paid for particular benefits, but they do not state the number of individuals or households receiving it.

Generally, ratios of coverage, where available, look much better for aggregate amounts than for number of recipients, at least with most of the benefits. The total amount paid for the aggregate variable of old-age benefits (*poa*) over the entire year 2009 is almost identical in EU-SILC (300bn euros) and in

the EVS data (298bn euros), although the reference year of the latter is 2008. This also holds for most of its sub-components. Ratios for old-age benefits from the statutory pension insurance (*poass*), from employer schemes (poa00) as well as schemes for civil servants (*poacs*) are very close to one. Again, there was very little information available from 2011 on yet. Pensions for employees in public service (*poapu*) are slightly under-covered in the EU-SILC, whereas no external information could be found for pensions of the self-employed (*poaps*) and pensions from a foreign country (*poaab*).

For disability benefits, there is again not much information from external data on the aggregate amounts received in the population available. Only for benefits for war victims and from burden sharing (*boawr*), the aggregate amounts are significantly greater in official statistics than in the EU-SILC data (ratios of about 70%). Aggregate amounts of survivor's benefits (*psu*) are also under-captured in the EU-SILC, although to a lesser extent (ratio of about 90%).

There is also not much external information on the total amounts received in terms of the minor unemployment benefits that have not been simulated in EUROMOD. There is no information at all for amounts of benefits for business start-ups (*bunot*), benefits for re-training (*buntr*) and benefits for early retirement (*byr*).

Among the minor benefits of social assistance that have not been simulated, there was no external information available for social benefits for children (*bsaot*). This is because this benefit is paid as an add-on to unemployment benefits II (*bunnc_de*) and thus is often reported in compound figures together with it. In fact, social benefits have been simulated in EUROMOD as a compound benefit, together with unemployment benefits II (*bunnc_de*, see Section 2.4.9). They shall nevertheless be listed in Table 41 among the non-simulated benefits, because they have not been simulated in a separate policy. External information could not be found for benefits for advances on alimony payments (*bsaam*) and benefits from non-profitable charity organizations (*bsapu*).

The aggregate amount of housing benefits is strongly over-covered in the EU-SILC, as compared to official statistics. This is in line with the strong over-coverage of recipients of housing benefits reported in Table 40 and a by-product of the need to disaggregate SILC data.

Table 41. Non-Simulated Taxes and Benefits – Aggregate Amounts (in bn. euros per year)

| | Variable Name in EM | Input (I) | Uprated Input (I) | | | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Pensions** | *ils_pen* | 325.27 | 328.82 | 337.00 | 343.14 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Old-Age B.** | *poa* | 300.27 | 303.64 | 311.20 | 316.76 | 297.95 | -- | -- | -- | 1.008 | -- | -- | -- |
| Employer s. | *poa00* | 22.80 | 23.05 | 23.63 | 24.05 | 22.10 | 23.60 | 23.24 | -- | 1.031 | 0.977 | 1.017 | -- |
| Civil Servants | *poacs* | 40.08 | 40.53 | 41.54 | 42.28 | 38.90 | 39.80 | -- | -- | 1.030 | 1.018 | -- | -- |
| Public Serv. | *poapu* | 8.21 | 8.30 | 8.51 | 8.66 | 10.00 | -- | -- | -- | 0.821 | -- | -- | -- |
| Self-Empl. | *poaps* | 2.52 | 2.55 | 2.62 | 2.66 | -- | -- | -- | -- | -- | -- | -- | -- |
| Stat. Pens. I. | *poass* | 224.89 | 227.41 | 233.08 | 237.24 | 225.35 | 247.46 | -- | -- | 0.998 | 0.919 | -- | -- |
| For. Country | *poaab* | 1.77 | 1.79 | 1.84 | 1.87 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Disability B.** | *pdi* | 18.25 | 18.45 | 18.91 | 19.25 | -- | -- | -- | -- | -- | -- | -- | -- |
| Stat. & Emp. | *pdi00* | 7.28 | 7.36 | 7.54 | 7.68 | -- | -- | -- | -- | -- | -- | -- | -- |
| Civil Servants | *pdiot* | 0.06 | 0.06 | 0.06 | 0.06 | -- | -- | -- | -- | -- | -- | -- | -- |
| War Victims | *boawr* | 1.28 | 1.30 | 1.33 | 1.35 | 1.84 | 1.68 | -- | -- | 0.696 | 0.774 | -- | -- |
| **Survivor P.** | *psu* | 7.02 | 7.09 | 7.27 | 7.40 | 7.85 | -- | -- | -- | 0.894 | -- | -- | -- |
| **Unempl. B.** | *bun* | 42.09 | 42.57 | 43.63 | 44.40 | -- | -- | -- | -- | -- | -- | -- | -- |
| Bus. Start-Up | *bunot* | 0.02 | 0.02 | 0.02 | 0.02 | -- | -- | -- | -- | -- | -- | -- | -- |
| Re-Training | *buntr* | 0.47 | 0.49 | 0.50 | 0.51 | -- | -- | -- | -- | -- | -- | -- | -- |
| Severance P. | *ysv* | 8.52 | 8.62 | 8.83 | 8.99 | -- | -- | -- | -- | -- | -- | -- | -- |
| Early Retire. | *byr* | 0.61 | 0.62 | 0.63 | 0.64 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Social Assist.** | *bsa* | 5.68 | 5.74 | 5.88 | 5.99 | -- | -- | -- | -- | -- | -- | -- | -- |
| Social Benef. | *bsaot* | 0.39 | 0.40 | 0.41 | 0.41 | -- | -- | -- | -- | -- | -- | -- | -- |
| Alimony Pay | *bsaam* | 0.21 | 0.21 | 0.21 | 0.22 | -- | -- | -- | -- | -- | -- | -- | -- |
| Non-Prof. Ch. | *bsapu* | 1.45 | 1.46 | 1.50 | 1.53 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Housing B.** | *bho* | 3.73 | 3.77 | 3.86 | 3.93 | 1.56 | 1.78 | -- | -- | 2.397 | 2.118 | -- | -- |
| **Prop. Taxes** | *tpr* | 6.18 | 6.25 | 6.41 | 6.52 | 10.58 | 10.95 | 11.31 | -- | 0.584 | 0.571 | 0.567 | -- |

Notes: Estimations for 2009 for these variables: poa00, poapu. In poass, widow's pensions from statutory system are included. Thus, psu includes widow's pensions from all schemes, except for statutory system.
Sources: EU-SILC 2010 and own benefit disaggregation . For external figures: Official statistics (poa00, poacs, poapu, boawr, bho), as well as micro data from GSOEP (poass for 2009).

### 4.1.2 Validation of Outputted (Simulated) Incomes

In this section, results from the EUROMOD simulation of taxes and benefits are presented and validated in terms of numbers of recipients and aggregate amounts against external data. The simulations are based on the assumption that all benefits are taken up completely, i.e. individuals are assumed to actually receive income from all benefits in exactly the amount that they are simulated to be eligible for. No correction for partial take-up of benefits has been applied, since the number of recipients of means-tested benefits in the simulations approach to a great extent the number of recipients of means-tested benefits in external (aggregate) statistics.

Results on the number of recipients for all benefits that have been simulated in EUROMOD are presented in Table 42. All disaggregated benefits that have been simulated are listed. Aggregate benefits (the harmonized UDB variables) are only listed in case all their sub-components have been simulated, so that the aggregate benefit has effectively been simulated, too, and is defined such that it can be consistently compared to external data. This is only the case for family benefits (*bfa*).[25]

Compared to the previous corresponding tables on recipients of market income and non-simulated benefits, Table 42 has an additional column, as all the following results tables will have. In the third column, figures from the EU-SILC data are displayed. These may now differ from the corresponding output figures from EUROMOD (second column), as the latter have been simulated. A ratio between the two has, however, been omitted from all following results tables for the sake of readability. For the same reason, columns for recipients in the simulations for 2010 to 2012 have been omitted from the tables. For all contributory benefits, they are constant over all simulated years anyway because contributions have not been simulated, or simulations are all based on the contributions, simulated (or observed) for 2009. Recipients may though vary over time for means-tested benefits, as the means tested change. In case the number of recipients varies significantly over time, figures will be reported in the text.

Disability pensions from the statutory accident insurance (*pdiss*) have been received by 1,106,000 individuals in the simulated population in 2009. This slightly over-estimates the 984,000 recipients who are reported in official statistics. This figure is even greater in the EU-SILC data (1,122,000). In the simulations for 20010 to 2012, it remains constant because *pdiss* is a contributory benefit, and contributions have not been simulated, i.e. they are based on the contributions underlying the 2009 simulations and are assumed to be constant from 2009 on. Official statistics for 2010 show a slight decline in the number of recipients of this benefit.

The picture is the opposite for the results of long-term care benefits from the statutory accident insurance (*bhlac*). The simulated number of recipients for 2009 is slightly greater (1,280,000) than for *pdiss*, and it falls below the actual number of recipients reported in official statistics (1,621,000). The corresponding figure from EU-SILC, however, is much smaller, which indicates that some error must have been made at disaggregation. Again, no official information for 2009 to 2012 has been available yet.

The coverage rate is very lower for the simulated number of recipients of sickness benefits from private health insurance (*bhlps*). Unfortunately, there is no external data available on recipients of sickness benefits from the statutory health insurance (*bhl01*).

For the two major unemployment benefits, the fit in terms of number of recipients is very different. The number of recipients of unemployment insurance (*bunct*) is significantly under-simulated in 2009 (ratio 71%) but the precision of the simulation continuously increases for years 2010-2012 (reaching a ratio of 94% in 2012). There are two important notes here to be done. First, there is a significant discrepancy in the number of recipients of unemployment benefits I between EUROMOD (baseline year) and EU-SILC, the latter being much closer to external data. This is due to the fact that

[25] Strictly speaking it is also the case for education benefits because they consist of the education benefits that have been simulated (*bed_s*, *BaFöG*) and other education allowances, such as scholarships for university students. However, these two have not been disentangled at disaggregation, which is why education benefits have nowhere been treated as an aggregate variable in the context of the EUROMOD simulations.

the figure from SILC is a direct result from the disaggregation procedure described in section 3.4.4, including the *ex-post* correction based on the magnitude of the benefits (step 7), whereas EUROMOD is strictly concerned with the policy requirements of *bunct* and no "ex-post" correction that mitigates the effects into the simulation of a input dataset collected in a labour market in extraordinary circumstances (as it was the case in 2009) is possible. The disaggregation procedure plays such a crucial role here because in 2009 (which is the income reference year of SILC) the overall number of unemployment benefits recipients as well as the intra-composition of aggregate unemployment benefits was quite extraordinary – with otherwise minor benefits playing a sudden important role (see section 4.1.1 and particularly Table 40). This is reinforced by the official statistics on recipients of unemployment benefits I, which display a significant change if compared before and after 2010 - the figures for 2011 and 2012 being significantly lower and closer to the simulated number of recipients for 2009. All in all seems to point to the fact that the simulation is extremely sensitive to changes in the relative weights of the different unemployment benefits.

Opposite to the case of unemployment benefits I, the coverage ratio for unemployment assistance (*bunnc*) is very precise and stable over time (ratios ranging from 95% in 2009 to 104% 2012). It is simulated to decrease slightly from 4.7m in 2009 households to 4.5m in 2012.

For the aggregate variable of family benefits (*bfa*), the coverage in terms of recipients is very good (ratio of 103%). The coverage ratio for the four sub-components of family benefits differs substantially. The best fit is achieved for the most important family benefit by number of recipients, namely child benefits (*bch*). Some 10m households receive child benefits, and these are captured with 87-93% in EU-SILC and by the EUROMOD simulations. The much smaller child-related benefits are the additional child benefits (*bchot*), which is quite precisely simulated in 2009 (ratio of 93%) and strongly under-simulated in 2010 (the change coming from a strong increase in the figure of official statistics). Maternity-leave benefits (*bmact*) are somewhat over-simulated (ratio of 128%) in EUROMOD, but the discrepancy is much bigger between SILC and external statistics. Parental-leave benefits (*bplct*) are significantly over-simulated in years 2009 and 2010 and, to a lesser extent, also in 2011. This could on the one hand be related to the fact that these benefits have been introduced in Germany in 2007 and not all individual eligible actually take them up (it speaks for this line of reasoning that over-simulation decrease continuously for all years). On the other hand, simulations are based on prior incomes, which have been approximated, and on the exact date of birth of the child, which has also been approximated, so that there is also scope for some approximation error.

The number of households in receipt of the two major components of social assistance is captured very well by the simulations in each year. General social assistance (*bsa00*) and old-age social assistance (*bsaoa*) are the two major benefits from social assistance. However, they are both quite small when compared to unemployment assistance (*bunnc*), which since the Hartz reforms in 2005 captures a large part of the means-tested basic assistance. As a consequence, only some 140tsd households receive *bsa00* and some 664tsd receive *bsaoa*, both almost constant between 2009 and 2010. These numbers from official statistics are captured by the EUROMOD simulations by between 87% and 89% for the two years where official statistics are available. The simulated number of households receiving *bsa00* varies slightly over time, between 140tsd and 160tsd, and for *bsaoa*, between 654tsd and 664tsd.

Also, the number of households receiving education benefits (*bed*) for 2009 is covered fairly well by the simulations. In the population, some 823,000 households receive education benefits (*bed*) in 2009. For years 2010-2012, this figure falls under the 800,000 households, which contradicts the increasing trend displayed by external figures. This is reflected in the worsening ratio between simulated number of recipients and external statistics (94% in 2009 down to 86% in 2011). The number of households in receipt in EU-SILC is significantly greater for 2009 (1,269,000). But it should be noted that in the EU-SILC data, the variable for education benefits also includes general scholarships for students, which have not been simulated and which are also excluded from the official statistic figures referred to in Table 42.

Table 42. Simulated Benefits -- Number of Recipients (in thousands)

| | EM Var. | EM Output (I) | EU-SILC | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Disability B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Pen. (St. Ac.) | *pdiss* | 1,106 | 1,122 | 984 | 965 | -- | -- | 1.124 | 1.146 | -- | -- |
| LTC (St. Ac.) | *bhlac* | 1,280 | 59 | 1,621 | -- | -- | -- | 0.790 | -- | -- | -- |
| **Sickness B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Prv. Health I. | *bhlps* | 1,172 | 1,286 | 1,694 | -- | -- | -- | 0.692 | -- | -- | -- |
| Sta. Health I. | *bhl01* | 994 | 994 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Unempl. B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| U. Insurance | *bunct* | 805 | 1,074 | 1,141 | 1,024 | 886 | 856* | 0.706 | 0.786 | 0.909 | 0.940 |
| U. Assistance | *bunnc* | 4,667 | 3,668 | 4,909 | 4,894 | 4,616 | 4,470* | 0.951 | 0.954 | 1.011 | 1.044 |
| **Family B.** | *bfa* | 11,277 | 11,277 | 10,921 | -- | -- | -- | 1.033 | -- | -- | -- |
| Child Ben. | *bch* | 10,313 | 10,980 | 11,795 | 11,134 | -- | -- | 0.874 | 0.926 | -- | -- |
| Add. Child A. | *bchot* | 75 | 250 | 81 | 119 | -- | -- | 0.926 | 0.630 | -- | -- |
| Maternity L. | *bmact* | 598 | 750 | 468 | -- | -- | -- | 1.278 | -- | -- | -- |
| Parental L. | *bplct* | 904 | 531 | 583 | 793 | 814 | -- | 1.551 | 1.140 | 1.111 | -- |
| **Social Assis.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| General S. A. | *bsa00* | 140 | 216 | 157 | 159 | -- | -- | 0.892 | 0.881 | -- | -- |
| Old-Age S.A. | *bsaoa* | 664 | 472 | 768 | 764 | -- | -- | 0.865 | 0.869 | -- | -- |
| **Education B.** | *bed* | 823 | 1,269 | 873 | 916 | 962 | -- | 0.943 | 0.898 | 0.856 | -- |

Notes: Number of individuals for pdiss, bhlac, bhlps, bhl01, bunct, bmact, bplct. Number of households for bunnc, bfa, bch, bchot, bsa00, bsaoa, bed.
Sources: EU-SILC 2010 and own simulations based on EUROMOD. For external figures: Official statistics (pdiss, bhlps, bhlac, bunct, bunnc, bsa00, bsaoa, bed) as well as micro data from GSOEP (bfa, bmact, bplct, bchot, bch).

Now, it comes to the taxes and social security contributions that have been simulated in EUROMOD. Table 43 displays numbers of contributors as simulated. No external data on the number of contributors could be found. Latest available data for income tax payers dates back to year 2004. Information on the number of tax payers is made available in the official income tax statistics, which is only available every three years and with a lag of about five years. There is more general information available already for 2007, but information on the number of tax payers does not belong to this.

In the EU-SILC data for 2009, about 35.9m households pay either income taxes or contribute to any scheme of social security (Table 43). The respective number of households simulated for 2009 is with some 36.9m households quite close (*tis*). In terms of individuals, about 35.7m individuals have been simulated to have their employers contribute to social security (*ils_sicer*). The number of those who contribute themselves in terms of employee social security contributions (*ils_sicee*) is a bit lower (32.6m). This is because for those individuals employed in mini jobs, the employer is obliged to pay all the social contributions (also see Section 2.5.1). There have been about 4.9m individuals employed in mini jobs in Germany at the time of 2009. About 2.9m individuals have been simulated to contribute to social security schemes as self-employed persons (*ils_sicse*), i.e. the

statutory or the private health insurance as well as the statutory pension insurance, and about 20.7m pensioners have been simulated to contribute to social security for pensioners (*ils_sicpe*), i.e. the statutory or the private health insurance and the respective long-term care insurance. There are no comparable external figures for contributors to social security as the national accounts usually only report aggregate sums but no numbers of contributors.

The number of individuals paying positive income taxes (*tin* and *tingt*) is simulated to be about 39.3m. Tax allowances here represent both imputed tax allowances (see section 3.4.6) and modelled tax allowances (see Table 26).

Table 43. Simulated Taxes and Social Security Contributions -- Number of Contributors (in thousands)

| | EM Var. | EM Output (I) | EU-SILC |
|---|---|---|---|
| | | [2009] | [2009] |
| **Taxes / SSC** | *tis* | 36,922 | 35,906 |
| **SSC** | *tsc* | 56,907 | -- |
| Employer | *ils_sicer* | 35,682 | -- |
| Employee | *ils_sicee* | 32,649 | -- |
| Self-Empl. | *ils_sicse* | 2,940 | -- |
| Pensioners | *ils_sicpe* | 20,701 | -- |
| **Income Tax** | *tin* | 39,307 | -- |
| Taxable Inc. | *tinty* | 59,953 | -- |
| Tax Allow. | *tinta* | 80,613 | -- |
| Tax Base | *tintb* | 80,609 | -- |
| Gross Inc Tax | *tingt* | 39,307 | -- |

Notes: Number of individuals for all variables, except for tis, where it is number of households.
Sources: EU-SILC 2010 and own simulations based on EUROMOD.

Aggregate amounts for the simulated benefits are validated in Table 44. Now, also columns for uprated input data are given because income have been uprated and may thereby vary of the policy years, also for contributory benefits. Firstly, the aggregate sums of disposable household income (*ils_dispy*) is listed in order to show that the simulation captures incomes overall very well. The total sum of disposable income simulated for the population covered in EUROMOD amounts to 1,188bn euros for the year 2009. This is very close to the respective sum from EU-SILC (ratio of 0.965) and from external figures (ratio of 0.987), in this case the GSOEP.

Of the two major simulated disability benefits, the aggregate amount corresponding to the disability pensions from the statutory accident insurance (*pdiss*) is significantly over-simulated (ratios around 174%) whereas the one corresponding to the long-term care benefits from the statutory accident insurance (*bhlac*) is very precisely simulated (ratios between 98% and 102%). This does not correlate with the coverage in terms of recipients reported

above, which could be related to approximation error at the degree of disability. Simulated aggregate sums for sickness benefits from statutory health insurance (*bhl01*) are somewhat under-simulated, while sickness benefits from the private health insurance (*bhl01*) are slightly over-simulated.

Simulation results for the aggregate sums of the unemployment benefit I (*bunct*) are half of those from external statistics. This is explained by the severe under-simulation of recipients reported in Table 42. With regard to unemployment benefits II (*bunnc*), the simulated aggregated amounts are quite precise (ratios between 94% and 103%).

Aggregate sums of simulated family benefits (*bfa*) in total are slightly over-simulated with respect to the external figure. The picture is a bit more heterogeneous among the sub-components of family benefits though. At the most important family benefit in terms of aggregate spending, namely the child benefits (*bch*), simulated amounts slightly overstep the official statistics figures (ratios between 1.09 and 1.11). At the minor family benefits, sums deviate significantly between simulations and external data – in all three cases heavily under-simulated. For maternity-leave benefits (*bmact*), the under-simulation amounts to 32% of the official expenditure. On first sight, this does not correspond to the slight over-simulation of recipients (Table 42). However, it should be noted that maternity-leave benefits are only partly paid for by the health insurance in terms of the actual benefit as it has been simulated. In addition, the residual to prior earnings usually has to be paid for by the employers. These residual payments are not included in the simulations, but they are probably included in the official statistics, though this could not have been verified. It is also unclear whether they have been reported in the EU-SILC data, as the aggregate amount covered in the EU-SILC lies between the simulated and the external amount.

Aggregate sums of parental-leave benefits (*bplct*) are also somewhat under-simulated (ratio around 0.66). This result does not correspond to the significant over-simulation of recipients of *bplct* (Table 42). Moreover, both findings together imply that the reason for these deviations cannot be the fact alone that this benefit has been implemented in 2007 and that take-up of the benefit requires time. This could explain an over-simulation of recipients in the first years, but it does not explain the under-simulation of aggregate benefit amounts. Probably the reason for the latter is related to approximation error at the date of birth of the child and the prior income of the parents.

At the two major benefits from social assistance, the picture is very positive. Coherent with the accurate simulation of benefit recipients, simulated aggregated amounts also match very well the official statistics. The coverage rates are (0.88-1.22) for general social assistance (*bsa00*) and (0.79-0.82) for old-age assistance (*bsaoa*). General social assistance is only a minor benefit, because since 2005 *bunnc* is the major benefit guaranteeing a minimum income. Aggregate amounts for bsa00 are only some 700m euros per year and only some 150tsd household are in receipt.

Education benefits (*bed*) are slightly over-simulated. While aggregate amounts are simulated some 31% higher in 2009 than in the official statistics data, this over-shoot decreases to 20% in 2010 and turns into under-simulation of 6% in 2011. From October 2010 on, a reform to education benefits has taken place in Germany, where benefit rates have been adjusted and benefit eligibility has been substantially extended.

Table 44. Simulated Benefits – Aggregate Amounts (in bn. euros per year)

| | EM Var. | EM Output (I) | EU-SILC | Uprated Input (I) | | | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Disp. Income** | *ils_dispy* | 1,188.8 | 1,231.6 | 1,232.2 | 1,256.4 | 1,273.4 | 1,204.7 | -- | -- | -- | 0.987 | -- | -- | -- |
| **Disability B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Pen. (St. Ac.) | *pdiss* | 9.90 | 9.39 | 9.91 | 10.15 | 10.46 | 5.69 | 5.66 | -- | -- | 1.741 | 1.753 | -- | -- |
| LTC (St. Ac.) | *bhlac* | 4.55 | 0.24 | 4.66 | 4.67 | 4.72 | 4.46 | 4.68 | 4.74 | -- | 1.020 | 0.997 | 0.985 | -- |
| **Sickness B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Prv. Health I. | *bhlps* | 9.48 | 5.11 | 9.49 | 9.70 | 10.01 | 7.33 | -- | -- | -- | 1.293 | -- | -- | -- |
| Sta. Health I. | *bhl01* | 3.59 | 3.59 | 3.63 | 3.72 | 3.79 | 6.37 | 6.92 | 7.49 | -- | 0.564 | 0.525 | 0.497 | -- |
| **Unempl. B.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| U. Insurance | *bunct* | 5.86 | 10.88 | 5.88 | 6.02 | 6.19 | 10.38 | 9.74 | -- | -- | 0.565 | 0.603 | -- | -- |
| U. Assistance | *bunnc* | 33.94 | 21.96 | 34.43 | 34.47 | 35.41 | 36.30 | 36.33 | 33.20 | -- | 0.935 | 0.948 | 1.038 | -- |
| **Family B.** | *bfa* | 42.25 | 42.25 | 42.72 | 43.79 | 44.57 | 38.60 | -- | -- | -- | 1.113 | -- | -- | -- |
| Child Ben. | *bch* | 34.50 | 39.502 | 36.93 | 36.78 | 33.81 | 31.74 | 33.53 | 33.21 | -- | 1.087 | 1.101 | 1.107 | -- |
| Add. Child A. | *bchot* | 0.20 | 0.16 | 0.17 | 0.18 | 0.19 | 0.36 | 0.40 | -- | -- | 0.548 | 0.431 | -- | -- |
| Maternity L. | *bmact* | 0.44 | 0.66 | 0.44 | 0.44 | 0.44 | 1.40 | -- | -- | -- | 0.315 | -- | -- | -- |
| Parental L. | *bplct* | 2.94 | 1.93 | 2.94 | 1.95 | 1.97 | 4.45 | 4.48 | -- | -- | 0.660 | 0.655 | -- | -- |
| **Social Assis.** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| General S. A. | *bsa00* | 0.70 | 1.32 | 0.71 | 0.68 | 0.76 | 0.80 | 0.59 | -- | -- | 0.884 | 1.217 | -- | -- |
| Old-Age S.A. | *bsaoa* | 2.42 | 2.32 | 2.50 | 2.53 | 2.60 | 2.97 | 3.15 | -- | -- | 0.815 | 0.794 | -- | -- |
| **Education B.** | *bed* | 3.54 | 4.92 | 3.42 | 3.00 | 2.93 | 2.70 | 2.87 | 3.18 | -- | 1.311 | 1.191 | 0.942 | -- |

Notes: Estimations for 2009 for the variable bmact. Social benefits for children are included in bunnc. Sums for bsa00 and bsaoa exclude people in institutions.
Sources: EU-SILC 2010 and own simulations based on EUROMOD. For external figures: Official statistics (bhlac, pdiss, bhlps, bunct, bunnc, bchot, bmact, bplct, bsa00, bsaoa, bed, bch) as well as micro data from GSOEP (ils_dispy, bfa).

Aggregate amounts of simulated taxes and social security contributions are compared to external figures in Table 45. External information from national accounts has been utilised to validate the simulated social security payments. Social contributions in general have been simulated (*tsc*) very precisely. The ratios stay constant over the years at 1.06. The range of ratios is greater when taking a closer look at the social contributions for the single groups in detail, particularly in the case of contributions paid by the self-employed. Contributions from employers (*ils_sicer*) are slightly over-simulated in amounts by about 9-11%. Accordingly, contributions for employees (*ils_sicee*) are slightly higher in EUROMOD than in national accounts (5-7%). Opposed to this, contributions from the self-employed (*ils_sicse*) are heavily under-simulated, which is explained by the under-simulation of recipients of self-employment income. Ratios for the latter group stay constant over the years at around 60%. Contributions from pensioners (*ils_sicpe*) are slightly under-simulated for the years 2009 and 2011 and slightly over-simulated for 2010, ratios ranging between 0.88 and 1.03.

There is less information available for taxes[26]. External information on taxable incomes and final amounts of incomes taxes paid is only reported in the official final income tax statistics (see Statistisches Bundesamt, 2004). These statistics are only available every three years and only with a lag of about five years. This is why, at the time of finalization of this report, only the final tax statistics for 2007 have been available (Statistisches Bundesamt, 2007) and this is the reason why the cells of external data on total income tax are empty in Table 45. External data on social security contributions originates from national accounts. Simulated contributions fit very well on aggregate level (ratios around 1.06) as well as for employers, employees and pensioners. However, social security contributions of pensioners are significantly under-simulated in EUROMOD. However, this is consistent with the under-estimation of income from self-employment described in Table 39.

Table 45. Simulated Taxes and Social Security Contributions – Aggregate Amounts (in bn. euros per year)

| | EM Var. | EM Output (I) | EU-SILC | Uprated Input (I) | | | External Source (III) | | | | Ratio (I/III) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Taxes / SSC** | *tis* | 460.79 | 406.58 | 452.14 | 474.83 | 485.19 | -- | -- | -- | -- | -- | -- | -- | -- |
| SSC | *tsc* | 409.50 | -- | 417.66 | 434.56 | 439.24 | 384.10 | 393.58 | 409.28 | -- | 1.066 | 1.061 | 1.062 | -- |
| Employer | *ils_sicer* | 178.73 | -- | 181.86 | 188.42 | 190.63 | 161.10 | 167.10 | 173.56 | -- | 1.109 | 1.088 | 1.086 | -- |
| Employee | *ils_sicee* | 186.07 | -- | 191.07 | 199.32 | 201.03 | 174.14 | 180.25 | 190.22 | -- | 1.068 | 1.060 | 1.048 | -- |
| Self-Empl. | *ils_sicse* | 14.29 | -- | 14.42 | 14.90 | 15.061 | 22.04 | 22.15 | 23.67 | -- | 0.648 | 0.651 | 0.630 | -- |
| Pensioners | *ils_sicpe* | 30.41 | -- | 30.32 | 31.92 | 32.52 | 30.74 | 29.41 | 35.96 | -- | 0.990 | 1.031 | 0.888 | -- |
| **Income Tax** | *tin* | 230.03 | -- | 216.34 | 228.69 | 236.58 | -- | -- | -- | -- | -- | -- | -- | -- |
| Taxable Inc. | *tinty* | 1,387.03 | -- | 1,423.74 | 1,475.13 | 1,508.27 | -- | -- | -- | -- | -- | -- | -- | -- |
| Tax Allow. | *tinta* | 195.04 | -- | 254.57 | 263.25 | 266.40 | -- | -- | -- | -- | -- | -- | -- | -- |
| Tax Base | *tintb* | 1,191.99 | -- | 1,169.18 | 1,211.88 | 1,241.88 | -- | -- | -- | -- | -- | -- | -- | -- |
| Gross I. Tax | *tingt* | 218.24 | -- | 205.27 | 216.98 | 224.46 | -- | -- | -- | -- | -- | -- | -- | -- |

Notes: In the sum of taxes and social contributions (tis), contributions from employers are excluded. The variables *tin* and *tingt* contain the solidarity surcharge.
Sources: EU-SILC 2010 and own simulations based on EUROMOD. For external figures: National accounts (Statistisches Bundesamt, 2012).

[26] For details on the imputation of tax allowance, please see section 3.4.6

## 4.2 Income Distribution

In this section, EUROMOD simulation results are validated in terms of the distribution of disposable household income. Firstly, income inequality is addressed when the distribution of equivalised household income is compared to the corresponding distribution from external data. Some common indicators for income inequality are computed. Then, poverty rates, for various definitions and sub-groups, are computed and compared to external statistics.

All income distribution results presented here are computed for individuals according to their household disposable income (HDI), equivalised by the "modified OECD" equivalence scale. HDI are calculated as the sum of all income sources of all household members, net of income tax and social insurance contributions. The weights in the OECD equivalence are: first adult=1; additional people aged 14+ = 0.5; additional people aged under 14 = 0.3.

### 4.2.1 Income Inequality

The distribution of equivalised disposable household income is presented in Table 46 in mean equivalised incomes by income deciles. Simulated incomes for the four policy years (EUROMOD) are compared to incomes from the EU-SILC data for 2009 and to external data. Ratios of coverage are tabulated for the latter. The external source for the decile mean incomes is micro data from the GSOEP, from the $PEQUIV-files from the wave 2010. See Grabka (2010), for documentation of these data.

Disposable household income from the GSOEP has been adjusted to the EUROMOD concept of disposable income, where the concepts differ and where an adjustment was possible in the sense that differing income components are observed exactly (losses from renting and leasing, losses from capital investment, operating and maintenance costs for income from renting and leasing). However, there remain some relevant differences in the concepts of disposable household income in EUROMOD and the $PEQUIV-files from the GSOEP that could not have been adjusted (mainly related to income from particular sickness benefits that are not reported in the GSOEP).

This is one reason why simulated disposable incomes are somewhat larger in all years 2009 to 2012 compared to the external data from the GSOEP. Euromod over-simulates the six lowest deciles, whereas the four highest deciles are under-simulated. Over-simulation is the strongest in the first decile, which is 207% higher in EUROMOD than in the external source. The fitting is much better in deciles five to nine, where the discrepancies between EUROMOD and the external source stay within ± 5%. On the opposite, the highest decile is strongly under-simulated (the ration being about 80%), which can possibly be explained by a relative higher underrepresentation of very high incomes in EU-SILC than in the GSOEP. For 2010-2012, there has been no micro data available at the time of writing this report (the $PEQUIV files for the 2010 wave of the GSOEP report incomes that have as the income reference period the entire previous year).

When equivalised disposable household incomes are compared in overall for the entire distribution, deviations are smaller. For the comparisons of median, mean, Gini coefficient, and the inter-quantile ratio (S80/S20), external data does not refer to the GSOEP, but to official statistics from Eurostat. These are in overall terms somewhat closer to the simulated incomes. Coverage ratios for the mean and the median are between 0.96 and 1.00 over all policy years. There is a slightly greater deviation with respect to income inequality. Ratios for the Gini index stay at about 0.91 over the years and for the inter-quantile ratio between 0.83 and 0.85.

Table 46. Income Distribution: Equivalised Disposable Household Income (euros per year)

| | EUROMOD (I) | | | | EU-SILC | External Source (II) | | | | Ratio (I/II) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [2009] | [2010] | [2011] | [2012] | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **Decile Mean:** | | | | | | | | | | | | | |
| …1 | 8,316 | 8,470 | 8,547 | 8,647 | 6,985 | 4,014 | -- | -- | -- | 2.072 | -- | -- | -- |
| …2 | 11,307 | 11,614 | 11,759 | 11,912 | 10,969 | 9,656 | -- | -- | -- | 1.171 | -- | -- | -- |
| …3 | 13,447 | 13,890 | 14,100 | 14,271 | 13,439 | 12,330 | -- | -- | -- | 1.091 | -- | -- | -- |
| …4 | 15,345 | 15,863 | 16,128 | 16,331 | 15,570 | 14,460 | -- | -- | -- | 1.061 | -- | -- | -- |
| …5 | 17,138 | 17,747 | 18,056 | 18,262 | 17,664 | 16,573 | -- | -- | -- | 1.034 | -- | -- | -- |
| …6 | 19,056 | 19,828 | 20,204 | 20,470 | 19,849 | 18,751 | -- | -- | -- | 1.016 | -- | -- | -- |
| …7 | 21,365 | 22,244 | 22,700 | 22,998 | 22,361 | 21,373 | -- | -- | -- | 0.999 | -- | -- | -- |
| …8 | 24,516 | 25,621 | 26,162 | 26,505 | 25,680 | 24,720 | -- | -- | -- | 0.992 | -- | -- | -- |
| …9 | 29,069 | 30,408 | 31,097 | 31,533 | 30,707 | 30,284 | -- | -- | -- | 0.960 | -- | -- | -- |
| …10 | 45,370 | 46,910 | 48,053 | 48,751 | 50,362 | 55,764 | -- | -- | -- | 0.814 | -- | -- | -- |
| **Overall:** | | | | | | | | | | | | | |
| …Median | 18,058 | 18,746 | 19,083 | 19,299 | 18,678 | 18,586 | 18,797 | 19,043 | -- | 0.972 | 0.997 | 1.002 | -- |
| …Mean | 20,458 | 21,228 | 21,644 | 21,931 | 21,264 | 21,223 | 21,470 | 21,549 | -- | 0.964 | 0.989 | 1.004 | -- |
| …Gini | 26.36 | 26.54 | 26.74 | 26.79 | 29.26 | 29.10 | 29.30 | 29.30 | -- | 0.906 | 0.906 | 0.913 | -- |
| …S80/S20 | 3.73 | 3.79 | 3.83 | 3.84 | 4.51 | 4.50 | 4.50 | 4.50 | -- | 0.830 | 0.841 | 0.851 | -- |

Notes: Based on household disposable income (HDI), equivalised by the "modified OECD" equivalence scale. HDI are calculated as the sum of all income sources of all household members, net of income tax and social insurance contributions, computed at the individual level.
Sources: EUROMOD simulations and EU-SILC micro data for 2009. External source for overall median, mean, Gini coefficient, and S80/S20 is Eurostat statistics. External source for decile means is micro data from the GSOEP, from the $PEQUIV-files from the wave 2010, adjusted to EUROMOD concept of disposable income.

Another reason why simulated disposable incomes are somewhat larger in all years compared to the reported data from the GSOEP is that in this version of simulation all benefits are assumed to be taken-up completely. If this is not true in reality for all benefits, some households will have zero income from a particular benefit instead of the simulated non-zero benefit amount. Such a take-up correction has not been done because of the good fitting of the simulated number of recipients of social assistance (bunnc, bsaoa, bsa00) to external data.

### 4.2.2 Poverty Rates

Poverty rates by gender and age are presented in Table 47. They are compared for the EUROMOD simulations and external data from Eurostat statistics. Their computation for the simulated data is based on the equivalised disposable household income that has already been analysed for its distribution in the previous section. Several definitions of poverty rates have been applied, always with respect to a share (40%, 50%, 60%, or 70%) of the median income in the population. Poverty rates are differentiated by gender, for the usual 60%-definition, they are also differentiated by age groups.

Table 47. At-Risk-of-Poverty Rates by Gender and Age (percent)

| of Median HDI | EUROMOD (I) | | | | EU-SILC | External Source (II) | | | | Ratio (I/II) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [2009] | [2010] | [2011] | [2012] | [2009] | [2009] | [2010] | [2011] | [2012] | [2009] | [2010] | [2011] | [2012] |
| **40%** | | | | | | | | | | | | | |
| Total | 1.24 | 1.34 | 1.48 | 1.46 | 4.38 | 4.60 | 4.00 | 4.30 | -- | 0.271 | 0.335 | 0.343 | -- |
| Males | 1.27 | 1.30 | 1.44 | 1.47 | 4.39 | 4.80 | 4.00 | 4.20 | -- | 0.264 | 0.324 | 0.344 | -- |
| Females | 1.22 | 1.38 | 1.51 | 1.46 | 4.36 | 4.50 | 4.10 | 4.30 | -- | 0.272 | 0.336 | 0.351 | -- |
| **50%** | | | | | | | | | | | | | |
| Total | 5.99 | 6.33 | 6.49 | 6.36 | 9.27 | 9.40 | 9.20 | 9.70 | -- | 0.637 | 0.688 | 0.669 | -- |
| Males | 6.09 | 6.33 | 6.52 | 6.41 | 9.39 | 9.20 | 9.00 | 9.40 | -- | 0.662 | 0.703 | 0.694 | -- |
| Females | 5.90 | 6.33 | 6.45 | 6.32 | 9.14 | 9.60 | 9.30 | 9.90 | -- | 0.615 | 0.680 | 0.652 | -- |
| **60%** | | | | | | | | | | | | | |
| Total | 12.70 | 13.36 | 13.77 | 13.57 | 15.64 | 15.50 | 15.60 | 15.80 | -- | 0.820 | 0.857 | 0.872 | -- |
| Males | 12.27 | 12.83 | 13.27 | 13.10 | 16.34 | 14.70 | 14.90 | 14.90 | -- | 0.835 | 0.861 | 0.891 | -- |
| Females | 13.12 | 13.88 | 14.26 | 14.03 | 14.92 | 16.30 | 16.40 | 16.80 | -- | 0.805 | 0.846 | 0.849 | -- |
| **70%** | | | | | | | | | | | | | |
| Total | 21.11 | 21.44 | 21.55 | 21.64 | 23.27 | 22.60 | 23.20 | 23.70 | -- | 0.934 | 0.924 | 0.909 | -- |
| Males | 20.42 | 20.69 | 20.78 | 20.86 | 24.33 | 21.30 | 22.10 | 22.40 | -- | 0.959 | 0.936 | 0.928 | -- |
| Females | 21.78 | 22.17 | 22.30 | 22.40 | 22.17 | 23.90 | 24.30 | 24.90 | -- | 0.911 | 0.912 | 0.896 | -- |
| **60%** | | | | | | | | | | | | | |
| 0-17 years | 12.66 | 12.86 | 13.62 | 13.63 | 17.43 | 15.00 | 17.50 | 15.60 | -- | 0.844 | 0.735 | 0.873 | -- |
| 18-24 years | 16.82 | 17.94 | 18.69 | 18.50 | 19.05 | 21.10 | 18.90 | 19.00 | -- | 0.797 | 0.949 | 0.984 | -- |
| 25-49 years | 12.01 | 12.40 | 12.92 | 12.79 | 14.00 | 14.10 | 14.10 | 14.60 | -- | 0.852 | 0.880 | 0.885 | -- |
| 50-64 years | 12.09 | 12.79 | 13.15 | 12.72 | 17.07 | 16.70 | 17.00 | 18.50 | -- | 0.724 | 0.753 | 0.711 | -- |
| 65+ years | 12.82 | 14.09 | 13.93 | 13.65 | 14.22 | 15.00 | 14.10 | 14.20 | -- | 0.855 | 0.999 | 0.981 | -- |

Notes: Based on household disposable income (HDI), equivalised by the "modified OECD" equivalence scale. HDI are calculated as the sum of all income sources of all household members, net of income tax and social insurance contributions, computed at the individual level.
Sources: EUROMOD simulations and EU-SILC micro data for 2009. External source is Eurostat statistics.

As a result of the significant over-simulation of equivalised household incomes in the lower income deciles (see Section 4.2.1 and Table 46), poverty rates, which are based on this income distribution, are significantly under-simulated (Table 47), at least for the 40% and 50% definitions. Ratios range between 26% and 35%, for the 40%-definition, and between 62% and 70% for the 50%-definition. Under-simulation is less severe, the closer we are to the median: ratios range between 81% and 89%, for the 60%-definition, and between 90% and 96% for the 70%-definition. For the 60%-definition, differentiated by age groups, the greatest deviations are found for the group of individuals aged 50-64 years, while the smallest deviations are found for individuals aged 65 years and older.

### 4.2.3 Validation of Minimum Wage

There has been no general minimum wage implemented across all industries in Germany up to now. Per default there is no simulation of a minimum wage in the EUROMOD simulations for Germany.

## 4.3 Budget Constraint Charts

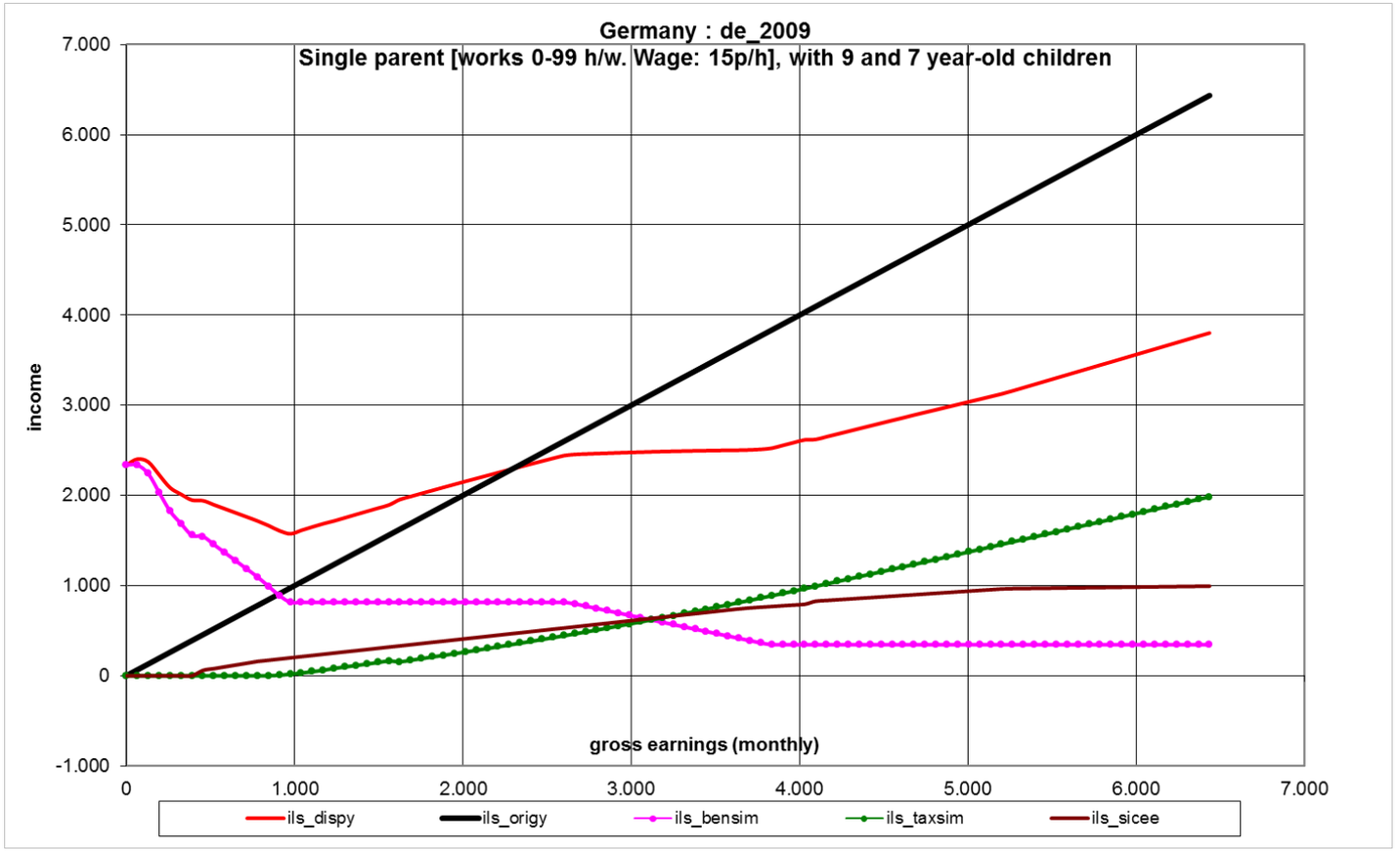
Budget constraints for three typical household types are presented in this section. They have been generated by the standard EUROMOD budget constraint tool for the policy year 2009. They have been applied to hypothetical data, i.e. data on stylized households, generated based on the EU-SILC data. Given a continuum on gross labour earnings for each individual, the budget constraints plot the level of the respective income component, benefit amounts received, tax burdens born, or contributions to social security. Output for standard plots from the EUROMOD budget constraint have been reduced to original income (*ils_origy*), simulated employee social security contributions (*ils_sicee*), total amount of simulated benefits received (*ils_bensim*), total amount of simulated taxes paid (*ils_taxsim*), and resulting disposable household income (*ils_dispy*). Household types vary according to the number of adults in the household (single or couple), number of children in the household (two or no children), and wage earned by the main earner (15 euros per hour, or 30.92 euros per hour).

Table 48 plots the budget constraint for single parents, working at an hourly wage of 15 euros per hour, with two children, aged 7 and 9, in the household. This is the average conditional wage in the sample, predicted from a wage regression. In the lower income region, up to gross monthly earnings of about 800 euros, disposable income of the single parents is dominated by social benefits, guaranteeing a minimum income, such as unemployment assistance (*bunnc*), additional child benefits (*bchot*), and general social assistance (*bsa00*). They are received on top of the child benefits (*bch*), which shift the benefit curve up by a constant of 345 euros for the two children together. Social benefits are faded out with increasing market income. Benefits are withdrawn if income from employment exceeds certain thresholds. However, benefits remain at a relatively high level (of about 815 euros), due to relatively high income allowances for lone parents with two children at the social benefits that are simulated for children (in *bunnc*) and the additional child allowances (*bchot*).

When market incomes exceed the region of marginal employment (mini jobs, up to 400 euros per month), social security contributions kick in, and, once general tax-free allowances are exceeded, income taxes are paid. Then, taxes (*ils_tax*) and social contributions (*ils_sicee*) increase, while benefits (*ils_bensim)* remain constant between 975 euros and about 2,600 euros market income. The curve of the taxes is slightly upwards sloping; this indicates the progressivity of the income tax system. The slope of the social contributions curve falls below one once the assessment ceiling of the statutory health insurance is reached (at 4,050 euros), and it further falls to almost zero once the assessment ceiling of the statutory pension insurance is reached (at about 5,200 euros). After 2,600 euros, benefits start decreasing again, down to their intercept at the child benefits (345 euros). This is when the child-related elements of *bunnc* and the additional child benefits are also taken away for single parents with two children. The curve for market income

(*ils_origy*) crosses the curve for disposable income (*ils_dispy*) at a relatively high income (about 2,340 euros), indicating the generosity of the tax and benefit system towards lone parents.

**Table 48.** Budget Constraints (for 2009) – **Single Parents with two Children**

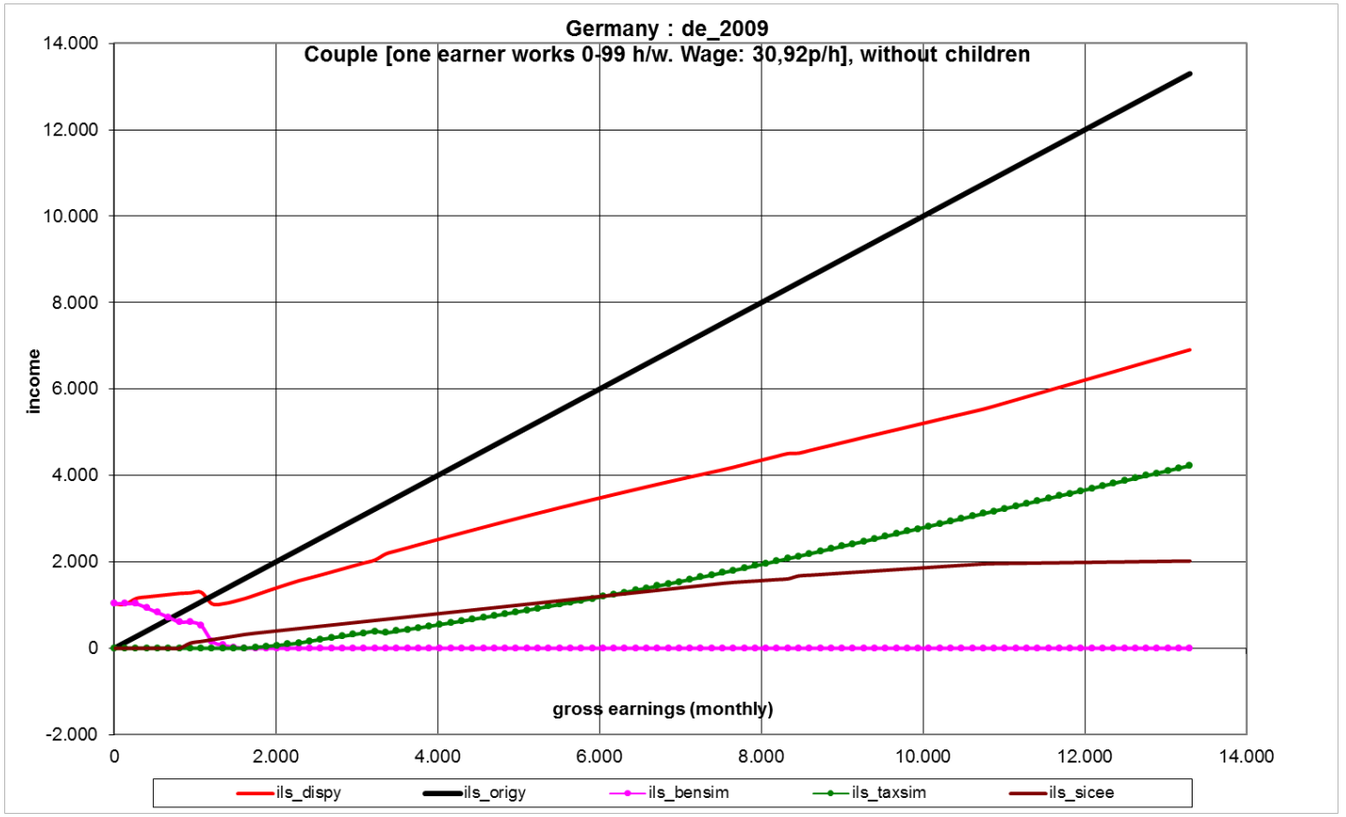



Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2009.

Table 49 plots the budget constraint for couples without children, where one spouse is working at an hourly wage of 30.92 euros per hour. This is a relatively high hourly wage (it is in the highest decile of conditional hourly wages, predicted from a wage regression). As this household has no kids, benefits entirely consist of the social benefits guaranteeing a minimum income. These benefits again dominate disposable income in the lower income region, this time until a couples' income of about 1,200 euros. This is also the area where the market income curve (*ils_origy*) crosses the disposable income curve (*ils_dispy*), indicating that the tax and benefit system is less generous to couples without children than to single parents with two children.

Again, social security contributions (*ils_sicee*) begin to kick in just above 800 eur/month (the upper threshold of marginal employment) and taxes (*ils_taxsim*) once the free-tax allowance (about 1600 eur/month for couples) is overstepped. These curves evolve in a similar way as for single parents. The lightly concave curvature of social contributions again indicates the two assessment ceilings for statutory pension and health insurance, and the convex curvature of the taxes curve indicates the progressivity of the income tax system.

Table 49. Budget Constraints (for 2009) – **Couples without Children**




Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2009.

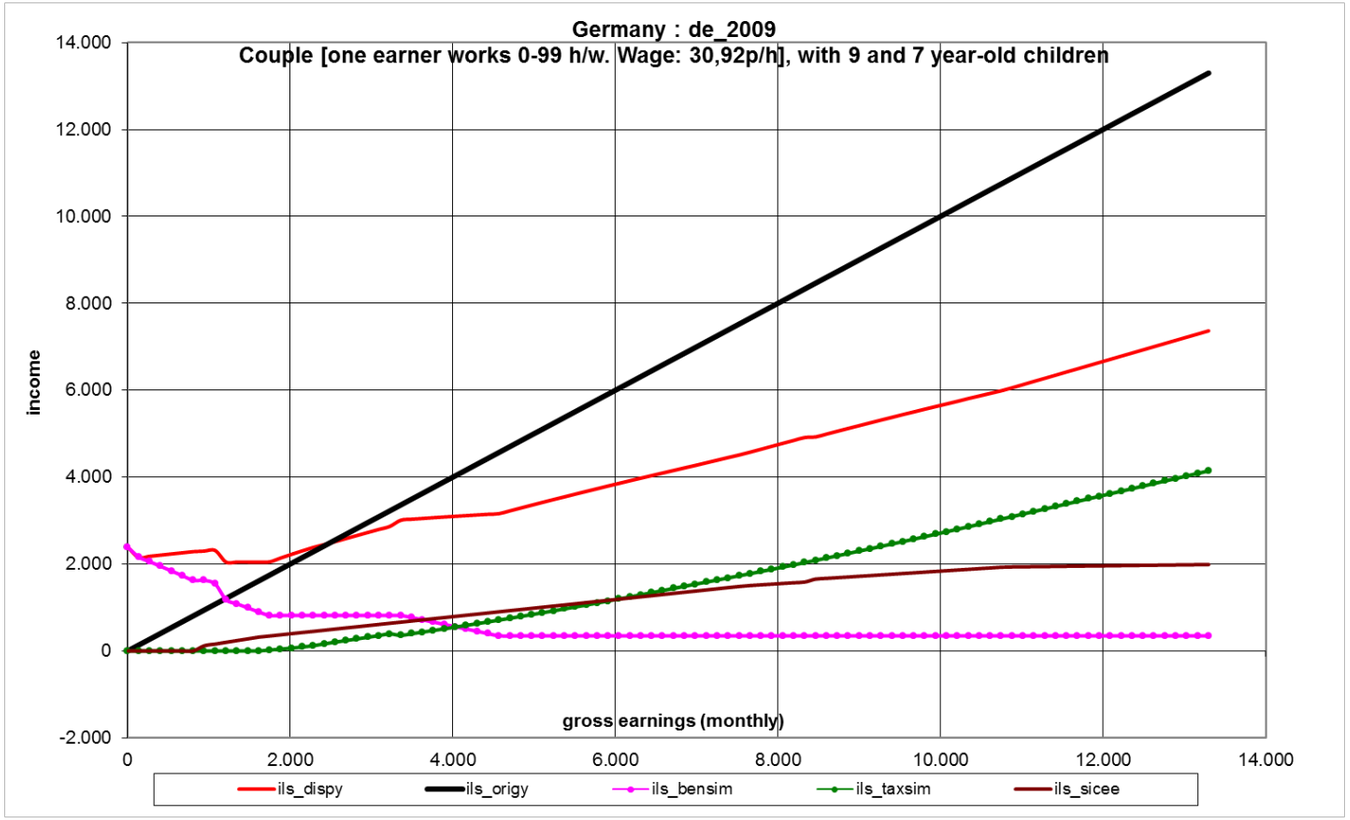
Once social benefits for minimum income are faded out, the benefits curve (*ils_bensim*) has reached its lowest level at zero, where it remains over all the income distribution, as there are no child benefits received by the childless couple household. There are also no other benefits received per assumption. Unemployment insurance benefits or any health or disability benefits are assumed to be zero for all the three households under consideration here.

Now the two households are partly combined to a third household. Table 50 plots the budget constraint for couple parents with two children, aged 7 and 9, in the household, where one spouse is working at the high hourly wage of 30.92 euros per hour. In the lower income region, up to gross monthly earnings of the couple of about 1,075 euros, this household benefits from the relatively generous benefit system. Already with a zero market income, this household has a disposable income of about 2,300 euros, whereas the couple without kids had a disposable income of only 1,000 euros. However, the single parent household had an equally high disposable income than the couple-with-two-children household. This is again related to the social benefits for minimum income (*bunnc*, bsa00) in the lower income region, as well as to the child-related benefits (from *bunnc*, and *bchot*), which the couple parent household receives up to a couple gross market income of about 4,300 euros. These are withdrawn thereafter, and only the child benefits (*bch*) for the two children (345 euros) remain.

Taxes (*ils_taxsim*) and social security contributions (*ils_sicee*) behave in the same way as for the couple without children. The tax-reducing effect of the child allowances, which exceeds the amount of tax benefits in higher income deciles, does not become apparent from the graphs. It slightly lowers the slope of the tax curve in the higher income regions, which is though hardly visible in the graph. Comparing the tax curve at a couples' income of 10,000 euros between Table 49 and Table 50, one can see that couples without children have a tax burden of about 2,822 euros (Table 49), whereas couples with children have a tax burden of only about 2,743 euros (Table 50).

The curve for market income (*ils_origy*) crosses the curve for disposable income (*ils_dispy*) at a medium-level income (about 2,500 euros). This is only slightly higher than the 2,400 euros for the single parent, but it is clearly higher compared to the 1,200 euros for the childless couple. This indicates that the tax and benefit system is generous to children, and it is relatively more generous to children living with single parents.

Table 50. Budget Constraints (for 2009) – **Couples with two Children**




Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2009.

## 4.4 Summary of "Health Warnings"

It seems that the model does not simulate benefit receipt of households in the lower income deciles very accurately. However, the deviations found do not seem to be solvable in a straight-forward way. On the one hand, receipt and magnitude of the three focussed social benefits (*bunnc*, *bsa00*, and *bsaoa*) appears to be accurately simulated. On the other hand, poverty rates appear to be somewhat under-simulated. These (unexplained) deviations should be kept in mind when using the model, especially when the focus is on benefit receipt in the lower tales of the income distribution.

It should also be noted that housing benefits (*bho*) have not been simulated in EUROMOD because reported information on housing expenditures is not detailed enough. Interactions between the receipt of housing benefits and the receipt of unemployment assistance (*bunnc*) have been addressed in the

disaggregation procedure of raw SILC data, but simulation results show that the complexity of interactions between housing benefits and unemployment assistance in reality has not been fully captured.

# 5. REFERENCES

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