

Ochmann, Richard; Fossen, Frank

Research Report

EUROMOD Country Report Germany: EUROMOD Version F6.0. Project on behalf of the Directorate-General for Employment, social affairs and equal opportunities of the European Commission

DIW Data Documentation, No. 64

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Ochmann, Richard; Fossen, Frank (2012) : EUROMOD Country Report Germany: EUROMOD Version F6.0. Project on behalf of the Directorate-General for Employment, social affairs and equal opportunities of the European Commission, DIW Data Documentation, No. 64, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/59605>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

64

Data Documentation

Deutsches Institut für Wirtschaftsforschung

2012

EUROMOD Country Report Germany

EUROMOD Version F6.0

Richard Ochmann and Frank Fossen

IMPRESSUM

© DIW Berlin, 2012

DIW Berlin

Deutsches Institut für Wirtschaftsforschung

Mohrenstr. 58

10117 Berlin

Tel. +49 (30) 897 89-0

Fax +49 (30) 897 89-200

www.diw.de

ISSN 1861-1532

All rights reserved.

Reproduction and distribution

in any form, also in parts,

requires the express written

permission of DIW Berlin.



Data Documentation 64

Richard Ochmann* (Project management)

Frank Fossen**

EUROMOD Country Report

Germany
EUROMOD Version F6.0

Project on behalf of the Directorate-General for Employment, social affairs and equal opportunities of the European Commission

Berlin, December 2011

* DIW Berlin, Department Public Economics. rochmann@diw.de

** DIW Berlin, Department Public Economics and FU Berlin. ffossen@diw.de



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.

EUROMOD coordinator: Holly Sutherland

EUROMOD coordination assistant: Lucy Brown

EUROMOD developer responsible for Germany: Iva Tasseva

National team for Germany: Frank Fossen and Richard Ochmann. We would like to thank Chrysanthi Tsiasioti for excellent research assistance.

The results presented in this report are derived using EUROMOD version F6.0 EUROMOD is continually being improved and the results presented here may not match those that would be obtained with later versions of EUROMOD.

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.

The seven-year Programme targets all stakeholders who can help shape the development of appropriate and effective employment and social legislation and policies, across the EU-27, EFTA-EEA and EU candidate and pre-candidate countries.

PROGRESS mission is to strengthen the EU contribution in support of Member States' commitment. PROGRESS is instrumental in providing analysis and policy advice on PROGRESS policy areas; monitoring and reporting on the implementation of EU legislation and policies in PROGRESS policy areas; promoting policy transfer, learning and support among Member States on EU objectives and priorities; and relaying the views of the stakeholders and society at large

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

The information contained in this publication does not necessarily reflect the position or opinion of the European Commission.

CONTENTS

1	Basic Information	1
1.1	Basic Figures	1
1.2	The Tax and Benefit System	2
1.2.1	Aggregate Figures from Fiscal Budget	2
1.2.2	Basic Information about the Tax-Benefit System	3
1.3	Social Benefits.....	5
1.3.1	Benefits from Statutory Unemployment Insurance.....	5
1.3.2	Benefits from Statutory Health and Accident Insurance	7
1.3.3	Benefits from Statutory Pension Insurance.....	9
1.3.4	Pensions from Other Institutions:	10
1.3.5	Public Transfers to Private Households	11
1.3.6	Scope and Scale	15
1.4	Social Contributions.....	18
1.4.1	Relevant Regulations.....	18
1.4.2	Scope and Scale	20
1.5	Taxes	22
1.5.1	Direct Taxes	22
1.5.2	Indirect Taxes	25
1.5.3	Scope and Scale	25
2	Simulation of Taxes and Benefits in EUROMOD	27
2.1	Scope of Simulation.....	28
2.2	Structural Changes between 2007 and 2010	31
2.3	Order of Simulation and Interdependencies (2007-2010)	32
2.4	Social Benefits.....	33
2.4.1	Correction of Take-up of Social Benefits.....	33
2.4.2	Minimum Wage (<i>minwage_de</i>)	34
2.4.3	Child Benefits (<i>bch_de</i>).....	35
2.4.3.1	Definitions	35
2.4.3.2	Eligibility Conditions.....	35
2.4.3.3	Income Test	35
2.4.3.4	Benefit Amount.....	35
2.4.3.5	EUROMOD Notes	35
2.4.4	Unemployment Benefits I (<i>bunct_de</i>).....	36

2.4.4.1	Definitions	36
2.4.4.2	Eligibility Conditions.....	36
2.4.4.3	Income Test	36
2.4.4.4	Benefit Amount.....	36
2.4.4.5	Benefit Duration.....	36
2.4.4.6	EUROMOD Notes	37
2.4.5	Disability Pension from the Statutory Accident Insurance (<i>pdiss_de</i>).....	38
2.4.5.1	Definitions	38
2.4.5.2	Eligibility Conditions.....	38
2.4.5.3	Income Test	38
2.4.5.4	Benefit Amount.....	38
2.4.5.5	EUROMOD Notes	38
2.4.6	Education Benefits (<i>bed_de</i>)	39
2.4.6.1	Definitions	39
2.4.6.2	Eligibility Conditions.....	39
2.4.6.3	Income Test	39
2.4.6.4	Benefit Amount.....	40
2.4.6.5	EUROMOD Notes	40
2.4.7	Long-Term Care Benefits from Statutory Accident Insurance (<i>bhlac_de</i>).....	41
2.4.7.1	Definitions	41
2.4.7.2	Eligibility Conditions.....	41
2.4.7.3	Income Test	41
2.4.7.4	Benefit Amount.....	41
2.4.7.5	EUROMOD Notes	41
2.4.8	Sickness Benefits (<i>bhlps_de</i>)	42
2.4.8.1	Definitions	42
2.4.8.2	Eligibility Conditions.....	42
2.4.8.3	Income Test	42
2.4.8.4	Benefit Amount.....	43
2.4.8.5	EUROMOD Notes	43
2.4.9	Unemployment Benefits II and Social Benefits (<i>bunnc_de</i>).....	43
2.4.9.1	Definitions	43
2.4.9.2	Eligibility Conditions.....	43
2.4.9.3	Income Test	44
2.4.9.4	Benefit Amount.....	44

2.4.9.5	EUROMOD Notes	45
2.4.10	Maternity Leave Benefits (<i>bmact_de</i>)	46
2.4.10.1	Definitions	46
2.4.10.2	Eligibility Conditions.....	46
2.4.10.3	Income Test	46
2.4.10.4	Benefit Amount.....	46
2.4.10.5	EUROMOD Notes	46
2.4.11	Parental Leave Benefits (<i>bplct_de</i>)	47
2.4.11.1	Definitions	47
2.4.11.2	Eligibility Conditions.....	47
2.4.11.3	Income Test	47
2.4.11.4	Benefit Amount.....	48
2.4.11.5	EUROMOD Notes	48
2.4.12	Social Assistance for Old-age and for Reduced Work Ability (<i>bsaoa_de</i>)	48
2.4.12.1	Definitions	49
2.4.12.2	Eligibility Conditions.....	49
2.4.12.3	Income Test	49
2.4.12.4	Benefit Amount.....	49
2.4.12.5	EUROMOD Notes	50
2.4.13	General Social Assistance (<i>bsaoo_de</i>)	50
2.4.13.1	Definitions	51
2.4.13.2	Eligibility Conditions.....	51
2.4.13.3	Income Test	51
2.4.13.4	Benefit Amount.....	51
2.4.13.5	EUROMOD Notes	52
2.4.14	Additional Child Benefits (<i>bchot_de</i>).....	52
2.4.14.1	Definitions	52
2.4.14.2	Eligibility Conditions.....	52
2.4.14.3	Income Test	52
2.4.14.4	Benefit Amount.....	53
2.4.14.5	EUROMOD Notes	53
2.5	Social Contributions.....	53
2.5.1	Employer Social Contributions (<i>tscer_de</i>).....	56
2.5.2	Employee Social Contributions (<i>tscee_de</i>)	57
2.5.3	Self-Employed Social Contributions (<i>tscse_de</i>)	58

2.5.4	Pensioner Social Contributions (<i>tspe_de</i>).....	59
2.6	Personal Income Tax.....	60
2.6.1	Taxable Income (<i>tin_de</i>).....	60
2.6.1.1	Tax Base.....	60
2.6.1.2	Tax Allowances.....	60
2.6.2	Individual Taxation (<i>tinit_de</i>).....	62
2.6.2.1	Tax Unit.....	63
2.6.2.2	Tax Exemptions.....	63
2.6.2.3	Tax Allowances.....	63
2.6.2.4	Tax Base.....	63
2.6.2.5	Tax Schedule.....	64
2.6.2.6	Tax Credits.....	64
2.6.3	Joint Taxation (<i>tinjt_de</i>).....	65
2.6.3.1	Tax Unit.....	66
2.6.3.2	Tax Exemptions.....	66
2.6.3.3	Tax Allowances.....	66
2.6.3.4	Tax Base.....	66
2.6.3.5	Tax Schedule.....	67
2.6.3.6	Tax Credits.....	67
2.7	Capital Income Taxation.....	67
2.7.1	Tax Unit.....	67
2.7.2	Exemptions.....	67
2.7.3	Tax Allowances.....	68
2.7.4	Tax Base.....	68
2.7.5	Tax Schedule.....	68
2.7.6	Tax Credits.....	68
3	Data.....	68
3.1	General Description.....	68
3.2	Sample Quality and Weights.....	70
3.2.1	Non-Response.....	70
3.2.2	Weights.....	71
3.2.3	Item Non-Response and Under Reporting.....	72
3.3	Data Adjustment.....	73
3.4	Imputations and Assumptions.....	74
3.4.1	Time Period.....	74

- 3.4.2 Gross Incomes 74
- 3.4.3 Correction for Non-Take-up of Benefits.....75
- 3.4.4 Disaggregation of Harmonized Benefit Data75
- 3.4.5 Approximation of Benefit Entitlement Basis..... 81
- 3.4.6 Other Imputed Variables 82
- 3.5 Updating 83
- 4 Validation..... 87
 - 4.1 Aggregate Validation.....87
 - 4.1.1 Validation of Incomes Inputted into the Simulation 88
 - 4.1.2 Validation of Outputted (Simulated) Incomes 95
 - 4.1.2.1 Full Take-Up of Benefits96
 - 4.1.2.2 Limited Take-Up of Benefits103
 - 4.2 Income Distribution..... 107
 - 4.2.1 Income Inequality108
 - 4.2.2 Poverty Rates 110
 - 4.2.3 Validation of Minimum Wage..... 112
 - 4.3 Budget Constraint Charts 112
 - 4.4 Summary of “Health Warnings” 116
- 5 References 117

TABLES

Table 1	Basic figures.....	1
Table 2	Tax-benefit system and government budget	2
Table 3	Social protection expenditure by function (as % of total social protection expenditure).....	3
Table 4	Taxation (as % of total tax receipts) ^[1]	3
Table 5	Social benefits: recipients (as % of population).....	16
Table 6	Social benefit: expenditure.....	17
Table 7	Social contributions: Contribution rates ^[1] and ceilings	19
Table 8	Social contributions: contributors (as % of population).....	20
Table 9	[A] Social contributions: revenue by contributors	21
	[B] Social contributions: revenue by insurance	21
Table 10	Determination of taxable income according to German Income Tax Law (§ 2 EStG).....	23
Table 11	Taxes: taxpayers (as % of population per year).....	26
Table 12	Taxes: Revenue.....	27
Table 13	Simulation of benefits in EUROMOD	29
Table 14	Simulation of taxes and social contributions in EUROMOD	30
Table 15	EUROMOD Spine: Order of Simulation, 2007-2010.....	32
Table 16	Social Security: Contribution Rates ^[1] and Ceilings.....	54
Table 17	Social contributions: Statutory Pension Insurance (Rates in %).....	54
Table 18	Social contributions: Statutory Health Insurance (Rates in %).....	55
Table 19	Social contributions: Statutory Long-term Care Insurance (Rates in %).....	55
Table 20	Social contributions: Statutory Unemployment Insurance (Rates in %).....	55
Table 21	Social contributions: Statutory Accident Insurance (Rates in %)	56
Table 22	Employers' Social Security Contribution Rates (in %)	57
Table 23	Employees' Social Security Contribution Rates (in %).....	58
Table 24	Self-employed Social Security Contribution Rates ^[1] (in %).....	58
Table 25	Pensioners' Social Security Contribution Rates (in %).....	59
Table 26	Personal Income Tax: Allowances (2007-2010).....	61
Table 27	Personal Income Tax Tariff (2007)	64
Table 28	Capital Income Taxation: Basic Allowance (2007-2010).....	68
Table 29	EUROMOD database description.....	69
Table 30	Descriptive Statistics of the Individual/Household Grossing-up Weight (dwt=DB090=RB050).....	71
Table 31	Reporting of Incomes in SILC and other Micro Data (per year)	73
Table 32	Disaggregation of Harmonized Benefit Data.....	77
Table 33	Updating Factors.....	85
Table 34	Components of Disposable Household Income	88

Table 35	Number of People in and out of Labour in the Population	89
Table 36	Components of Market Income -- Number of Recipients (in thousands)	90
Table 37	Components of Market Income – Aggregate Amounts (in bn. euros per year)	91
Table 38	Non-Simulated Taxes and Benefits -- Number of Recipients (in thousands).....	93
Table 39	Non-Simulated Taxes and Benefits – Aggregate Amounts (in bn. euros per year)	95
Table 40	Simulated Benefits -- Number of Recipients (in thousands) – Full Take-Up	98
Table 41	Simulated Taxes and Social Security Contributions -- Number of Contributors (in thousands) – Full Take-Up.....	99
Table 42	Simulated Benefits – Aggregate Amounts (in bn. euros per year) – Full Take-Up.....	101
Table 43	Simulated Taxes and Social Security Contributions – Aggregate Amounts (in bn. euros per year) – Full Take-Up	103
Table 44	Simulated Benefits -- Number of Recipients (in thousands) – Limited Take-Up	105
Table 45	Simulated Taxes and Social Security Contributions -- Number of Recipients (in thousands) – Limited Take-Up	105
Table 46	Simulated Benefits – Aggregate Amounts (in bn. euros per year) – Limited Take-Up.....	106
Table 47	Simulated Taxes and Social Security Contributions – Aggregate Amounts (in bn. euros per year) – Limited Take-Up	107
Table 48	Income Distribution: Equivalised Disposable Household Income (euros per year) – Full Take-Up.....	109
Table 49	Income Distribution: Equivalised Disposable Household Income (euros per year) – Limited Take-Up.....	110
Table 50	At-Risk-of-Poverty Rates by Gender and Age (percent) – Full Take-Up	111
Table 51	At-Risk-of-Poverty Rates by Gender and Age (percent) – Limited Take-Up.....	112
Table 52	Budget Constraints (for 2007) – Single Parents with two Children	113
Table 53	Budget Constraints (for 2007) – Couple without Children.....	114
Table 54	Budget Constraints (for 2007) – Couple with two Children	115

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, but continuously, from 82.3m in 2007 to 81.8m in 2010.¹ On the other hand, the age structure of the population changes significantly. While the share of children in the population decreases continuously (from 17.3% in 2007 to 16.5% in 2010), the share of people in retirement increases continuously (from 19.8% in 2007 to 20.7% in 2010). At the same time, life expectancy increases slightly, for men and women, and the fertility rate decreases slightly. 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] < 18 (%)	Pop. ^[1] ≥ 65 (%)	Life ^[1] expect. (years) m f	Fertility ^[1] rate	Unemp. ^[1] rate ILO ^[2] Eurostat m f	GDP ^[1] per head (PPS)	Currency Name
2007	82.315	17.3	19.8	77.4 82.7	1.37	8.5 8.4	116	EURO
2008	82.218	17.0	20.1	77.6 82.7	1.38	7.4 7.3	116	EURO
2009	82.002	16.6	20.4	77.8 82.8	1.36	8.0 7.5	116	EURO
2010	81.802*	16.5	20.7	n/a	n/a	7.4 6.8	n/a	EURO

Notes: * This figure is preliminary.

Source: ^[1] Eurostat (February 2011) on-line data base; ^[2] Statistisches Bundesamt Deutschland.

Total population - [tps00001] at 1 January (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=de&pcode=tps00001&plugin=1>

Proportion of population aged 65 and over - [tps00028] (% of total population) (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00028&plugin=1>

Life expectancy at birth, by gender - [tps00025] (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tps00025&language=en>

Total fertility rate - [tsdde220] (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdde220&plugin=1>

GDP per capita in PPS - [tsieb010]; GDP per capita in Purchasing Power Standards (PPS) (EU-27 = 100) (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsieb010&plugin=1>

Unemployment rate by gender - [tsiem110]; Total (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsiem110&plugin=1>

Unemployment rate by ILO (last accessed on 04.02.2011)

<https://www-genesis.destatis.de/genesis/online>

Population on 1 January: Structure indicators [demo_pjanind]; proportion of population aged 0-19 years

<http://appsso.eurostat.ec.europa.eu/nui/show.do>

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 44% of GDP (see Table 2), about the same holds for total general government expenditures (44%). Regarding the tax and benefit system, this fraction is lower. Total tax receipts amount to about 23% of GDP and social protection to about 28%. Total social security contributions aggregate to some 14% of GDP. All these figures were more or less stable over the time between 2007 and 2010.

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]
2007	43.8	22.8	13.2	43.6	27.68
2008	43.9	23.1	13.9	43.8	27.76*
2009	44.5	22.6**	14.4**	47.5	n/a
2010	n/a	n/a	n/a	n/a	n/a

Notes: * This figure is preliminary.

** For 2009, these are preliminary estimates.

^[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 (February 2011) on-line database; ^[b]OECD (February 2011) on-line database.

Total tax receipts (% of GDP) do not include social security contributions. (last accessed on 28.02.2011)

<http://stats.oecd.org/index.aspx?r=84234>

Total expenditures for social protection; figure for 2008 preliminary. (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=de&pcode=tps00098&plugin=0>

Total general government expenditure - [tec00023]; (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=0&language=en&pcode=tec00023>

Total general government revenue - [tec00021]; (last accessed on 04.02.2011)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tec00021&plugin=1>

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 30%) and to old-age (35%). Family and children (11%), disability (8%), survivors (8%), 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]
2007	29.8	7.6	35.6	7.7	10.5	5.8	2.3	0.7
2008	30.5*	7.8*	35.4*	7.6*	10.6*	5.4*	2.2*	0.6*
2009	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2010	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Notes: * The figures for 2008 are preliminary.

^[1] Social exclusion not elsewhere classified.

Source: Eurostat (February 2011) on-line database;

Social benefits by function - [tps00106]; (% of total benefits) (last accessed on 07.02.2011)

The figures for 2008 for: sickness/health care, unemployment, survivors, family/children housing and social exclusion are preliminary.

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=de&pcode=tps00106>

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 46%) in total tax receipts. The share of personal income tax is only slightly lower (40%), whereas corporate income taxes (9%) and other taxes are of only minor relevance (5%). There is some dynamics in this structure over the recent four years apparent. While the relevance of corporate income taxes decreases continuously, in course of a great reform to corporate taxes in Germany in the year of 2008, the relative weight of the other groups of taxes in revenue increases in turn.

Table 4. Taxation (as % of total tax receipts)^[1]

	Personal income tax	Corporate income tax ^[2]	Taxes on goods and services	Other taxes
2007	39.6	9.6	46.1	4.7
2008	41.6	8.2	45.7	4.5
2009*	41.2	5.9	48.4	4.5
2010	n/a	n/a	n/a	n/a

Notes: ^[1] Total tax receipts here without receipts from social security contributions; figures are recalculated.

* Figures for 2009 are estimates/provisional.

^[2] Sum of corporate tax and net local business tax.

Source: OECD (February 2011).

<http://stats.oecd.org/index.aspx?r=84234> (last accessed on 07.02.2011)

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 27 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 tariff 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. Finally, however, income from capital was taxable at the personal income tax rate, where the withholding tax prepayment was considered as a tax credit. This is why it is common in Germany to file income tax returns, especially in order to deduct income-related expenses exceeding specific thresholds. In 2009, a final withholding tax on capital income (“Abgeltungssteuer”) was implemented, with a flat tax rate of 25% on capital income exceeding an allowance. It is also 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 tariffs 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 tariff. 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 (5,250 euros per month in West-Germany and 4,550 in the East) – 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% and 2011 it is set zero. 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 July 2008).

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 2007, the taxable fraction of old-age pensions amounts to 54% (so that 46% 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 18th 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 Landabgabereuten*) 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 presumably 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 (until 2008 child benefits were paid up to the age of 27), in case children are still in education and have an own income that does not exceed a threshold. For the age-groups 1981, 1982, 1983 transitional arrangements are applied. Individuals born in 1981 are eligible until they reach the age of 27; those born in 1982 until the age of 26, and children born from the year 1983 onwards are eligible up to the age of 25. 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 2007 and 2008, child benefits amounted to 154 euros for each the first, second, and third child and to 179 euros for each subsequent one. In 2009 the benefit increased up to 164 euros for each of the first two children, for the third child 170 euros were paid for and for each subsequent one the benefit was equivalent to 195 euros. Since 2010 child benefits for the first two children amount to 184 euros, to 190 euros for the third one and to 215 euros for each subsequent child. In 2007 and 2008 the child tax allowance was 5808 euros, 6024 euros in 2009, and since 2010 the tax allowance amounts 7008 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, which is relevant for a single household, was 345 euros per month in 2007 (347 euros since July 1st 2007),² 351 euros in 2008, 359 euros in 2009 and 2010. 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”. 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 reduces benefits at a rate of 80%, income between 800 and 1,200 euros 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. The lower threshold of this range has been subject to changes between 2008 and 2009.

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€ per adult (except for the head of household) and 256€ per child added to the basic rate. For those born before 1948, the base

² However, in EUROMOD we only take into account policy changes up to and including the 30th of June of the respective year.

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, which is identical to the basic rate from “unemployment benefits II”, is 345 euros per month. In 2008 the basic social assistance rate was raised to 351 euros, and since 2009 it equals 351 euros. 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 2008, payments for children who had not completed the age of six amounted to 125€, in 2009 to 117€ and since 2010 they amount to 133€. If a child is below the age of twelve, in 2008 168€ were paid, in 2009 158€, 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, z.B. 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 is up to 1,555€ per month. 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. Moreover the amount of 470€ per month 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 2008 and 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 466 euros in 2007 and 2008; it was increased up to 512 euros in October 2008 and to 597 euros in 2010. The amount of exemption for parental income (for married couples) was 1,440 euros in 2007 and 2008; it was increased to 1,555 euros in October 2008 and to 1,605 euros in 2010. For recipients’ income, the exemption amounted to 112-215 euros in 2007 and 2008; it was increased to 255 euros in October 2008.

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. Benefits were generally increased in 2008 and 2010.

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. In 2007, the basic benefit amounts to 114 euros per year and person and an additional 138 euros for each child. These rates were increased in 2008 to 154 euros and

185 euros, respectively. Maximum benefits are only paid if a minimum share of gross income from the previous year (3% in 2007 and 4% in 2008) is contributed to the certified savings contract. Moreover, in 2008, subsidization in the Riester-scheme was extended to owner-occupied housing assets. Tax authorities undertake a higher-yield test for which of two options is better for the recipient, the Riester benefit or a tax-reducing allowance.

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 35,000 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. At maximum, it amounts to 80 euros per year.

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 increases only marginally between 2007 and 2009. Also benefits from the health insurance system show high rates of recipients (disability 37% and hospital 15%). 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%), housing benefits (1%), as well as child care and youth care benefits (1%) have lowest relevance.

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

	2007	2008	2009	2010
Total population (million)	82.315	82.218	82.002	81.802
	as % of population			
Social security system				
Old-age pension insurance ^[3]	30.05	30.17	30.40	n/a
Health insurance				
<i>Disability</i>	36.86	39.53	n/a	n/a
<i>Hospital</i>	15.35	15.93	n/a	n/a
<i>Maternity help</i>	0.42	0.45	n/a	n/a
Long-term care insurance	2.46	2.57	2.74	n/a
Accident insurance	1.27	1.21	n/a	n/a
Unemployment insurance				
<i>Unemployment benefits (Arbeitslosengeld I)</i>	1.31	1.11	1.39	n/a
<i>Unemployment benefits for further training (Arbeitslosengeld bei Weiterbildung)</i>	0.06	0.06	0.09	n/a
<i>Short-term Work Compensations (Kurzarbeitergeld)</i>	0.08	0.12	1.39	n/a
Public transfers to private households				n/a
Child benefit (<i>Kindergeld</i>)	11.06	10.89	10.81	n/a
Social benefit (<i>Sozialgeld</i>) [*]	2.38	2.31	2.22	n/a
Unemployment benefit II ^[1] [*]	6.41	6.09	5.99	n/a
Social assistance (<i>Sozialhilfe</i>)	1.27	1.33	n/a	n/a
Housing benefit	0.70	0.69	n/a	n/a
Child care and youth care benefit (<i>Kinder- und Jugendhilfe</i>) ^[2]	0.56	0.68	n/a	n/a

Notes: ^{*} Extrapolated values; for 2007 and 2008 revised values – partially estimated.

^[1] Unemployment benefits II were introduced on in 2005, changing former unemployment and social assistance

^[2] Multiple benefits recipients may be counted more than once.

^[3] Pension insurance and pension by reason of death.

Source: Statistisches Bundesamt Deutschland; Statistical yearbook 2010/2009 (Statistisches Jahrbuch 2010/2009);

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 60%) of overall benefit spending, among which the statutory pension insurance (32%) and health insurance (21%) 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 (1%) as well as other special schemes (1%). This structure was largely constant over the recent four years.

Table 6. Social benefit: expenditure

	2007	2008	2009	2010
Annual expenditure (€-million) ^[1]	741,837	755,264	788,467	n/a
as % of total expenditure				n/a
Social security systems ^[1]				n/a
<i>(Sozialversicherungssysteme)</i>				n/a
Statutory pension insurance	61.2	61.4	62.2	n/a
<i>(Rentenversicherung)</i>	32.6	32.4	31.7	n/a
Health insurance				n/a
<i>(Krankenversicherung)</i>	20.5	21.0	21.4	n/a
Long-term care insurance				n/a
<i>(Pflegeversicherung)</i>	2.5	2.5	2.6	n/a
Accident insurance				n/a
<i>(Unfallversicherung)</i>	1.5	1.6	1.4	n/a
Unemployment insurance				n/a
<i>(Arbeitslosenversicherung)</i>	4.2	3.8	5.0	n/a
Other special schemes	0.9	0.9	0.9	n/a
<i>(Sondersysteme)</i>				n/a
Public sector systems for civil servants	6.9	7.1	7.0	n/a
<i>(Systeme des öffentlichen Dienstes)</i>				n/a
Pensions	5.1	5.2	5.1	n/a
<i>(Pensionen)</i>				n/a
Family supplements	0.4	0.4	0.4	n/a
<i>(Familienzuschläge)</i>				n/a
State aid	1.5	1.5	1.5	n/a
<i>(Beihilfen)</i>				n/a
Employers' schemes	7.9	8.0	7.8	n/a
<i>(Arbeitgebersysteme)</i>				n/a
Continued payments in case of sickness				n/a
<i>(Entgeltfortzahlung)</i>	3.5	3.7	3.5	n/a
Occupational pensions				n/a
<i>(Betriebliche Altersversorgung)</i>	2.9	2.9	2.8	n/a
Supplementary pension				n/a
<i>(Zusatzversorgung)</i>	1.3	1.3	1.3	n/a
Other employer benefits				n/a
<i>(Sonstige Arbeitgeberleistungen)</i>	0.2	0.2	0.2	n/a
Compensation schemes	0.5	0.5	0.4	n/a
<i>(Entschädigungssysteme)</i>				n/a
Public transfers to private households	17.8	17.6	17.6	n/a
<i>(Förder- und Fürsorgesysteme)</i>				n/a
Child and family services equalization scheme benefit	5.0	4.9	5.0	n/a
<i>(Kindergeld- und Familienleistungsausgleich)</i>				n/a
Child-raising/parents benefit	0.5	0.7	0.6	n/a
<i>(Erziehungsgeld/Elterngeld)</i>				n/a
Unemployment benefits II and Social benefits	6.1	5.9	5.8	n/a
<i>(Grundsicherung für Arbeitsuchende:Arbeitslosengeld II und Sozialgeld)</i>				n/a
Other employment promotion	0.1	0.1	0.0	n/a
<i>(sonst. Arbeitsförderung)</i>				n/a
Education and career advancement benefit	0.2	0.2	0.3	n/a
<i>(Ausbildungs- und Aufstiegsförderung)</i>				n/a
Social assistance	3.1	3.1	3.1	n/a
<i>(Sozialhilfe)</i>				n/a
Child and youth care benefit	2.7	2.7	2.6	n/a
<i>(Kinder- und Jugendhilfe)</i>				n/a
Housing benefit	0.1	0.1	0.2	n/a
<i>(Wohngeld)</i>				n/a
Tax benefits	4.8	4.6	4.1	n/a
<i>(Steuerliche Leistungen)</i>				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 2008 are preliminary and for 2009 estimated.

Source: Bundesministerium für Arbeit und Soziales (2009)

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, *Beitragsätze*) 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 table shows typical contribution rates for 2007 and 2008). The contribution assessment ceilings are adjusted every year.

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 €350 per month in 2007 (€355 in 2008, €360 in 2009, €365 in 2010, respectively) 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).

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

	2007	2008	2009	2010
Statutory pension insurance (<i>gesetzliche Rentenversicherung</i>)				
Contribution rate	19.9	19.9	19.9	19.9
Assessment ceiling (western Germany), euros per month	5,250	5,300	5,400	5,500
Assessment ceiling (eastern Germany), euros per month	4,550	4,500	4,550	4,650
Assessment ceiling (average, weighted by census population shares)	5,099	5,127	5,216	5,316
Statutory health insurance (<i>gesetzliche Krankenversicherung</i>)				
Contribution rate	15.0	15.0	15.2	14.9
Assessment ceiling, euros per month (<i>Beitragsbemessungsgrenze</i>)	3,563	3,600	3,675	3,750
Threshold for compulsory insurance, euros per month (<i>Versicherungspflichtgrenze</i>)	3,975	4,013	4,050	4,163
Statutory long term care insurance (<i>soziale Pflegeversicherung</i>)	1.7	1.825	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)	1.0	1.0	1.0	1.0
Statutory unemployment insurance (<i>gesetzliche Arbeitslosenversicherung</i>)	4.2	3.3	2.8	2.8
Statutory accident insurance (<i>gesetzliche Unfallversicherung</i>)	1.6	1.6	1.6	1.6

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.

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 2007, the employer paid a lump sum contribution rate of 30.10%, which was raised to 30.77% in 2009 and to 31.08% in 2010. It consists of health insurance (13ppt), pension insurance (15ppt), a lump sum for payroll tax, solidarity surcharge (see below), and church tax (2ppt), and certain levies (*Umlagen*, 0.10ppt in 2007, 0.77ppt in 2009, and 1.18ppt in 2010). 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: 0.7673 in 2007; 0.7732 in 2008; 0.7472 in 2009; 0.7585 in 2010). 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 (73% 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)

	2007	2008	2009	2010
Total population (million)	82.315	82.218	82.002	81.802
as % of population				
Social contributions: contributors				
Statutory pension insurance (<i>gesetzliche Rentenversicherung</i>)	63.3	63.5	63.7	n/a
Health insurance* (<i>gesetzliche Krankenversicherung</i>)	61.6	62.1	62.5	n/a
Accident insurance ^[2] (<i>gesetzliche Unfallversicherung</i>)	72.8	73.8	n/a	n/a
Long-term care insurance* (<i>gesetzliche Pflegeversicherung</i>)	61.5	62.0	62.4	n/a
Unemployment insurance ^[1] (<i>gesetzliche Arbeitslosenversicherung</i>)	32.6	33.4	33.4	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 2010), Deutsche Rentenversicherung (2009), Bundesagentur für Arbeit (2009).

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). Employees pay the greatest share of contributions to social security (50%), followed by employers (40%), and self-employed, together with non-

employed, only pay 10% of total contributions. This structure was stable over the time of 2007 till 2010.

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 180bn euros) and to the health insurance (153bn euros), whereas contributions to the unemployment insurance (26bn euros), the long-term insurance (19bn euros), and the accident insurance (12bn euros) are significantly lower. While contributions to the pension insurance, the health insurance, as well as the long-term insurance have been steadily increasing over the recent four years, contributions to the unemployment insurance have been declining and contributions to the accident insurance were stable over this time.

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

	2007	2008	2009	2010
Social security contributions: revenue (€-millions)	320,900	345,120	344,040	n/a
Employers	140,950	151,910	150,260	n/a
Employees	152,600	162,350	161,890	n/a
Self-employed or non-employed	27,350	30,860	31,890	n/a
as % of total revenue				
Employers	0.4	0.4	0.4	n/a
Employees	0.5	0.5	0.5	n/a
Self-employed or non-employed	0.1	0.1	0.1	n/a

Source: OECD (February 2011).

Dataset: Revenue Statistics Details of Tax Revenue – Germany; social security funds.

<http://stats.oecd.org/index.aspx?>

[B] Social contributions: revenue by insurance

	2007	2008	2009	2010
Social contributions (€-millions)	384,091	391,219	/	/
Statutory pension insurance (<i>gesetzliche Rentenversicherung</i>)	174,726	180,028	180,649	183,810*
Health insurance ^[1] (<i>gesetzliche Krankenversicherung</i>)	147,474	153,331	158,610	n/a
Accident insurance ^[3] (<i>gesetzliche Unfallversicherung</i>)	11,755	11,800	n/a	n/a
Long-term care insurance ^[2] (<i>gesetzliche Pflegeversicherung</i>)	17,872	19,608	21,189	n/a
Unemployment insurance (<i>gesetzliche Arbeitslosenversicherung</i>)	32,264	26,452	22,046	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.

* Estimated figure.

Source: Statistisches Bundesamt Deutschland (Statistical yearbook 2010) and (Statistical yearbook 2009): Statutory pension insurance figures for 2009/2010:

Health insurance figure for 2009:

https://www.bundesgesundheitsministerium.de/uploads/publications/Daten_des_Gesundheitswesens.pdf

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 (36.8% in 2007, 35.2% in 2008, 33.6% in 2009, and 32.0% in 2010) and a threshold for this allowance (1,748 euros per year in 2007, 1,672 euros in 2008, 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 2007 and 2010. 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 2,904 euros per year *and child* in 2007 and 2008. It was raised to 3,012 euros in 2009 and to 3,504 euros in 2010. Since 2000, it includes an allowance for child care. The tax allowance for civil servants in 2007 consists of 36.8% of their pension that is tax-exempt up to a maximum of 2,760€ per year. Moreover there is a deduction allowed for special expenses, for example for old-age provision with a basic allowance of 3,068€ per year and an allowance for high incomes of about 2,001€ per year. Here it is assumed that for all taxpayers the old law (valid until 2004) is more profitable and thus it is applied for everybody.³ For alimonies the minimum deduction is 36€ per year as lump sum. 54% 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 2007.

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 €7,664 (for singles) in 2007, which was increased in 2009 up to €7,834 and up to €8,004 in 2010. Within the progressive tax schedule, the lowest marginal tax rate was 15% in 2007. Since 2009, 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.

³ 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.

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 (<i>Kinderfreibetrag</i>)	§ 32 VI
– Single parents' tax allowance (<i>Alleinerziehendenentlastungsbetrag</i>)	§ 24b
= Taxable income (the tax base)	§ 2
Progression Clause (<i>Progressionsvorbehalt</i>)	§ 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).

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 were not final in 2007 and 2008. 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%.⁴ This rate applies above a saver's tax allowance, which amounted to €750 for single persons – for couples, it is doubled -- in 2007 and was increased to € 801 in 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 may increase the income tax rate used for the other income sources which are subject to the income tax.

Solidarity Surcharge (*Solidaritätszuschlag*): A surcharge of 5.5% on the income tax and the corporate tax, which was originally motivated with the costs of the German re-unification. The solidarity surcharge has not been simulated in EUROMOD.

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. In 2007, the average multiplier was 295% for Property Tax A and 400% for Property Tax B.⁵

Inheritance Tax (*Erbchaftsteuer*): A tax on capital transfer in case of inheritance. Capital transfers between living persons are similarly taxed by the gift tax (*Schenkungssteuer*). There is a tax free allowance depending on who is the recipient, e.g. €307,000 (€500,000) in 2007 (from 2009 on) for the partner and €205,000 (€400,000) for each child. Since 2009, there are 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 value of the tax rate per 100 cm³ cylinder capacity was until June 2009 6.75€ for an Otto engine and 15.44 € for a

⁴ 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, solidarity surcharge and church taxes have not been simulated in EUROMOD.

⁵ http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Presse/pm/2008/09/PD08_346_735,templateld=renderPrint.psmj, last accessed 8 March 2011.

Diesel engine. The maximum rate was 25.36 € and 37.58 € respectively. 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. 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 25% in 2007, which was reduced to 15% in 2008 in combination with some broadening of the tax base.

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 and – before 2008 – had reduced tax rates up to a taxable income of €72,500. 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*). The tobacco tax rate is 1.4 Cent per cigar, 8.27 Cent per cigarette plus 1.47% of the retail price of a cigar and 24.66%, 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. These rates were stable over the recent four years.

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

	2007	2008	2009	2010
Total population (million)	82.315	82.218	82.002	81.802
as % of population				
Direct taxes				
Income tax (total earnings) ^{a*}	31.5	31.5	31.6	31.7
Local Business Tax (sole proprietors only) ^b	1.8	1.8	1.8	1.8
Inheritance Tax	0.17	0.17	n/a	n/a
Gift tax	0.05	0.06	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.

* Relative to total population, including children.

Source: Statistisches Bundesamt Deutschland; Statistical yearbook 2010 (Statistisches Jahrbuch 2010)

<http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/SharedContent/Oeffentlich/B3/Publikation/Jahrbuch/StatistischesJahrbuch,property=file.pdf>

Statistisches Bundesamt Deutschland, GENESIS-Online; (last accessed on 22.02.2011)

<https://www-genesis.destatis.de/genesis/online>

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) and value added taxes (131bn euros). Furthermore, relevant taxes are also import turnover taxes (42bn euros) local business tax (40bn euros), energy taxes (40bn euros), assessed income taxes (27bn euros), and corporate income tax (17bn euros).

There are some dynamics in revenue apparent for some taxes over the recent four years. In particular, revenue from corporate income taxes has declined significantly from 23bn euros in 2007 to 7bn euros in 2009, in course of the great corporate tax reform in 2008. Payroll taxes were increasing slightly from 132bn euros in 2007 to 142bn euros in 2008, just to decline again to 135bn euros in 2009. A similar development is observed for import turnover taxes and assessed income taxes. Energy taxes have increased only marginally between 2007 and 2009.

Then, there are taxes of relatively minor relevance, such as tobacco taxes (14bn euros) solidarity surcharge (about 13bn euros), taxes of interest (12bn euros), property taxes (11bn euros), motor vehicle taxes (9bn euros), insurance taxes (10bn euros), property transfer tax (6bn euros), and electricity taxes (6bn euros). Taxes with least relevance, according to revenue, are e.g. inheritance taxes (4bn euros), customs duties (4bn euros), gambling and lottery taxes (2bn euros), taxes on spirits (2bn euros), and coffee taxes (1bn euros).

Table 12. Taxes: Revenue

	2007	2008	2009	Q1/2010 ^[1]
Annual revenue (€-million)	538,243	561,182	524,000	121,322
Direct taxes				
<i>Income tax</i>				
Payroll tax (<i>Lohnsteuer</i>)	131,773	141,895	135,165	30,255
Tax on interest (<i>Zinsabschlagsteuer</i>) [2009/2010: withholding tax (<i>Abgeltungsteuer</i>) includes tax on interest]	11,178	13,459	12,442	3,961
Assessed income tax (<i>veranlagte Einkommensteuer</i>)	25,027	32,685	26,430	6,155
Not assessed income tax (nicht veranlagte Steuern vom Ertrag)				
Corporate Tax	13,791	16,575	12,474	2,805
Local Business Tax (<i>gross</i>) *	22,929	15,868	7,173	1,952
Solidarity Surcharge	40,116	41,037	32,421	7,641
Property Tax A (from agriculture and forestry)	12,349	13,146	11,927	2,856
Property Tax B (other properties)	355	356	356	84
Inheritance Tax	10,358	10,451	10,580	2,435
Motor Vehicle Tax	4,203	4,771	4,550	918
	8,898	8,842	3,803	2,345
Indirect taxes				
Property transfer tax	6,952	5,728	4,857	1,229
Value Added Tax	127,522	130,789	141,907	34,054
Energy tax	38,955	39,248	39,822	4,446
Tobacco tax	14,254	13,574	13,366	2,462
Beer tax	757	740	730	153
Electricity tax	6,355	6,261	6,278	1,498
Import turnover tax	42,114	45,200	35,084	8,837
Insurance tax	10,331	10,478	10,548	4,496
Customs duty	3,983	4,002	3,604	1,115
Fire brigade tax	319	327	323	157
Gambling and lottery tax	1,702	1,536	1,511	359
Tax on spirits	1,959	2,126	2,101	526
Coffee tax	1,087	1,008	997	238
Other indirect taxes (revenue)	978	1,079	1,155	347

Notes: Figure for taxes on interest in 2009 and 2010 represents the withholding tax (*Abgeltungssteuer*), it includes the former tax on interest.

* Not taking into account that the local business tax is deductible from its own tax base.

[1] Figures in 2010 only available for the 1. quarter.

Source: Statistisches Bundesamt Deutschland; (Fachserie 14 Reihe 4) FS14 R4 year 2007-2009

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 13 and 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, could be 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, could not be simulated, due to lack of sufficient information on the contribution history. Moreover, many benefits for sickness or disability could not be 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 could not be 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				Main Limitations
		2007	2008	2009	2010	
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	bsaap	I	I	I	I	Data on alimony payments
Benefits from charity organizations	bsaco	I	I	I	I	Data on such payments
Housing Benefits	-	E	E	E	E	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				Main Limitations
		2007	2008	2009	2010	
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	in 2007, it was integrated into tinit_s and tinjt_s
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	tsceeu_i_s	S	S	S	S	
to accident insurance	tsceaac_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 2007 and 2010

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.

Regulations for entitlement and benefit duration of unemployment benefits I (*Arbeitslosengeld I; bunct_de*) were slightly changed in 2008. Until 2007, 12 months of contributions entitled to 6 months of benefit receipt, and 24 months of contributions entitled to 12 months receipt. From 2008 on, in addition to these rules, 16 months of contributions entitled to 8 months of receipt, and 20 months of contributions entitled to 10 months of receipt. Rules were also changed for old people in 2008. Until 2007, for people aged 55 or older, the regular duration maximum could be extended to 15 months in case of contributions made for 30 months and to 18 months for contributions made for 36 months. Since 2008, people aged between 50 and 55 are eligible to a maximum of 15 months benefit receipt for 30 months of contributions, and people aged between 55 and 58 to a maximum of 18 months for 36 months of contributions. In addition, another maximum has been introduced. People aged 58 or older are entitled to 24 months of benefit receipt in case they contribute for 48 months.

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; bhlp_de*) 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. 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 1602 euros for married couples, which are exempt from capital income taxation.

2.3 Order of Simulation and Interdependencies (2007-2010)

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.

Table 15. EUROMOD Spine: Order of Simulation, 2007-2010

Section	Policy	Description	Main output
2.4.1	takeup_de	Correction of take-up of several social benefits	temp_rand
2.4.2	minwage_de	Minimum hourly wage (<i>switched off in the baseline for all years</i>)	yem
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)	bunct_s
2.4.5	pdiss_de	Disability pension from stat. acc. insurance (Rente gesetzliche Unfallversicherung)	pdiss_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.

Minimum wage and contributions to social security systems are simulated up front. 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 contributory benefits from the unemployment insurance, i.e. unemployment benefits I. By their contributory nature, they condition on income in past periods, but not on income in the current period. Disability pensions from the statutory accident insurance are simulated thereafter. The condition on no receipt of unemployment benefits I is used in order to identify individuals who are not actively searching for a job, which is a condition for eligibility to disability pensions.

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.

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, in the German contribution to EUROMOD, a policy has been implemented that allows for corrections to the default assumption of full benefit take-up. It has been implemented based on similar approaches by other national developer teams from UK and Belgium. Generally, non-take-up corrections have been implemented in a separate policy sheet (*takeup_de*), such that they can be switched on and off.

If the policy is switched on, it is assumed that there exists a probability of taking up benefits from the schemes of social assistance. These schemes cover unemployment benefits II (*bunnc_de*), means-tested old-age assistance (*bsaoa_de*), and general social assistance (*bsaoo_de*). It is further assumed that this probability is homogenous across these benefits as well as across the entire population. This assumption has been made for reasons of feasibility, because no information on heterogeneous take-up rates, neither by benefits, nor by social groups could have been found.

Then, an estimate for this probability has been applied from the literature. It has been estimated in Bruckmeier and Wiemers (2011) for the probability of take up of any social assistance (including unemployment benefits II, means-tested old-age assistance, and general social assistance), and the point estimate amounts to 58.7%.⁶ This estimate has been applied in the simulations as a proxy for the unobserved take-up rate for the three benefits, *bunnc_de*, *bsaoa_de*, and *bsaoo_de*.

Some more technical details on how this policy is applied shall be described in the following. By default, this policy is switched off, i.e. the parameter (*temp_takeup_corr*) defined in the sheet for constants (*ConstDef_de*) is set to 0. In the policy sheet for take-up corrections (*takeup_de*), this parameter is replaced by 1 if the policy is switched on. This is the master policy switch. Only if the parameter evaluates to 1 (*temp_takeup_corr=1*), take-up corrections are applied in the policy sheets for the respective benefits.

Furthermore, in the take-up sheet (*takeup_de*), the homogeneous take-up rate is defined as a constant (*temp_takeup_rate*) and set to the assumed take-up rate of 58.7%. Then, a random variable is generated, which is distributed equally between 0 and 1 (both included). In order to guarantee that this random variable evaluates to the identical value for each individual, every time the random variable generator is called, i.e. every time the policy is simulated, the seed for the generator needs to be set to an arbitrary number. This random variable is assigned on the household level when it is generated (*temp_rand*). This is necessary because all the three benefits for which take-up shall be corrected (*bunnc_de*, *bsaoa_de*, and *bsaoo_de*) are assigned at the household level, too. Then this random variable (*temp_rand*) is then assigned to each household member, such that each member of a household has the same random number assigned (*temp_rand_ind*).

In the respective policy sheet (*bunnc_de*, *bsaoa_de*, and *bsaoo_de*), at the end of the respective benefit simulation, take-up of the benefit is conditioned on take-up correction switched on (*temp_takeup_corr=1*) and the random variable falling below the applied take-up rate (*temp_rand_ind <= temp_takeup_rate*). Thereby, it is guaranteed that only eligible households, for which the random variable evaluates to a value lower than take-up rate, get the benefit amount assigned. As the random variable has been constructed such that it is equally distributed between 0 and 1, this procedure assures that exactly 58.7% of all eligible households get a benefit amount assigned.

2.4.2 Minimum Wage (*minwage_de*)

There was no economy-wide general minimum wage in Germany between 2007 and 2010. 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

⁶ This is the point estimate for the persistent take-up rate. Bruckmeier and Wiemers (2011) also estimate a temporary take-up rate. The point estimate is 54.2%.

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.

2.4.3.1 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.

2.4.3.2 Eligibility Conditions

There are two groups of eligible children.⁷ 1) Generally, eligible children can at maximum be aged 17. 2) The age limit is extended to 26 in case children are still in tertiary education and their income does not exceed a threshold (see Income Test). If the child is disabled, and has been disabled since the age of 26 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. The age limit was lowered in 2009, from 26 to 24 (both included). So, those in education are eligible, as long as they have not reached the age of 27 (25).

2.4.3.3 Income Test

An income test applies if, and only if, the child is 18 or older and not disabled. If in this case the child is still in education (*dec>0*) and has own income, the child's original income (*ils_origy*) is 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. The same threshold applies if children do not live with their parents.

2.4.3.4 Benefit Amount

The benefit is paid monthly to one of the parents. In 2007 and 2008, the amount per child was 154€ for the first three children and 179€ from the fourth child onwards. In 2009, the amount was 164 (184 in 2010) euros for the first second child, 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. This was abolished again in 2010.

2.4.3.5 EUROMOD Notes

It is assumed that disabled children have been disabled since the age of 26 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

⁷ 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.

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.

2.4.4.1 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.

2.4.4.2 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.

2.4.4.3 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.

2.4.4.4 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.

2.4.4.5 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. 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. In 2007, 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.

From 2008 on, in addition to these rules, 16 months of contributions entitled to 8 months of receipt, and 20 months of contributions entitled to 10 months of receipt. Rules were also changed for old people in 2008. Until 2007, for people aged 55 or older, the regular duration maximum could be extended to 15 months in case of contributions made for 30 months and to 18 months for contributions made for 36 months. Since 2008, people aged between 50 and 55 are eligible to a maximum of 15 months benefit receipt for 30 months of contributions, and

people aged between 55 and 58 to a maximum of 18 months for 36 months of contributions. In addition, another maximum has been introduced. People aged 58 or older are entitled to 24 months of benefit receipt in case they contribute for 48 months.

2.4.4.6 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 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 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.

2.4.5.1 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.

2.4.5.2 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.

2.4.5.3 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.

2.4.5.4 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 ($lhw \geq 30$) 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*).

2.4.5.5 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)*”.

2.4.6.1 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.

2.4.6.2 Eligibility Conditions

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

2.4.6.3 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 2009, 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 1,440 euros in 2007 and 2008; it was increased to 1,555 euros in 2009. For recipients' income, the exemption amounted to 215 euros in 2007 and 2008; it was increased to 255 euros in 2009.

2.4.6.4 Benefit Amount

The basic amount for students who do not live with their parents was 466 euros in 2007 and 2008. It was increased in 2009 up to 512 euros. 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 (44 euros per month until 2008, and 48 euros from 2009 on), while students living on their own get an increased rate (133 euros and 146 euros, respectively).

If actual rental costs exceed this allowance, the exceeding part, including heating costs, is covered partly (up to a maximum of 64 euros per month until 2008, and 72 euros from 2009 on). For recipients aged 25 and older, the basic rate is topped up by a lump-sum social insurance rate (55 euros per month until 2008, and 64 euros from 2009 on).

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.

2.4.6.5 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 lives on their own. 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 4,374 euros per month in 2007 and has been indexed to CPI from there on (so that it amounts to 4,496 euros in 2008, 4,504 in 2009, and 4,555 in 2010).

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 98 euros per month in 2007, 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.

2.4.7.1 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.

2.4.7.2 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.

2.4.7.3 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.

2.4.7.4 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. The maximum amount is 1,180 euros per month in West Germany (1,186 since 2008) and 1,023 euros in East Germany (1,029 since 2009). Thus, the benefit amount in the West lies between 295 (297) euros (25% of maximum amount) and 1,180 (1,186) euros (maximum amount), and in the East between 256 (257) euros and 1,023 (1,029).

2.4.7.5 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 (0.2163) and the West (0.7837) in 2007. The resulting average minimum benefit amount is 344 euros per month (346 since 2008), and the respective maximum amount is 1,146 euros (1,152).

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*).

2.4.8.1 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.

2.4.8.2 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.

2.4.8.3 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.

2.4.8.4 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.

2.4.8.5 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 are covered until 2008, while from 2009 on, they have been excluded.

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.

2.4.9.1 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.

2.4.9.2 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.

2.4.9.3 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 2007 to 2010. 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 reduces benefits at a rate of 80%, income between 800 and 1,200 euros 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. These rates have been constant over the years 2007 to 2010.

For each child younger than 18, a wealth allowance of 4,100 euros (3,100 euros since 2010) is 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. But these changes occurred after June 30th of 2010, so that they have not been considered in the 2010 policy simulations.

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

2.4.9.4 Benefit Amount

The resulting amount 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, which is relevant for a single household, was 345 euros per month in 2007, 347 euros in 2008 and 2009, and 351 euros in 2010. 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.

2.4.9.5 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.⁸ The relevant disposable income excludes benefits and pensions that are not primarily supposed to cover basic needs (*bhllac_s; bhllps_s; pdiss_s; pdioo; 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.

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.⁹ Average maximum amounts, differentiated by household size, have been applied from the national model. The maximum rent covered, excluding heating costs, amounts to 207 euros per month for a single-person household (242 for a two-person household, 330 for three persons, 378 for four, and 442 for five and more persons). In 2008, it amounts to 209 euros per month for a single household (247 for two persons, 332 for three, 379 for four, and 439 for five and more persons), and it has been kept constant in 2009 and 2010.

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 85 euros per month for a single household in 2007 (108 euros for two persons, also 108 for three, 111 for four, and 134 for five and more persons). In 2008, they amount to 90 euros per month for a single household (115 for two persons, 119 for three, 122 for four, and 135 for five and more persons). These amounts have been kept constant in 2009 and 2010.¹⁰

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 (*bsaoo_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 *bsaoo_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.

⁸ 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.

⁹ For documentation of the national tax and benefit microsimulation model for Germany, see Steiner, Viktor, Katharina Wrohlich, Peter Haan und Johannes Geyer (2008).

¹⁰ 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 is missing for Germany.

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.

In addition, a take-up correction is simulated, at the end of the policy sheet. If this policy is switched on in the take-up policy sheet ($takeup_de$), it is assumed that only 58.7% of all households actually take-up the benefits, and for the rest zero benefit amount if assigned. For more on the methodology of this take-up correction, see Section 2.4.1.

2.4.10 Maternity Leave Benefits ($bmact_de$)

Maternity-leave benefits are contributory benefits paid 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.

2.4.10.1 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.

2.4.10.2 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.

2.4.10.3 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).

2.4.10.4 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 2007 to 2010. 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.

2.4.10.5 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 a 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 (1,518 euros per month in 2007, 1,560 for 2008, 1,563 for 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.

2.4.11.1 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 couples of partners in the household and sometimes the family.

2.4.11.2 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.

2.4.11.3 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.

2.4.11.4 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 2007 to 2010.

2.4.11.5 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 is 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).

Mother 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.

Mother working non-zero hours ($lhw > 0$), but less than the maximum allowed number of hours ($lhw \leq 30$), 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 ($bsaaq_de$)

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.

2.4.12.1 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.

2.4.12.2 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 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).

2.4.12.3 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 (*bhllac_s; bhllps_s; pdiss_s; pdioo; 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€. 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. These rates have been constant over the years 2007 to 2010.

2.4.12.4 Benefit Amount

There is a regular benefit rate, which is the same regular rate as for unemployment benefits II (345 euros per month in 2007). 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 (345 euros in 2007) and the partner of the head 80% 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 (345 euros in 2007); the partner of the head gets 80% of this rate, children older than 13 also get 80%, and children younger than 13 get 60%. 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*).

2.4.12.5 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 (*bhllac_s*; *bhllps_s*; *pdiss_s*; *pdioo*; *pdioi*; *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*).

In addition, a take-up correction is simulated, at the end of the policy sheet. If this policy is switched on in the take-up policy sheet (*takeup_de*), it is assumed that only 58.7% of all households actually take-up the benefits, and for the rest zero benefit amount if assigned. For more on the methodology of this take-up correction, see Section 2.4.1.

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.

2.4.13.1 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.

2.4.13.2 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*).

2.4.13.3 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*; *pdioo*; *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 2007 to 2010.

2.4.13.4 Benefit Amount

There is a regular benefit rate, which is the same regular rate as for unemployment benefits II (345 euros per month in 2007). In 2008 the basic social assistance rate was raised to 347 euros, and since 2010 it equals 351 euros. 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 (345 euros); the partner of the head gets 80% of this rate, children older than 13 also get 80%, and children younger than 13 get 60%. 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*).

2.4.13.5 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*; *pdioo*; *pdiot*; *psuw*; *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).

In addition, a take-up correction is simulated, at the end of the policy sheet. If this policy is switched on in the take-up policy sheet (*takeup_de*), it is assumed that only 58.7% of all households actually take-up the benefits, and for the rest zero benefit amount if assigned. For more on the methodology of this take-up correction, see Section 2.4.1.

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.

2.4.14.1 Definitions

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

2.4.14.2 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.

2.4.14.3 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.

In 2007, 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. Both income thresholds vary with the number of children, the monthly rent, and for lone parents and couple parents. There is a basic income allowance (312 euros per month), which is relevant for a lone parent with only one child. This allowance determines the lower limit that the parents' income must exceed for eligibility. In case of more children, this lower limit is multiplied by the number of children. In 2008, this lower income threshold has been replaced by a lump-sum amount of 600 euros per lone parent and 900 euros per couple.

The respective upper limit, which may not be exceeded by the parents' income, has not been changed between 2007 and 2008. It 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 since 2008 also parental-leave benefits.

2.4.14.4 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 70% of this deviation in 2007 and 2008, and of 50% thereafter. 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.

2.4.14.5 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

	2007	2008	2009	2010
Statutory pension insurance (<i>gesetzliche Rentenversicherung</i>)				
Contribution rate	19.9	19.9	19.9	19.9
Assessment ceiling (western Germany), euros per month	5,250	5,300	5,400	5,500
Assessment ceiling (eastern Germany), euros per month	4,550	4,500	4,550	4,650
Assessment ceiling (average, weighted by census population shares)	5,099	5,127	5,216	5,316
Statutory health insurance (<i>gesetzliche Krankenversicherung</i>)				
Contribution rate	15.0	15.0	15.2	14.9
Assessment ceiling, euros per month (<i>Beitragsbemessungsgrenze</i>)	3,563	3,600	3,675	3,750
Threshold for compulsory insurance, euros per month (<i>Versicherungspflichtgrenze</i>)	3,975	4,013	4,050	4,163
Statutory long term care insurance (<i>soziale Pflegeversicherung</i>)	1.7	1.825	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)	1.0	1.0	1.0	1.0
Statutory unemployment insurance (<i>ges. Arbeitslosenversicherung</i>)	4.2	3.3	2.8	2.8
Statutory accident insurance (<i>gesetzliche Unfallversicherung</i>)	1.6	1.6	1.6	1.6

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 2007 to 2010, 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 %)

	2007	2008	2009	2010
Employer Contribution Rate				
Regular Employment (and Midijobs)	9.95	9.95	9.95	9.95
...Minijobs	15.00	15.00	15.00	15.00
Employee Contribution Rate	9.95	9.95	9.95	9.95
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 2007 to 2010, 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 %)

	2007	2008	2009	2010
Employer Contribution Rate				
Regular Employment (and Midijobs)	7.05	7.05	7.15	7.00
...Minijobs	13.00	13.00	13.00	13.00
Employee Contribution Rate	7.95	7.95	8.05	7.90
Self-employed Contribution Rate ^[1]	15.90	15.90	15.90	15.90
Pensioner Contribution Rate	7.95	7.95	8.05	7.90

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 2007 to 2010, 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 %)

	2007	2008	2009	2010
Employer Contribution Rate				
Regular Employment (and Midijobs)	0.8500	0.9125	0.9750	0.9750
Minijobs	0.0000	0.0000	0.0000	0.0000
Employee Contribution Rate				
Regular Rate	0.8500	0.9125	0.9750	0.9750
Additional Contribution Rate (for childless older 23)	0.1250	0.1250	0.1250	0.1250
Self-employed Contribution Rate ^[1]	-	-	-	-
Pensioner Contribution Rate				
Regular Rate	1.7000	1.8250	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 2007 to 2010, 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 %)

	2007	2008	2009	2010
Employer Contribution Rate				
Regular Employment (and Midijobs)	2.10	1.65	1.40	1.40
...Minijobs	0.00	0.00	0.00	0.00
Employee Contribution Rate	2.10	1.65	1.40	1.40
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 2007 to 2010, 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 %)

	2007	2008	2009	2010
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.¹¹

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.

¹¹ 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 %)

	2007	2008	2009	2010
1. Pension social insurance (<i>tscerpi_s</i>)	9.9500	9.9500	9.9500	9.9500
2. Compulsory statutory health insurance (<i>tscerhl_s</i>)	7.0500	7.0500	7.1500	7.0000
3. Statutory long-term care insurance (<i>tscerci_s</i>)	0.8500	0.9125	0.9750	0.9750
4. Statutory unemployment insurance (<i>tscerui_s</i>)	2.1000	1.6500	1.4000	1.4000
5. Statutory accident insurance (<i>tscerac_s</i>)	1.6000	1.6000	1.6000	1.6000
6. Compulsory statutory health insurance (Minijob) (<i>tscerhl_s</i>)	13.0000	13.0000	13.0000	13.0000
7. Statutory pension insurance (Minijob) (<i>tscerpi_s</i>)	15.0000	15.0000	15.0000	15.0000
Total (<i>tscer_s</i>)	21.5000	21.1625	21.0750	20.9250
Total (Minijob) (<i>tscer_s</i>)	28.0000	28.0000	28.0000	28.0000

For mini jobs, employers have to pay contributions to statutory health and pension insurance. In 2007, the employer paid a lump sum contribution rate of 30.10%, which was raised to 30.77% in 2009 and to 31.08% in 2010. It consists of health insurance (13ppt), pension insurance (15ppt), a lump sum for payroll tax, solidarity surcharge, and church tax (2ppt), and certain levies (0.10ppt in 2007, 0.77ppt in 2009, and 1.18ppt in 2010). 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 linearly 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: 0.7673 in 2007; 0.7732 in 2008; 0.7472 in 2009; 0.7585 in 2010).

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 for 2007.

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

	2007	2008	2009	2010
1. Compulsory statutory pension insurance (<i>tscepi_s</i>)	9.9500	9.9500	9.950	9.950
2. Compulsory statutory health insurance (<i>tscehl_s</i>)	7.9500	7.9500	8.050	7.900
3. Statutory long-term care insurance (<i>tsceci_s</i>)	0.8500	0.9125	0.9750	0.9750
4. Additional LTC contribution: childless older 23 (<i>tsceci_s</i>)	0.1250	0.1250	0.1250	0.1250
5. Statutory unemployment insurance (<i>tsceui_s</i>)	2.1000	1.6500	1.4000	1.4000
6. Statutory accident insurance (<i>tsceac_s</i>)	0.0000	0.0000	0.0000	0.0000
7. Contributions factor for fading-in at Midi Jobs (<i>tscehl_s</i>)	0.7673	0.7732	0.7472	0.7585
Total (<i>tscee_s</i>)	20.9750	20.5875	20.5000	20.3500

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 (*lin=3* & (*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%).

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 %)

	2007	2008	2009	2010
1. Compulsory statutory pension insurance (<i>tscsepi_s</i>)	19.9	19.9	19.9	19.9
2. Compulsory statutory health insurance (<i>tscsehl_s</i>)	15.0	15.0	15.2	14.9
Total (<i>tscse_s</i>)	34.9	34.9	35.1	34.8

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 amount of 958 euros per month and a maximum amount of 3750 euros for this income.

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 for 2007.

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 (*tscope_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 7.95% for health insurance and 1.70% for long-term care insurance. 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 %)

	2007	2008	2009	2010
1. Compulsory statutory health insurance (<i>tscopehl_s</i>)	7.950	7.950	8.050	7.900
2. Statutory long-term care insurance (<i>tscopeci_s</i>)	1.700	1.825	1.950	1.950
3. Additional LTC contribution: childless older 23 (<i>tscopeci_s</i>)	0.250	0.250	0.250	0.250
Total (<i>tscope_s</i>)	9.900	10.025	10.250	10.100

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 tariff 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 tariff, 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.

2.6.1.1 Tax Base

Income from employment, from self-employment, from property,¹² 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 2007. 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 54% for non-civil servants. For civil servants, the fraction of pensions that is tax exempt is 36.8%, with a maximum threshold at 2,760 euros per year. It follows “taxable income before allowances”.

2.6.1.2 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.

¹² 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.

Table 26. Personal Income Tax: Allowances (2007-2010)

Allowances	2007	2008	2009	2010
- Tax allowance for elderly persons: tax-exempt income share	36.8	35.2	33.6	32.0
- Tax allowance for elderly persons: tax-exempt income threshold	1 748	1 672	1 596	1 520
- 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)	2 904	2 904	3 012	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	920	920
- Tax-exemption of pensions for civil servants: share	36.8	35.2	33.6	32.0
- Tax-exemption of pensions for civil servants: maximum (level)	2 760	2 640	2 520	2 400
- Deduction of special expenses: Old-age provision: basic allowance	3 068	3 068	3 068	3 068
- Deduction of special expenses: Old-age provision: high-income allowance	2 001	2 001	2 001	2 001
- Deduction of Special Expenses: Alimonies: minimum 36 euros lump sum	36	36	36	36

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 that is applied in case income from employment (*yem*) exceeds 920 euros 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. Contributions made for old-age provision are 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 can be applied, depending on which of the two is more profitable for the tax unit. It is assumed that for all tax units, the old 2004-law is more profitable.¹³ 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.

There is a tax allowance for elderly persons (for people aged 64 and older) who are still working. It consists of a fraction of their income from employment that is tax-exempt (36.8%

¹³ 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.

in 2007, 35.2% in 2008, 33.6% in 2009, and 32.0% in 2010) and a threshold for this allowance (1,748 euros per year in 2007, 1,672 euros in 2008, 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, 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 2007 and 2010. The tax allowance for civil servants consists of the afore-mentioned 36.8% of their pension that is tax-exempt, up to a maximum of 2,760€ per year.

Accounting for all these allowances and deductions, "taxable income before capital income" follows. Only from 2008 on, taxation of capital income is conducted in a separate policy sheet (*tinkt_de*). For 2007, it has been integrated into personal income taxation, because capital income was taxed at the personal income tax rate until 2008.

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, capital income is added to the afore-derived taxable income. There is an allowance for income from the investment of capital. For 2007, it amounts to 750 euros per year, if the tax unit is subject to individual taxation. Capital income below this allowance is tax-exempt.
- 2) Secondly, the relevant average tax rate is determined for all individuals who are subject to individual taxation, by applying taxable income including capital income and further accounting for progression clause (by adding related benefits to taxable income). Taxable income including benefits is put into the tariff, 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.
- 3) Thirdly, 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.
- 4) 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.

- 5) Finally, tax burdens for the two groups, the childless and individuals with children are assembled in the variable *tin_s*. This is the relevant tax burden for each individual, and an average tax rate follows.

2.6.2.1 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.

2.6.2.2 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.

2.6.2.3 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 2,904 euros per year *and child* in 2007 and 2008. It was raised to 3,012 euros in 2009 and to 3,504 euros in 2010. 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.

2.6.2.4 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.

2.6.2.5 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 (7,664 euros per year in 2007) and several tax brackets beyond this allowance, the entire tariff has a progressive effect.

Table 27. Personal Income Tax Tariff (2007)

Bracket	Lower limit (for Y)	Upper limit (for Y)	Marginal Tax Rate (%)	Tax Burden (TAX)
1	0	7 664	0	$TAX = 0$ (tax-free allowance)
2	7 665	12 739	15-24	$TAX = (883.74 * Z_1 + 1 500) * Z_1$ $Z_1 = (Y - 7 632) / 10 000$
3	12 740	52 151	24-42	$TAX = (228.74 * Z_2 + 1 500) * Z_2 + 989$ $Z_2 = (Y - 12 708) / 10 000$
4	52 152	250 000	42	$TAX = 0.42 * Y - 7 914$
5	250 001	-	45	$TAX = 0.45 * Y - 15 414$

Taxable income falls into five different tax brackets. There was a basic tax allowance of €7,664 in 2007, which was increased in 2009 up to €7,834 and up to €8,004 in 2010. Within the progressive tax schedule, the lowest marginal tax rate was at 15% in 2007 (lowered to 14% in 2009) 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 tariff 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 tariff (e.g. Z_1 and Z_2) are computed in temporary variables during the simulation ($tinta00_s$, $tinta01_s$, $tinta02_s$, $tinta03_s$, $tinta04_s$, $tinta05_s$, for the childless, and $tinta06_s$, $tinta07_s$, $tinta08_s$, $tinta09_s$, $tinta10_s$, $tinta11_s$, for the tax burden after accounting for the child allowance). These are only applied within the tax tariff at the computation of the tax burden, and have no further function in the simulation.

2.6.2.6 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) Firstly, capital income is added to the afore-derived taxable income. The crucial difference to individual taxation is that, for married couples, taxable incomes are pooled. As a consequence, the allowance for income from the investment of capital is doubled for married couples. For 2007, it amounts to 1,550 euros per year. Again, capital income below this allowance is tax-exempt.

EUROMOD Notes: The fact that the allowance is doubled for married couples, and that it is applied to their pooled income, is the reason why capital income cannot be added to taxable income earlier than in the tariff policies (*tinit_de* and *tinjt_de*). This does not hold for any other allowance, simulated in *tin_de*, they all apply at the individual level.

- 2) Secondly, the relevant average tax rate is determined for all married couples, by applying taxable income including capital 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 capital income and 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 tariff, 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 tariff. This is the relevant tax burden of the couple, before accounting for the child allowance.
- 3) Thirdly, 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.
- 4) Then, 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.

- 6) Finally, 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. Tax burdens 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.

2.6.3.1 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 tariff 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 (*sin29_s*) has been assigned to the head. Thus, for the simulation of the tariff, 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.

2.6.3.2 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.

2.6.3.3 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 5,808 euros per year *and child* in 2007 and 2008. It was raised to 6,024 euros in 2009 and to 7,008 euros in 2010. 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.

2.6.3.4 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). In this policy (*tinjt_de*), in addition capital income is added, and the relevant taxable income for each spouse results. 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.

2.6.3.5 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 tariff (e.g. Z_1 and Z_2) are computed in temporary variables during the simulation (*tinta12_s*, *tinta13_s*, *tinta14_s*, *tinta15_s*, *tinta16_s*, *tinta17_s*, for the childless couples, and *tinta18_s*, *tinta19_s*, *tinta20_s*, *tinta21_s*, *tinta22_s*, *tinta23_s*, for the tax burden after accounting for the child allowance). These are only applied within the tax tariff at the computation of the tax burden, and have no further function in the simulation.

2.6.3.6 Tax Credits

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

2.7 Capital Income Taxation

Similarly to the payroll tax on wages, tax on capital income is collected at source via withholding tax. However, these taxes were not final in 2007 and 2008. 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 was introduced with a flat tax rate of 25%.¹⁴ This rate applies above a saver's tax allowance, which amounted to €750 for single persons – for couples, it is doubled -- in 2007 and was increased to €801 in 2009.

In 2007, 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 2008 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 2007-2010. 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.

¹⁴ 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, solidarity surcharge and church taxes have not been simulated in EUROMOD.

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 (2007-2010)

Allowances	2007	2008	2009	2010
- Singles	750	750	801	801
- Married Couples	1 550	1 550	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

Before 2007, the tax schedule for capital income taxation was the general progressive schedule from personal income taxation. From 2008 on, the tax rate is a flat rate of 25%.

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 survey in 2008, i.e. the reference survey underlying EUROMOD, is 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_co8 ver 2008-1*; after data manipulations, we labeled the input data base used for *EUROMOD DE_2008_a1_disagg*). This was the only source of micro data that could have been utilized for the development of the German contribution to EUROMOD. There was no possibility for the national developer team to have any access to the national German SILC data (before harmonization) at the German statistical office at all.

The period of collection was April 2008 to August 2008. The reference period, over which households reported incomes and employment status, was the entire year 2007. 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 28,904 individuals, living in 13,312 households. 24,336 of these individuals are aged 16 or older.

Table 29. EUROMOD database description

EUROMOD database	DE_2008_a1_disagg
Original name	EU-SILC_UDB_c08 (ver 2008-1)
Provider	Eurostat
Year of collection	2008
Period of collection	April 2008 to August 2008
Income reference period	Year 2007
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	28,904 individuals in 13,312 households
Response rate	24.42% for the old sample and 42.66% for the new sample (household response rate)

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 2008 sample is 24.42% for the old sample and 42.66% for the new 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 24.42% of households who have been contacted for the previous survey have participated again, and 42.66% of those households that have been contacted for the new survey actually participated. For more methodological details, see Statistisches Bundesamt (2009), or Statistisches Bundesamt (2008), or Eurostat (2010).

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 2008 survey, the address response rate for the old sample was 77.93% and for the new sample 57.34%. These rates are significantly lower than the average address response rate over all EU countries, and they are actually the 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 96.98% for the old sample and 100.00% for the new sample. The respective response rates at the individual level are 99.53% for the old and 99.30% for the new sample. These rates are significantly higher than on EU average, and they are actually the largest rates of all 27 countries.

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 24.42% for the old sample and 42.66% for the new sample. The overall response rate for individuals follows accordingly. It amounts to 24.78% for the old sample and 43.06% for the new sample. All response rates calculated here refer to Eurostat (2010) – 2008 Comparative EU Intermediate Quality Report – Version 2 – June 2010.

3.2.2 Weights

Grossing-up weights have been generated in order to infer from information in the sample to the targeted population. The method for construction of these weights for the German data has been significantly modified in 2006. Since then, 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 (PBo40). 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	28,845
Mean	2,814.1
Median	2,675.5
Maximum	8,290.7
Minimum	107.6
Max/Min	77.1
Decile 1	1,723.6
Decile 9	4,128.9
Dec 9 / Dec1	2.4

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 28,904 individuals, from the survey, amounts to 81,357,584 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 (2007) and before the interview (summer 2008) have been excluded from the data set. This drops 59 individual observations, but leaves the number of households unaffected.

After dropping these 59 babies born in the interview year from the EUROMOD simulations, 28,845 individuals living in 13,312 households remain in the 2008 survey. Aggregated up to the population, they cover 81,171,875 individuals, living in a total of 39,486,850 households. Consequently, the target population of individuals aged 16 or older remains unaffected by dropping these babies at 24,336. Descriptive statistics on the variable for the grossing-up weight from the 2008 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 information in the 2007 survey (this information has not been available for the 2008 survey yet) varies over the various income components, between 0% and 69%. For some income components, there was no household reporting incomplete information, while for other income components, 69% of all households reported incomplete information. The fraction of individuals with incomplete income information varies between 0% and 97% over the income components.

The fraction of households with missing income information varies over the income components between 0.8% and 39%. As opposed to the above figures for incomplete reporting, this rate refers to information that is entirely missing at particular income components. The fraction of individuals with missing income information varies over the income components between 1.2% and 37%. At the variable for gross household income (HY010), the fraction of households with missing information was 1.2%, and at the variable for net household income (HY020), this fraction was 2.9%.

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, 2009).

The UDB data set for the German EU-SILC survey contains imputation flags for all income variables. For the 2008 survey, the imputation flags have been revised. The flag contains a digit associated to each income variable that refers to the applied imputation technique. This allows analyses of the impact of the various imputation techniques on the distribution of the respective income variable (also see Eurostat (2010) – 2008 Comparative EU Intermediate Quality Report – Version 2 – June 2010). These imputation flags have not been used in the simulations for EUROMOD.

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 12,363 euros per year for 2007 (median 0 euros), and in the German Socio-Economic Panel (SOEP) to 12,240 euros (median 0 euros). The compared results are very 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 1,003.555bn euros per year in SILC and to 1,002.094bn euros in SOEP, both for the income reference year 2007. It is slightly lower in the household budget survey for Germany (EVS): 978.144bn euros. However, this figure refers to the income reference year 2008.¹⁵

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

	Mean (euros)	Median (euros)	Aggregate (bn. euros)
Income from Employment (<i>yem</i>)	(per individual)	(per individual)	(in the population)
SILC (for 2007)	12,363	0	1,003.555
SOEP (for 2007)	12,240	0	1,002.094
EVS (for 2008) [1]	n/a	n/a	978.144
Disposable Household Income (<i>ils_dispy</i>)	(per household)	(per household)	(in the population)
SILC (for 2007)	30,602	25,023	1,208.356
SOEP (for 2007)	30,317	24,930	1,180.908
EVS (for 2008) [1]	35,071	28,492	1,382.090

Notes: [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 34), on average over all households, amounts to 30,602 euros per household in SILC for 2007 (median 25,023 euros), and to 30,317 euros in SOEP for 2007 (median 24,930 euros). On population aggregate, it amounts to some 1,208.356bn euros per year in SILC and to some 1,180.908bn euros in SOEP, both again for 2007. 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, these 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 (2007) and before the interview (summer 2008) have been excluded from the data set. This drops 59 individual observations, but leaves the number of households unaffected.

¹⁵ 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.

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 2008*” has been collected was April 2008 to August 2008. 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 2007. 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. In the German contribution to EUROMOD, a policy has been implemented that allows for corrections to the full-take-up assumption (*takeup_de*). It has been implemented based on similar approaches by the national developer teams from UK and Belgium. If the policy is switched on, it is assumed that the probability of taking up benefits from the schemes of unemployment benefits II (*bunnc_de*), means-tested old-age assistance (*bsaoa_de*), and general social assistance (*bsaoo_de*) is homogeneous across these benefits as well as across the entire population.

It has been estimated in Bruckmeier and Wiemers (2011) for the probability of take up of any social assistance from the three schemes, and the point estimate amounts to 58.7%. This estimate has been applied in the EUROMOD simulations as a proxy for the unobserved take-up rate for the three policies, *bunnc_de*, *bsaoa_de*, and *bsaoo_de*. For more details on the implementation, see Chapter 2.4.1.

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 2008”, 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.¹⁶ 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.

¹⁶ 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-STLC 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 Rentenversicherung) Pensions for disability to work for civil servants (Pension aufgrund von Dienstunfähigkeit) Benefits for war victims and burden sharing (Lastenausgleichsrente, Rente der Kriegsofferversorgung)
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-Questionnaire: 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)

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 (*yyi*), 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.

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. Then, 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. Finally, 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.

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 2007), 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 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 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”.

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*). Furthermore, housing benefits (*bho*) only consist of housing benefits that are paid in the framework of the separate benefit relating to the “*Wohngeldgesetz*”, excluding housing benefits paid in the framework of unemployment benefits II and social assistance. 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 2007 to 2006 (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. Thereby, a proxy for all simulated contributory benefits has been generated for about 52% of the entire population represented by the micro data. This ratio increases to 95.8% if the number of people for whom a proxy has been derived is related to the active population only (i.e. excluding pensioners, children, students, and people with labour status “inactive”).

3.4.6 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 (*y_{iy}*). 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 2008 of the interest rate on deposits for households, with maturity of 1-2 years.¹⁷ It evaluates to 4.605%. Inverting the rate of return function, applying the calibration for the rate, returns the stock of financial assets, on average for the year 2007.

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 updated from the reference year (2007) to the respective policy year in EUROMOD (2008, 2009, and 2010). 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 updating 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 updated. In other words, benefit amounts have been updated, conditional on receipt. As a consequence, recipient rates are unaffected by updating, 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 2008, 2009, and 2010, and has to be kept in mind when applying simulation results. This also holds for any non-monetary variables. They have not been updated. 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.

¹⁷ See ECB, MFI interest rates: <http://sdw.ecb.europa.eu/browse.do?node=2018774>.

Applied uprating factors are tabulated in Table 33. 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 2010 has been available yet.¹⁸ 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*).¹⁹ 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. As a result, for example, the uprating factor for the proxy (*yxy*) in the second column of Table 33 (2007 to 2009) coincides with the uprating factor for employment income in the first column (2007 to 2008). The uprating factor for this proxy that is applied for 2008 (Year 2007 to 2008) is the growth rate in employment income from 2006 to 2007, which is not displayed for employment income (line for *yem*) directly in Table 33.

All other income variables have been uprated by growth in the respective aggregate population sum, taken from national accounts (*yse*, *yiy*, *ypr*, *yprrt*, *yot*, *ypt*, *yds*). The only exception is income from private pensions (*ypp*), for which growth in average amount per recipient from the SOEP, for years where applicable, has been used. This has also been done with many of the benefit variables, where comparable information in the SOEP was applicable (*bhlps*, *bunct*, *bunnc*, *bch*, *bsaoo*, *bsaoa*, *bho*, *pdiss*, *bhllac*, *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.

¹⁸ 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.

¹⁹ 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 33. Updating Factors

Index	Income Source / Index Type	2007 to 2008	2007 to 2009	2007 to 2010
<i>default</i>	CPI (consumer price index)	1.0279	1.0298	1.0413
<i>yivwg</i>	INC : Imputed value : Wage/Salary	1.0374	1.0346	1.0616
	INC : Empl. (not applicable detailed industry)	1.0374	1.0346	1.0616
	INC : Empl. (agriculture and fishing)	1.0292	1.0626	1.0835
	INC : Empl. (mining, manufacturing and utilities)	1.0392	0.9786	1.0021
	INC : Empl. (construction)	1.0109	1.0061	1.0099
	INC : Empl. (wholesale and retail)	1.0421	1.0463	1.0613
	INC : Empl. (hotels, restaurants)	1.0421	1.0463	1.0613
	INC : Empl. (transport and communication)	1.0192	1.0052	1.0196
	INC : Empl. (financial intermediation)	1.0132	1.0219	1.0316
	INC : Empl. (real estate and business activities)	1.0084	0.9845	0.9988
	INC : Empl. (public administration and defence)	1.0326	1.0873	1.1227
	INC : Empl. (education)	1.0326	1.0873	1.1227
	INC : Empl. (health and social work)	1.0326	1.0873	1.1227
	INC : Empl. (other)	1.0318	1.0701	1.0942
<i>yem</i>	INC : Empl. (general)	1.0292	1.0293	1.0501
	INC : Empl. (not applicable detailed industry)	1.0292	1.0293	1.0501
	INC : Empl. (agriculture and fishing)	1.0367	1.0407	1.0681
	INC : Empl. (mining, manufacturing and utilities)	1.0250	0.9962	1.0360
	INC : Empl. (construction)	1.0329	1.0267	1.0223
	INC : Empl. (wholesale and retail)	1.0376	1.0367	1.0554
	INC : Empl. (hotels, restaurants)	1.0376	1.0367	1.0554
	INC : Empl. (transport and communication)	1.0527	1.0655	1.0988
	INC : Empl. (financial intermediation)	1.0511	1.0552	1.0677
	INC : Empl. (real estate and business activities)	1.0379	1.0510	1.0739
	INC : Empl. (public administration and defence)	1.0214	1.0515	1.0685
	INC : Empl. (education)	1.0214	1.0515	1.0685
	INC : Empl. (health and social work)	1.0214	1.0515	1.0685
	INC : Empl. (other)	1.0263	1.0500	1.0689
<i>xyx</i>	INC : Empl. (general)	1.0078	1.0292	1.0293
	INC : Empl. (not applicable detailed industry)	1.0078	1.0292	1.0293
	INC : Empl. (agriculture and fishing)	1.0086	1.0367	1.0407
	INC : Empl. (mining, manufacturing and utilities)	1.0086	1.0250	0.9962
	INC : Empl. (construction)	1.0180	1.0329	1.0268
	INC : Empl. (wholesale and retail)	1.0115	1.0376	1.0367
	INC : Empl. (hotels, restaurants)	1.0115	1.0376	1.0367
	INC : Empl. (transport and communication)	1.0190	1.0527	1.0655
	INC : Empl. (financial intermediation)	1.0364	1.0511	1.0552
	INC : Empl. (real estate and business activities)	1.0252	1.0379	1.0510
	INC : Empl. (public administration and defence)	1.0026	1.0214	1.0515
	INC : Empl. (education)	1.0026	1.0214	1.0515
	INC : Empl. (health and social work)	1.0026	1.0214	1.0515
	INC : Empl. (other)	0.9979	1.0263	1.0500
<i>kfb</i>	IN KIND : Fringe Benefit	<i>default</i>	<i>default</i>	<i>default</i>
<i>yse</i>	INC : Self Employment	1.0406	0.9226	0.9517
<i>ypp</i>	INC : Private Pension	0.9301	1.0512	<i>default</i>
<i>bhlps</i>	BENEFIT/PENSION : Private long-term care insurance	1.0430	0.9860	<i>default</i>
<i>yiy</i>	INC : Investment	1.0647	0.8865	0.8744
<i>ypr</i>	INC : Property	1.0389	0.9525	0.9631
<i>yprrt</i>	INC : Property : Rent	1.0389	0.9525	0.9631
<i>ypt</i>	INC : Private Transfers	0.9206	0.9577	1
<i>yot</i>	INC : Other	0.9206	0.9577	1
<i>yds</i>	INC : Disposable	1.0268	1.0191	1.0489
<i>bed</i>	BEN/PEN : Education	1.0329	1.0857	<i>default</i>
<i>bun</i>	BEN/PEN : Unemployment	aggregate	aggregate	aggregate

Index	Income Source / Index Type	2007 to 2008	2007 to 2009	2007 to 2010
ysv	INC : Severance pay	default	default	default
bunct	BEN/PEN : Unemployment I	0.9032	0.9756	default
bunnc	BEN/PEN : Unemployment II	0.9735	1.0632	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	1.0010	1.0666	default
bchot	BEN/PEN : Additional child	default	default	default
bsa	BEN/PEN : Social Assistance	aggregate	aggregate	aggregate
bsa00	BEN/PEN : General Social Assistance	0.9819	0.8478	default
bsaoa	BEN/PEN : Old-age Social Assistance	0.8527	1.0865	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	0.9901	0.9366	default
pdi	BEN/PEN : Disability	aggregate	aggregate	aggregate
pdiss	BEN/PEN : Disability (statutory accident)	0.9952	0.9703	default
bhllac	BEN/PEN : Disability (long-term care accident)	1.0430	0.9861	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)	0.9921	1.0660	default
poa	BEN/PEN : Old Age	aggregate	aggregate	aggregate
poass	BEN/PEN : Old Age (statutory)	1.0099	1.0280	default
poacs	BEN/PEN : Old Age (civil servants)	1.0008	1.0891	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	1.0071	1.0374	default
tpr	TAX : Property tax	default	default	default
tad	TAX : Repayments/Receipts	default	default	default
tin	TAX : Income tax	1.0718	1.0356	0.9961
tis	TAX : Income tax and SICs	1.0580	1.0590	1.0578
twl	TAX : Wealth	default	default	default
kivho	IN KIND : Imputed value : Housing	default	default	default
afc	ASSETS : Financial Capital	0.9411	1.0017	1.0737
xmp	EXPENDITURE : Maintenance Payment	default	default	default
xpp	EXPENDITURE : Private Pension (voluntary)	default	default	default
xhc	EXPENDITURE : Housing cost	1.0343	1.0381	1.0496
xhcrt	EXPENDITURE : Housing cost : Rent	1.0343	1.0381	1.0496
xhcmomi	EXPENDITURE : Housing cost: Mortgage (interest+capital)	1.0343	1.0381	1.0496
xhcot	EXPENDITURE : Housing cost : Other	1.0343	1.0381	1.0496

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 (2011) -

Volkswirtschaftliche Gesamtrechnungen, Inlandsproduktberechnung - detaillierte Jahresergebnisse 2010; SOEP micro data, waves 2008, 2009, and 2010. Financial assets: Deutsche Bundesbank (2011) - Ergebnisse der Gesamtwirtschaftlichen Finanzierungsrechnung für Deutschland 2005-2010.

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 34.

There are no major differences between the definitions of disposable income in EUROMOD and in the EU-SILC data (see Table 34). Almost all income components listed in Table 34 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 34 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*), and social assistance (*bsa*).

In Table 34, 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 34 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 *HY14oG*). 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 2007, 2008, 2009, and 2010.

Table 34. Components of Disposable Household Income

	EUROMOD [2007-2010]	EU-SILC [2007]
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	--
Income from Capital (interests, dividends, etc.)	iyi	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) are aggregate variables. They consist of several components, some of which have been simulated in EUROMOD and some not.

Source: For EU-SILC, Eurostat (2010) – EU-SILC 065 (2008 operation) – Description of Target Variables: Cross-sectional and longitudinal, 2008 operation (Version January 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 2007, 2008, and 2009 in Institut für Arbeitsmarkt- und Berufsforschung (2008), and have been kept constant for 2010.

The figure for employed people from the EU-SILC micro data for 2007 is very close to the corresponding figure from employment agencies. It is slightly greater than the external figure for 2007 and slightly lower than the external figures for 2008 to 2010. All in all, the number of employed people seems to be captured very well by the EU-SILC data, and thus also by the EUROMOD simulations.

Table 35. Number of People in and out of Labour in the Population

	Input dataset	External Source (II)				Ratio (I/II)			
	(I)	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Employed	34 384 969	33 974 811	34 679 885	34 714 062	35 129 165	1.012	0.991	0.991	0.979
Unemployed									
only registered	n/a	3 760 072	3 258 451	3 414 545	3 238 421	n/a	n/a	n/a	n/a
all	4 935 077	5 130 072	4 478 451	4 434 545	4 258 421	0.962	1.102	1.113	1.159

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 (2011) – Beschäftigungsstatistik: Sozialversicherungspflichtig Beschäftigte nach ausgewählten Merkmalen – Zeitreihe; Bundesagentur für Arbeit (2011) – Beschäftigungsstatistik: Geringfügig entlohnte Beschäftigte nach ausgewählten Merkmalen – Zeitreihe; Bundesagentur für Arbeit (2011) – Arbeitslosigkeit im Zeitverlauf 2010, Arbeitsmarkt in Zahlen, Jahreszahlen (<http://statistik.arbeitsagentur.de>). Institut für Arbeitsmarkt- und Berufsforschung (2008) – Projektion 2009: Der Arbeitsmarkt tritt auf der Stelle, IAB-Kurzbericht 13/2008.

The figure for unemployed people from the EU-SILC micro data for 2007 is also quite close to 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 3.8m unemployed people registered at employment agencies as actively searching for a job, there have been another almost 1.4m unemployed people not registered (estimated in Institut für Arbeitsmarkt- und Berufsforschung, 2008). 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*"), both of which groups have been of more or less the same size in 2007. If these two groups are taken into account the number of unemployed people is slightly greater in EU-SILC than the external figure for 2007 and slightly lower than the external figures for 2008 to 2010. However, a significant decrease in the number of non-registered unemployed (*Stille Reserve*) between 2007 and 2010 is not captured.

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 2007. This information has been averaged over all months in 2007 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 36 tabulates the number of recipients for each component of market income, as it has been defined in EU-SILC for 2007, 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 (36,568), and thus also in EU-SILC, than in external figures (39,185), which here is the GSOEP, like for most of the components of original income (see Table 36). This difference slightly increases from 2007 to 2009.²⁰ For 2010, 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 36. Components of Market Income -- Number of Recipients (in thousands)

	Variable Name in EM	Input database (I)	External Source (III)				Ratio (I/III)			
			[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]
Original Income	<i>ils_origy</i>	60 310	--	--	--	--	--	--	--	--
Employment Inc.	<i>yem</i>	36 568	39 185	39 747	40 110	--	0.933	0.920	0.912	--
Self-empl. Inc.	<i>yse</i>	3 883	3 884	4 040	3 925	--	1.000	0.961	0.989	--
Priv. Pension Inc.	<i>il_ppen</i>	585	464	477	665	--	1.261	1.226	0.880	--
Capital Income	<i>yiy</i>	50 251	56 186	55 268	53 778	--	0.894	0.909	0.934	--
Property Income	<i>ypr</i>	5 881	7 519	7 341	6 944	--	0.782	0.801	0.847	--
Private Transfers	<i>ypt</i>	3 254	2 794	2 446	2 845	--	1.165	1.330	1.144	--
Other Income	<i>yot</i>	330	1 233	--	--	--	0.267	--	--	--
Fringe Benefits	<i>kfb</i>	3 056	6 554	--	--	--	0.466	--	--	--
Imputed Rents	<i>kivho</i>	35 776	31 785	31 829	30 717	--	1.126	1.124	1.165	--

Notes: Number of households for *ypt*. For all other variables, number of individuals.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics from the German Insurance Association (*bhls*), micro data from GSOEP (*yem*, *yse*, *yiy*, *il_ppen*, *ypr*, *ypt*, *kivho*) and micro data from EVS 2008 (*yot*, *kfb*).

For income from self-employment (*yse*), the numbers of recipients match almost perfectly between EU-SILC and 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 (50,251) than in GSOEP (56,186), but the ratio is close to 90% 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 80% over all three years.

Income from private transfers (*ypt*) is presented in Table 36 in terms of numbers of households receiving this income component, as it has been reported at the household level. This number is slightly greater in EU-SILC than in the external data. Individuals receiving other income (*yot*), or fringe benefits (*kfb*), are under reported in EU-SILC to a greater extent. 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 in external data is taken from the household budget

²⁰ 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 2007 in Table 36.

survey (EVS 2008) for these two variables.²¹ The number of individuals for who rents have been imputed (*kivho*) because they are owner-occupiers is slightly greater in EU-SILC than in GSOEP.

The respective aggregate amounts for the components of market income are displayed in Table 37. All market income, after alimony payments have been subtracted, sums up to some 1,200bn euros in the population captured by EU-SILC. Some 1,002bn of it relates to income from dependent employment (*yem*). This figure matches almost perfectly to the corresponding number from external sources (1,003bn), 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 updated. Again, no external figures have been found for any aggregate sum of the components of market income. The ratio is also close to one for income from self-employment, but it slightly declines until 2009.²²

Table 37. 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)			
		[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	
Orig. Income	<i>ils_origy</i>	1212.01	1250.41	1230.58	1258.14	--	--	--	--	--	--	--	--	
Empl. Inc.	<i>yem</i>	1003.56	1034.60	1039.53	1062.73	1002.1	1027.6	1036.5	--	1.001	1.007	1.003	--	
Self-emp. Inc.	<i>yse</i>	142.84	148.64	131.78	135.94	140.74	166.78	155.24	--	1.015	0.891	0.849	--	
Prv. Pen. Inc.	<i>il_ppen</i>	2.94	2.64	3.14	3.06	3.13	2.99	4.72	--	0.936	0.882	0.664	--	
Capital Inc.	<i>yiy</i>	38.05	40.51	33.73	33.27	55.91	41.64	37.00	--	0.681	0.973	0.912	--	
Property Inc.	<i>ypr</i>	24.24	25.18	23.09	23.34	56.45	53.96	50.80	--	0.429	0.467	0.454	--	
Prv. Transfers	<i>ypt</i>	14.42	13.28	13.81	14.42	8.40	7.15	9.84	--	1.718	1.858	1.404	--	
Other Income	<i>yot</i>	0.31	0.28	0.30	0.31	0.15	--	--	--	2.043	--	--	--	
Fringe Benef.	<i>kfb</i>	11.72	12.04	12.07	12.20	4.67	--	--	--	2.512	--	--	--	
Imputed Rent	<i>kivho</i>	141.64	145.59	145.86	147.49	90.62	91.24	88.93	--	1.563	1.596	1.640	--	

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics from the German Insurance Association (*bhfps*), micro data from GSOEP (*yem*, *yse*, *yiy*, *il_ppen*, *ypr*, *ypt*, *kivho*) and micro data from EVS 2008 (*yot*, *kfb*).

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*), capital income (*yiy*), and property income (*ypr*). For the latter two, this corresponds to the under-coverage of the number of recipients (Table 36). 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 2007 and 2008), but both rates are relatively close to 100%.

The remaining income components are each significantly over-covered in the EU-SILC. For private transfers (*ypt*) and 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 slightly greater. However, for other income (*yot*) and for fringe benefits (*kfb*), the over-coverage of aggregate sums does not correspond to the under-coverage of the number of recipients. Other income is a very small component (<1bn euros in EU-SILC) and its distribution might be affected by minor residual incomes that people have not reported

²¹ This information has been reported at the household level in the EVS. The corresponding number of individuals has been derived together with the number of adults living in the household.

²² These ratios are not constant over time because incomes have been updated by growth in the aggregate sums from national accounts (see Section 3.5). These growth rates differ for some variables from the respective growth rates in the GSOEP.

elsewhere. Moreover, incomes of children aged younger than 16 might be covered differently in the EU-SILC and the EVS survey. Also fringe benefits are a compound income component where people could have reported very different types of incomes between the two surveys. It holds for both the components (*yot* and *kfb*) that they have been reported in the EVS at the household level and have been distributed to the respective household members with information on the number of adults, respectively children aged younger than 16 in the household. Thereat, an error is inevitable, and it might affect the distribution of these components over the population of individuals.

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 38.

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. Where a comparable benefit was available in the GSOEP data, it has been reported in Table 38. However, many benefits have only been found, defined in a consistent way, in the household budget survey (EVS). This survey data is only available every five years, so that only the 2008 cross-section could have been utilised for validation of the EU-SILC 2007. This is why many of the columns in Table 38 are empty, while some of them are filled in for 2007 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. The aggregate variable for old-age pensions (*poa*) is covered fairly well in terms of number of recipients, with about 90%. This also holds for the most important disaggregate old-age benefits, i.e. the ones from statutory pension insurance (*poass*). Or, it should better be put this way: The disaggregation efforts perform fairly well in comparison to external data, which is for most of them the GSOEP. This is because a great part of the deviation between disaggregated EU-SILC recipients (as well as aggregate amounts), and recipients from external data, is probably related to inevitable errors made at benefit disaggregation. However, this part cannot be quantified, and it could also be related to actual under- or over-coverage in one of the data sets. A significant deviation is found for the number of individuals receiving pensions from employer schemes (*poaoo*), which is about three times as high in the disaggregated EU-SILC variable than in official statistics.

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 from statutory and employer schemes (*pdioo*) as well as for war victims (*boawr*). Survivor's benefits (*psu*) on the opposite are slightly over-covered in the EU-SILC. Among the unemployment benefits, only the minor ones have not been simulated. While the fit in number of recipients is fairly good in the aggregate benefit (*bun*) and for severance pay

(*ysv*), the minor benefits for business start-ups (*bunot*) and re-training (*buntr*) are greatly over-covered in the EU-SILC. 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 twice as large in the EU-SILC, than in official statistics. However, these figures begin to converge since 2008. They are much closer in 2009, when housing benefits have been significantly reformed in Germany. There is also some scope for mis-reporting of housing benefits because households receiving unemployment benefits II (*bunnc_de*) usually are not eligible to housing benefits, but get a rental allowance included in the unemployment benefits.

Table 38. Non-Simulated Taxes and Benefits -- Number of Recipients (in thousands)

	Variable Name in EM	Input database (I)	External Source (III)				Ratio (I/III)			
			[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Pensions	<i>ils_pen</i>	20 522	--	--	--	--	--	--	--	--
Old-Age Benefits	<i>poa</i>	18 208	19 896	--	--	--	0.915	--	--	--
Employer schemes	<i>poa00</i>	15 751	5 196	--	--	--	3.031	--	--	--
Civil Servants	<i>poacs</i>	2 009	1 291	1 328	1 325	--	1.556	1.512	1.516	--
Public Service	<i>poapu</i>	2 009	1 282	1 387	1 521	--	1.567	1.448	1.321	--
Self-Employed	<i>poaps</i>	162	409	--	--	--	0.396	--	--	--
Stat. Pens. Insur.	<i>poass</i>	15 662	17 241	17 215	16 819	--	0.908	0.910	0.931	--
Foreign Country	<i>poaab</i>	287	329	--	--	--	0.870	--	--	--
Disability Benef.	<i>pdi</i>	1 953	--	--	--	--	--	--	--	--
Stat. & Employer	<i>pdi00</i>	926	1 596	1 582	--	--	0.580	0.585	--	--
Civil Servants	<i>pdiot</i>	17	--	--	--	--	--	--	--	--
War Victims	<i>boawr</i>	298	459	416	375	345	0.649	0.715	0.793	0.863
Survivor Pension	<i>psu</i>	1 066	951	863	901	--	1.121	1.236	1.183	--
Unempl. Benefits	<i>bun</i>	6 197	4 989	--	--	--	1.242	--	--	--
Business Start-Ups	<i>bunot</i>	32	9	8	7	7	3.682	4.175	4.266	4.392
Re-Training	<i>buntr</i>	255	97	--	--	--	2.622	--	--	--
Severance Pay	<i>ysv</i>	612	525	642	1 772	1 031	1.166	0.953	0.345	0.594
Early Retirement	<i>byr</i>	67	--	--	--	--	--	--	--	--
Social Assistance	<i>bsa</i>	2 248	--	--	--	--	--	--	--	--
Social Benefits	<i>bsaat</i>	296	--	--	--	--	--	--	--	--
Alimony Pay	<i>bsaap</i>	104	334	--	152	--	0.311	--	0.686	--
Non-Prof. Charity	<i>bsaco</i>	914	7 313	--	--	--	0.125	--	--	--
Housing Benefits	<i>bho</i>	1 180	580	584	860	--	2.035	2.021	1.372	--
Property Taxes	<i>tpr</i>	18 029	--	--	--	--	--	--	--	--

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 2008 and own simulations based on EUROMOD. For external figures: Official statistics (*ysv*, *bunot*, *bho*), as well as micro data from GSOEP (*poa*, *poass*, *poaps*, *poapu*, *poacs*, and *bsaap* for 2009) and from EVS 2008 (all other variables).

Aggregate amounts for the non-simulated taxes and benefits are compared between EU-SILC and external sources in Table 39. 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 2007 is almost identical in EU-SILC (292bn euros) and in the EVS data (295bn euros). This also holds for most of its sub-components. Ratios for old-age benefits from the statutory pension insurance (*poass*), from employer schemes (*poaoo*) as well as schemes for civil servants (*poacs*) are very close to one, in 2007, 2008, and 2009. Again, there was very little information available for 2010 yet. Pensions for employees in public service (*poapu*) and for the self-employed (*poaps*) are slightly under-covered in the EU-SILC, while pensions from a foreign country (*poaab*) are slightly over-covered.

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. Aggregate amounts of survivor's benefits (*psu*) are also under-captured in the EU-SILC. However, these ratios are close to 90% over the years from 2007 to 2009.

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*) seem to be greatly over-captured in the EU-SILC for 2007. The same holds for benefits for early retirement (*byr*), where the ratio is also greater than 3 in the years 2008 and 2009. Opposed to this, the ratio of aggregate amounts of severance payments in EU-SILC compared to the EVS data is close to 90% in 2007. Here, again, only the EVS 2008 data could have been utilised for validation.

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 39 among the non-simulated benefits, because they have not been simulated in a separate policy. The coverage of the other two minor benefits of social assistance is fairly good. Benefits for advances on alimony payments (*bsaap*) are slightly under-covered in EU-SILC, with ratios around 70%, while benefits from non-profitable charity organizations (*bsaco*) are slightly over-covered, with a ratio of about 130% in 2007. For the latter, this over-coverage does not correspond to a huge under-coverage of the number of recipients of *bsaco* (see Table 38). This indicates that the distributions of this benefit deviate greatly between the EU-SILC data and the EVS data, and probably also their definitions are not consistently comparable.

The coverage of the aggregate of housing benefits is again fairly good in the EU-SILC, compared to official statistics. There is some variation in the coverage ratio over the four years, which does not perfectly correspond to the decrease in the deviation for the number of recipients found earlier (see Table 38), but it is probably again related to the reform to housing benefits that took place in Germany in 2009. While the aggregate is close to the official one in 2007 (ratio of 1.06), the EU-SILC amount overshoots slightly in 2008 (1.29), just to go significantly below the official amount in 2008 (0.59) and remain there in 2009 (0.64). For property taxes, there has no external information been available for the years 2007 to 2010 yet that is consistently comparable to the variable in the EU-SILC data.

Table 39. 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)			
			[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Pensions	<i>ils_pen</i>	313.34	316.82	324.64	326.21	--	--	--	--	--	--	--	--	
Old-Age B.	<i>poa</i>	291.73	294.89	302.31	303.78	294.49	294.51	297.95	--	0.991	1.001	1.015	--	
Employer s.	<i>poa00</i>	22.05	22.66	22.71	22.96	21.30	21.50	21.90	--	1.035	1.054	1.037	--	
Civil Servants	<i>poacs</i>	38.38	38.41	41.80	39.97	37.10	39.30	40.70	--	1.034	0.977	1.027	--	
Public Serv.	<i>poapu</i>	7.86	8.08	8.10	8.19	9.20	9.60	10.00	--	0.854	0.842	0.810	--	
Self-Empl.	<i>poaps</i>	3.01	3.09	3.10	3.13	4.23	--	--	--	0.711	--	--	--	
Stat. Pens. I.	<i>poass</i>	218.82	220.99	224.95	227.86	221.65	224.11	225.35	--	0.987	0.986	0.998	--	
For. Country	<i>poaab</i>	1.62	1.66	1.66	1.68	1.01	--	--	--	1.606	--	--	--	
Disability B.	<i>pdi</i>	17.62	17.99	17.75	18.35	--	--	--	--	--	--	--	--	
Stat. & Emp.	<i>pdi00</i>	8.11	8.33	8.35	8.44	--	--	--	--	--	--	--	--	
Civil Servants	<i>pdiot</i>	0.13	0.13	0.13	0.14	--	--	--	--	--	--	--	--	
War Victims	<i>boawr</i>	1.07	1.06	1.14	1.11	2.31	2.07	1.84	1.68	0.464	0.513	0.621	0.665	
Survivor P.	<i>psu</i>	6.70	6.75	6.95	6.97	7.81	7.40	7.85	--	0.858	0.912	0.885	--	
Unempl. B.	<i>bun</i>	39.31	39.33	40.35	40.67	--	--	--	--	--	--	--	--	
Bus. Start-Up	<i>bunot</i>	0.26	0.26	0.27	0.27	--	--	--	--	--	--	--	--	
Re-Training	<i>buntr</i>	0.80	0.83	0.83	0.84	0.17	--	--	--	4.737	--	--	--	
Severance P.	<i>ysv</i>	2.78	2.86	2.86	2.89	3.03	--	--	--	0.916	--	--	--	
Early Retire.	<i>byr</i>	0.68	0.70	0.70	0.71	0.20	0.20	0.20	--	3.396	3.491	3.498	--	
Social Assist.	<i>bsa</i>	12.27	11.98	12.68	12.78	--	--	--	--	--	--	--	--	
Social Benef.	<i>bsaot</i>	1.86	1.91	1.91	1.94	--	--	--	--	--	--	--	--	
Alimony Pay	<i>bsaap</i>	0.64	0.66	0.66	0.67	0.85	0.85	0.85	0.96	0.756	0.777	0.784	0.698	
Non-Prof. Ch.	<i>bsaco</i>	5.52	5.68	5.69	5.75	4.16	--	--	--	1.329	--	--	--	
Housing B.	<i>bho</i>	0.98	0.97	0.91	1.02	0.92	0.75	1.56	1.60	1.055	1.287	0.587	0.635	
Prop. Taxes	<i>tpr</i>	6.41	6.58	6.60	6.67	--	--	--	--	--	--	--	--	

Notes: Estimations for 2008 and 2009 for these variables: poa00, poacs, poapu, byr. 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 2008 and own simulations based on EUROMOD. For external figures: Official statistics (poa00, poacs, poapu, boawr, bsaap, bho), as well as micro data from GSOEP (poass) and from EVS 2008 (all other variables).

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. Results are presented for two distinct simulations. In the first version, 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. In the second version, simulations are based on the assumption that some social benefits are taken up incompletely, i.e. it is assumed that individuals take up and thus receive income through the respective benefit with a specific probability, and with the residual probability they do not take up the benefit and thus receive zero income through the benefit. Such take-up corrections have been simulated for unemployment benefits II (*bunnc_de*), general social assistance (*bsaoo_de*), and old-age social assistance (*bsaoa_de*). More details can be found in Section 2.4.1. In the present section, firstly, results for simulations under full take-

up are presented (Full Take-Up of Benefits, Section 4.1.2.1), whereupon results for limited take-up are presented (Limited Take-Up of Benefits, Section 4.1.2.2).

4.1.2.1 Full Take-Up of Benefits

Results on the number of recipients for all benefits that have been simulated in EUROMOD are presented in Table 40 under the assumption of full take up of all benefits. 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*).²³

Compared to the previous corresponding tables on recipients of market income and non-simulated benefits, Table 40 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 2008 to 2010 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 2007. 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 918,000 individuals in the simulated population in 2007. This matches almost perfectly the 921,000 recipients who are reported in official statistics. This figure is only slightly greater in the EU-SILC data (926,000). In the simulations for 2008 to 2010, 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 2007 simulations and are assumed to be constant from 2007 on. Unfortunately, no information from official statistics on the number of recipients of *pdiss* for 2008 to 2010 has been available yet.

The picture is very similar at the results for long-term care benefits from the statutory accident insurance (*bhlac*). The simulated number of recipients for 2007 is slightly greater (1,032,000) than for *pdiss*, and it matches perfectly the actual number of recipients reported in official statistics (1,033,000). 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 2008 to 2010 has been available yet.

Coverage rates are much lower at the two simulated components of sickness benefits. For sickness benefits from the statutory health insurance (*bhloi*) as well as for sickness benefits from private health insurance (*bhlps*), the ratios of numbers of individuals receiving the benefit in the EUROMOD simulations compared to the external sources are about 60%. For *bhloi*, this ratio is largely constant in 2008 and 2009. In the model, these two benefits have been simulated together in one policy (*bhlps_de*) and *bhloi* is included here in the figures for *bhlps*,

²³ 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.

which is why the number of recipients simulated for *bhlo1* is the same as the one simulated for *bhlps*.

For the two major unemployment benefits, the fit in terms of number of recipients is relatively good. 1,080,000 individuals are reported by employment agencies to having received benefits in the context of the unemployment insurance (*bunct*) in 2007. In EUROMOD, some 8% more recipients are simulated, and also EU-SILC contains about 8% more recipients. As this figure has been kept constant in the simulations over time, the variation in the number of unemployed in the population in response to the world-wide economic crisis during the years 2008 to 2010 could not be captured by the simulations and coverage ratios vary slightly over time as a result. The coverage ratio for unemployment assistance (*bunnc*) is more stable over time, as the number of households receiving *bunnc* has been more stable between 2007 and 2010, between 3.5m and 3.7m households. The respective figure from EU-SILC as well as the simulated number of recipients is about 20-25% greater. It is simulated to decrease slightly from 4.4m in 2007 households to 4.3m in 2010.

For the aggregate variable of family benefits (*bfa*), the coverage in terms of recipients is very good. The ratio is between 1.0 and 1.1 during 2007 to 2009, and for 2010 there has been no external information available. Also for the four sub-components of family benefits, the coverage ratio is relatively close to 100% in most cases. The best fit is achieved for the most important family benefit by number of recipients, namely child benefits (*bch*). Some 11m households receive child benefits, and these are captured with 93-99% in EU-SILC and by the EUROMOD simulations. The simulated number varies slightly over time, between 10.8 and 11.1m. The much smaller child-related benefits are the additional child benefits (*bchot*), which are somewhat over-simulated, at least in 2008 and 2009. The simulated number of households slightly increases over time (from 126tsd in 2007 to 156tsd in 2010). Maternity-leave benefits (*bmact*) are captured fairly well, with the coverage ratio for the simulated benefits varying somewhat between 0.9 and 1.3 during 2007 and 2010. Parental-leave benefits (*bplct*) are significantly over-simulated in each of the years until 2009. 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. 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 (*bsaoo*) 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 150tsd households receive *bsaoo* and some 700tsd receive *bsaoa*, both slightly increasing between 2007 and 2010. These numbers from official statistics are captured by the EUROMOD simulations by between 90% and 115% over all the four years. The simulated number of households receiving *bsaoo* varies slightly over time, between 157tsd and 171tsd, and for *bsaoa*, between 697tsd and 721tsd.

Also the number of households receiving education benefits (*bed*) is covered fairly well by the simulations. In the population, some 900,000 households receive education benefits (*bed*) in 2007 and 2008. In 2009, this figure increased to 1,165,000 in turn of a reform to education benefits. The simulated number of households also increases slightly from 874,000 in 2007 to 959,000 in 2009. Although the increase cannot fully be seen in the simulations, the coverage ratio for the simulated benefits actually improves over the time period. The coverage ratio

ranges between 80% and 96% between 2007 and 2009. The number of households in receipt in EU-SILC is somewhat greater for 2007 (1,365,000). 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 GSOEP figures referred to in Table 40.

Table 40. Simulated Benefits -- Number of Recipients (in thousands) – Full Take-Up

	EM Var.	EM Output (I)	EU-SILC	External Source (III)				Ratio (I/III)			
		[2007]	[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Disability B.		--	--	--	--	--	--	--	--	--	--
Pen. (St. Ac.)	<i>pdiss</i>	918	926	921	--	--	--	0.996	--	--	--
LTC (St. Ac.)	<i>bh lac</i>	1 032	582	1 033	--	--	--	0.999	--	--	--
Sickness B.		--	--	--	--	--	--	--	--	--	--
Prv. Health I.	<i>bhlps</i>	980	1 058	1 630	1 690	1 694	--	0.601	0.580	0.569	--
Sta. Health I.	<i>bhl01</i>	838	838	1 451	--	--	--	0.578	--	--	--
Unempl. B.		--	--	--	--	--	--	--	--	--	--
U. Insurance	<i>bunct</i>	1 169	1 176	1 080	917	1 141	1 024	1.083	1.275	1.025	1.142
U. Assistance	<i>bunnc</i>	4 425	4 264	3 726	3 578	3 560	3 584	1.188	1.242	1.222	1.188
Family B.	<i>bfa</i>	11 984	11 984	11 941	11 474	10 921	--	1.004	1.044	1.097	--
Child Ben.	<i>bch</i>	11 083	11 671	11 865	11 466	10 902	--	0.934	0.969	0.986	--
Add. Child A.	<i>bchot</i>	126	101	124	82	118	--	1.015	1.797	1.273	--
Maternity L.	<i>bmact</i>	589	727	543	666	468	--	1.086	0.885	1.258	--
Parental L.	<i>bplct</i>	831	812	506	509	583	--	1.641	1.632	1.425	--
Social Assis.		--	--	--	--	--	--	--	--	--	--
General S. A.	<i>bsa00</i>	157	171	136	147	157	159	1.158	1.102	1.089	1.025
Old-Age S.A.	<i>bsaoa</i>	705	762	682	733	768	764	1.034	0.984	0.917	0.912
Education B.	<i>bed</i>	874	1 365	909	898	1 165	--	0.961	0.948	0.823	--

Notes: Number of individuals for *pdiss*, *bh lac*, *bhlps*, *bhl01*, *bunct*, *bmact*, *bplct*. Number of households for *bunnc*, *bfa*, *bch*, *bchot*, *bsa00*, *bsaoa*, *bed*.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics (*pdiss*, *bhlps*, *bh lac*, *bunct*, *bunnc*, *bsa00*, *bsaoa*) as well as micro data from GSOEP (*bmact*, *bplct*, *bchot* for 2008 and 2009, *bed*) and from EVS 2008 (*bhl01*, *bch*).

Now, it comes to the taxes and social security contributions that have been simulated in EUROMOD. Table 41 displays numbers of contributors as simulated and compares them to external data. External data on the number of contributors has only been available for income tax payers and this one only for the year 2004. This detailed information 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, which will be used further down below at the validation of aggregate sums, but information on the number of tax payers does not belong to this. Information on the number of tax payers for 2007 would only be available in summer 2012. The corresponding information for 2004 is displayed in Table 41 in order to have a comparable figure that gives a broad indication on the coverage of the tax simulations.

In the EU-SILC data for 2007, about 34.8m households pay either income taxes or contribute to any scheme of social security (Table 41). The respective number of households simulated for 2007 is with some 36.4m households quite close (*tis*). In terms of individuals, about 34.1m 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 (29.8m). 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 3.3m 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 19.8m 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 34.5m. This comes very close to the number of tax payers from official income tax statistics, which is about 35.2m individuals (for 2004!). However, both the number of individuals with positive taxable incomes (*tinty*) as well as the number of individuals with positive tax allowances applied (*tinta*) are somewhat greater than the number of tax payers -- as there is a tax free allowance for low incomes -- and they are both slightly over-simulated, with coverage ratios of around 1.18, compared to tax statistics. People with tax allowances are over-simulated because people with positive taxable income are over-simulated, and the latter group is over-simulated because there are several tax allowances applicable already before taxable income is derived that could not have been simulated in detail in EUROMOD. This is further discussed further down below at the aggregate sums. As a result of over-simulating these two variables, the number of people with a positive tax base (*tintb*), which results from applying allowances to taxable income, is also somewhat over-simulated (ratio of 1.26).

Table 41. Simulated Taxes and Social Security Contributions -- Number of Contributors (in thousands)
-- Full Take-Up

	EM Var.	EM Output (I)	EU-SILC	External Source (III)				Ratio (I/III)			
				[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Taxes / SSC	<i>tis</i>	36 429	34 827	--	--	--	--	--	--	--	--
SSC	<i>tsc</i>	54 936	--	--	--	--	--	--	--	--	--
Employer	<i>ils_sice</i>	34 124	--	--	--	--	--	--	--	--	--
Employee	<i>ils_sice</i>	29 796	--	--	--	--	--	--	--	--	--
Self-Empl.	<i>ils_sics</i>	3 325	--	--	--	--	--	--	--	--	--
Pensioners	<i>ils_sicp</i>	19 834	--	--	--	--	--	--	--	--	--
Income Tax	<i>tin</i>	34 486	--	35 221	--	--	--	0.979	--	--	--
Taxable Inc.	<i>tinty</i>	59 110	--	50 122	--	--	--	1.179	--	--	--
Tax Allow.	<i>tinta</i>	58 937	--	50 122	--	--	--	1.176	--	--	--
Tax Base	<i>tintb</i>	58 078	--	46 199	--	--	--	1.257	--	--	--
Gross Inc Tax	<i>tingt</i>	34 486	--	35 221	--	--	--	0.979	--	--	--

Notes: Number of individuals for all variables, except for *tis*, where it is number of households. Number of tax payers (*tin*, *tinty*, *tintb*, *tingt*) for 2004.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official Income Tax Statistics (Statistisches Bundesamt, 2004).

Aggregate amounts for the simulated benefits are validated in Table 42. Now, also columns for updated input data are given because income have been updated 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 1,171bn euros for the year 2007. This is very close to the respective sum from EU-SILC (ratio of 0.992), and also for the updated incomes in the subsequent policy years, simulated aggregate disposable incomes align very closely to external figures (ratios of 0.999 and 0.995), in this case the GSOEP.

The two major disability benefits are slightly over-simulated in terms of aggregate benefit amounts received. Coverage ratios for disability pensions from the statutory accident insurance (*pdiss*) lie between 1.15 and 1.19, and for long-term care benefits from the statutory accident insurance (*bhlac*) they lie between 1.04 and 1.12. Together with the almost exact simulation of the number of recipients (Table 40) for these two benefits, the result is a slight over-simulation of the average benefit amount per recipient, which could be related to approximation error at the degree of disability. Opposed to this result, simulated aggregate sums for the two major sickness benefits (*bhlps* and *bhlo1*) are slightly below the external sums, while simulated recipients are significantly lower.

Simulation results for the aggregate sums of the two major unemployment benefits are quite precise. On the one hand, the coverage ratio of benefits from the unemployment insurance (*bunct*) slightly varies between 0.89 and 1.10 over the four years, which is in line with the variation in the simulated number of recipients, though ratios for the sums are a somewhat lower than for the recipients throughout all years. On the other hand, coverage ratios for benefits from unemployment assistance (*bunnc*) are very close to one in all the four years (0.988-1.045). Together with a slight over-simulation of households receiving *bunnc*, this implies an over-simulation of the average benefit amount per household in receipt. This will be taken up again at the correction for benefit take-up further down below.

Aggregate sums of simulated family benefits (*bfa*) in total are close to the respective external figures in all years, corresponding to the simulated numbers of recipients. 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 fit very well to the respective amounts (ratios between 0.99 and 1.11). At the minor family benefits, sums deviate significantly between simulations and external data. Additional child benefits (*bchot*) are a very small benefit, with only some 200m euros spent on it. This amount is significantly over-simulated in 2007 and 2008, whereas in 2009 and 2010 it is slightly under-simulated. Apparently, the reform that took place at these benefits in 2009 could only partly be captured in the simulations.

Opposed to this, aggregate sums for maternity-leave benefits (*bmact*) are greatly under-simulated (ratios around 0.33). On first sight, this does not correspond to the slight over-simulation of recipients (Table 40). 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 (ratios between 0.52-0.72). This result does not correspond to the significant over-simulation of recipients of *bplct* (Table 40). Moreover, both findings together imply that the reason for these deviations cannot be the fact alone that this benefit has just been implemented in 2007. 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 two-fold. While for old-age assistance (*bsaoa*), coverage rates are relatively close to one (0.89-0.99), for general social assistance (*bsa00*), they are significantly below one (0.77-0.87). The latter result does not correspond to the slight over-simulation of recipients for *bsa00*. The result is an under-simulation of the average benefit amount per household in receipt. 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 600m euros per year and only some 150tsd household are in receipt. In addition, the simulation of the benefit conditions on no receipt of *bunnc*, where some error seems to be inevitable.

Education benefits (*bed*) are slightly over-simulated. While aggregate amounts are simulated some 27% higher in 2007 than in the GSOEP data, this over-shoot decreases to 22% in 2008 and to 7% in 2009. In 2009, a reform to education benefits took place in Germany, where benefit rates have been adjusted and benefit eligibility has been substantially extended.

Table 42. Simulated Benefits – Aggregate Amounts (in bn. euros per year) – Full Take-Up

	EM Var.	EM Output (I)	EU-SILC	Upated Input (I)			External Source (III)				Ratio (I/III)			
		[2007]		[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]
Disp. Income	<i>ils_disp</i>	1171.4	1209.1	1196.9	1198.6	1221.6	1180.9	1198.1	1204.7	--	0.992	0.999	0.995	--
Disability B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pen. (St. Ac.)	<i>pdiss</i>	6.24	4.39	6.29	6.42	6.42	5.40	5.40	5.40	--	1.155	1.164	1.189	--
LTC (St. Ac.)	<i>bhllac</i>	5.35	3.92	5.59	5.33	5.58	4.80	5.00	5.10	--	1.113	1.117	1.046	--
Sickness B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Prv. Health I.	<i>bhlps</i>	6.18	3.83	6.26	6.22	6.23	6.19	6.85	7.33		0.999	0.914	0.849	--
Sta. Health I.	<i>bhI01</i>	3.04	3.04	3.13	3.13	3.17	3.66	--	--	--	0.831	--	--	--
Unempl. B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U. Insurance	<i>bunnc</i>	8.94	9.19	9.01	9.20	9.20	9.91	8.21	10.38	9.74	0.902	1.097	0.886	0.944
U. Assistance	<i>bunnc</i>	29.29	27.46	29.76	29.17	28.88	29.66	28.49	29.09	29.12	0.988	1.045	1.003	0.992
Family B.	<i>bfa</i>	39.69	39.69	39.80	42.23	41.33	38.19	38.55	38.60	--	1.039	1.033	1.094	--
Child Ben.	<i>bch</i>	32.85	36.90	32.89	35.87	38.45	33.15	32.12	32.38	--	0.991	1.024	1.108	--
Add. Child A.	<i>bchot</i>	0.24	0.16	0.26	0.35	0.35	0.11	0.15	0.36	0.40	2.165	1.762	0.952	0.882
Maternity L.	<i>bmact</i>	0.43	0.59	0.43	0.43	0.43	1.30	1.30	1.40	--	0.333	0.333	0.309	--
Parental L.	<i>bplct</i>	2.61	2.03	2.61	2.62	2.62	3.64	4.98	4.45	4.48	0.716	0.524	0.588	0.584
Social Assis.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General S. A.	<i>bsa00</i>	0.61	0.84	0.63	0.61	0.59	0.71	0.76	0.80	--	0.864	0.829	0.766	--
Old-Age S.A.	<i>bsaoa</i>	2.51	3.41	2.59	2.64	2.69	2.54	2.75	2.97	--	0.989	0.943	0.890	--
Education B.	<i>bed</i>	3.72	4.04	3.66	4.37	4.26	2.93	2.99	4.07	--	1.271	1.223	1.072	--

Notes: Estimations for 2008 and 2009 for these variables: *pdiss*, *bhllac*, *bmact*. Social benefits for children are included in *bunnc*. For 2007 and 2008, *bplct* includes fading out payments of the old *Erziehungsgeld*. Sums for *bsa00* and *bsaoa* exclude people in institutions.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics (*bhllac*, *pdiss*, *bhlps*, *bunnc*, *bunnc*, *bchot*, *bmact*, *bplct*, *bsa00*, *bsaoa*,) as well as micro data from GSOEP (*ils_dispy*, *bch*, *bed*) and from EVS 2008 (*bhI01*).

Aggregate amounts of simulated taxes and social security contributions are compared to external figures in Table 43. 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. Ratios range between 1.01 and 1.07. The range of ratios is only slightly greater when taking a closer look at the social contributions for the single groups in detail. Contributions from employers (*ils_sicer*) are slightly over-simulated in amounts by about 6-10%. Accordingly, contributions for employees (*ils_sicee*) are slightly higher in EUROMOD than in national accounts (0-8%). Opposed to this, contributions from the self-employed (*ils_sicse*) and from pensioners (*ils_sicpe*) are slightly under-simulated, ratios ranging between 0.71 and 0.98 for self-employed and between 0.85 and 1.02 for pensioners.

There is less information available for taxes. 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 2004 have been available (Statistisches Bundesamt, 2004). There are preliminary tax statistics available for 2007 already (Statistisches Bundesamt, 2007), but they do not capture the entire tax burden of income taxes. The preliminary statistics exclude the group of tax payers that does not file a tax declaration (*Nichtveranlagte steuerpflichtige Personen*). These tax payers only pay payroll taxes on their wages during the year, but they do not in addition file a tax declaration at the end of the year, in most cases because they do not have any further income to report and thus their tax burden has already been correctly paid in advance, in form of payroll taxes. These preliminary tax statistics (*Kassenstatistik*) have been applied for the external figures in Table 43.

Generally, there is a pattern of over-simulation of taxable income and under-simulation of tax allowances apparent from Table 43, resulting in an over-simulation of income taxes paid. Taxable incomes (*tinty*) are in aggregate sums some 29% greater in EUROMOD simulations than in the preliminary tax statistics. In addition, tax allowances (*tinta*) are under-simulated with a ratio of 0.88. As a result, the tax base is about 38% greater in EUROMOD than in official statistics. Consequently, income taxes (*tin* and *tingt*) are over-simulated by almost 20%. Aggregate tax burdens amount to some 230bn euros for 2007 in EUROMOD and only to 193bn euros in the preliminary tax statistics. National accounts report some 208bn euros for private households.

This deviation in simulations and tax statistics is mainly related to the structural difference in the coverage of income in the model and the preliminary tax statistics, namely the exclusion of tax payers who only pay payroll taxes. Aggregate wage income reported in the preliminary tax statistics for 2007 (852bn euros) is about 115bn euros lower than reported in national accounts (966bn euros). Wage income in EU-SILC (1,004bn euros) and the GSOEP (1,005bn euros) is also greater.

Unfortunately, by the time of writing this report, we do not know exactly how many tax payers belong to the group of non-filers for 2007 because the final detailed tax statistics will only be available around summer 2012. But, we can make a guess by looking at the statistics for 2004 (see Statistisches Bundesamt, 2004). From there we would estimate, very crudely, that wage income in the preliminary tax statistics could be underestimated by some 100bn euros. The true wage income would thus be about 952bn (=852bn+100bn) euros, and this is very close to the respective figure from national accounts (966bn euros).

If we further assume that these additional 100bn euros are taxable with an average tax rate of 15%,²⁴ this would bring about an additional 15bn euros of income taxes. Altogether, taxes would then amount to 208bn euros for 2007. This is almost exactly the amount that is reported for private households in national accounts (about 208bn euros). The remaining over-simulation of about 22bn euros in aggregate tax burden can be partly explained by allowances on various sources of income (*yem*, *yse*, *ypr*) that are under-simulated, for example because allowances actually applied for work-related expenses, such as commuting, are not observed and are only applied in the simulations with lump-sum amounts. From the final tax statistics for 2004, it can be estimated that such allowances are under-simulated by about 26bn euros. With an average tax rate of 22%, this would correspond to some 6bn euros additional income taxes.²⁵

Table 43. Simulated Taxes and Social Security Contributions – Aggregate Amounts (in bn. euros per year) – Full Take-Up

	EM Var.	EM Output (I)	EU-SILC	Uprated Input (I)			External Source (III)				Ratio (I/III)			
		[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Taxes / SSC	<i>tis</i>	451.83	408.57	469.36	454.68	463.50	403.46	--	--	--	1.120	--	--	--
SSC	<i>tsc</i>	395.57	--	401.09	400.75	407.24	369.55	385.97	392.39	401.85	1.070	1.039	1.021	1.013
Employer	<i>ils_sicer</i>	174.43	--	175.60	175.88	178.92	159.09	162.38	162.82	168.24	1.096	1.081	1.080	1.063
Employee	<i>ils_sicee</i>	176.75	--	179.73	179.00	182.32	163.16	171.40	176.79	182.06	1.083	1.049	1.013	1.001
Self-Empl.	<i>ils_sicse</i>	16.24	--	16.92	15.62	16.02	16.64	18.28	22.04	22.15	0.976	0.926	0.709	0.723
Pensioners	<i>ils_sicpe</i>	28.14	--	28.84	30.26	29.98	30.67	33.92	30.74	29.41	0.918	0.850	0.984	1.019
Income Tax	<i>tin</i>	230.69	--	243.87	229.80	235.18	193.00	--	--	--	1.195	--	--	--
Taxable Inc.	<i>tinty</i>	1373.76	--	1421.9	1397.0	1432.2	1067.1	--	--	--	1.287	--	--	--
Tax Allow.	<i>tinta</i>	176.21	--	178.41	179.26	180.87	201.10	--	--	--	0.876	--	--	--
Tax Base	<i>tintb</i>	1197.55	--	1243.5	1217.7	1251.3	866.00	--	--	--	1.383	--	--	--
Gross I. Tax	<i>tingt</i>	230.69	--	243.87	229.80	235.18	193.00	--	--	--	1.195	--	--	--

Notes: In the sum of taxes and social contributions (*tis*), contributions from employers are excluded.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official Income Tax Statistics (Statistisches Bundesamt, 2007) and national accounts (Statistisches Bundesamt, 2011).

4.1.2.2 Limited Take-Up of Benefits

Now, results are presented in the same structure as in the previous subsection, but this time under the assumption of limited take up of some social benefits. Results on the number of recipients for all benefits that have been simulated in EUROMOD are presented in Table 44 under the assumption of limited take-up. Take-up has been assumed to be limited simultaneously for unemployment benefits II (*bunnc_de*), general social assistance (*bsaoo_de*), and old-age social assistance (*bsaoa_de*).

²⁴ The group of non-filers typically has lower taxable income and thus also an average tax rate that is lower than the average one, which is about 22% in the sample for 2007.

²⁵ The remaining difference of about 16bn euros between simulated taxes and external statistics remains unsolved so far. In the national microsimulation model for Germany, we simulate a tax burden for 2007 of 233bn euros, which is very close to the one from EUROMOD. For documentation of the national tax and benefit microsimulation model for Germany, see Steiner et al. (2008). For a follow-up project, it shall be attempted to improve tax simulations by means of imputation of tax allowances.

The presentation of results is structured in the same way as in the previous section for the assumption of full benefit take-up. Firstly, simulated numbers of recipients of benefits (Table 44) and payers of income taxes as well as contributors to social security (Table 45) are compared to external sources. Then, aggregate amounts of benefits (Table 46) as well as taxes and social security contributions simulated (Table 47) are compared to external statistics. The focus in this section shall be on the differences between the results for the two distinct assumptions on take-up. Consequently, the most relevant differences are apparent for the numbers of recipients and aggregate amounts of the three simulated benefits, for which take-up rates are assumed to be limited now (*bunnc*, *bsaoo*, *bsaoa*). Figures that changed by the take-up corrections have been formatted in bold-face in the following tables.

When benefit take-up is assumed to be limited for unemployment assistance (*bunnc*), general social assistance (*bsaoo*), and old-age social assistance (*bsaoa*) the number of recipients only changes significantly for these three social benefits. An underlying take-up rate of 58.7% implies that the number of households receiving each of these benefits must be lowered by about 42%.²⁶ This is true for *bunnc*, where the number of households for which receipt is simulated decreases in 2007 by 42% from 4,425tsd (full take-up) to 2,561 (limited take-up). This hampers the coverage ratio accordingly. It lies now at about 70% only. The reduction in recipients is lower than 42% for *bsaoa* because eligibility of *bsaoa* conditions on no receipt of *bunnc*. If now fewer people take-up *bunnc*, as a result more households are generally eligible for *bsaoa* and thus the number of households receiving *bsaoa* in 2007 is only reduced by 35%, instead of 42%, from 705tsd to 462tsd. In turn, *bsaoo* conditions on no receipt of *bunnc* and no receipt of *bsaoa*. As a result of the compound effect from *bunnc* and *bsaoa*, the number of households in receipt of *bsaoo* is reduced even stronger, by 47% in 2007, from 157tsd to 83tsd households.

The only additional change at the number of households in receipt of a benefit for which take-up assumptions remain unchanged (at 100%) occurs at the additional child benefits (*bchot*). Eligibility for *bchot* conditions on receipt of *bunnc* and on the benefit amount of *bunnc*. As these two variables change for about 42% of the households that are eligible for *bunnc*, the number of recipients of *bchot* also changes consequently. It increases by 25% in 2007, from 126tsd to 158tsd. Changes are smaller for the other policy years so that a significant change in the coverage ratio is only present for 2007 (from 1.02 to 1.27).

Changes in the number of tax payers and contributors to social security through the take-up corrections are very limited (Table 45). The number of contributors to all social security schemes is unaffected by the correction, as contributions are function of market income only and not of social benefits. The numbers of individuals with positive taxable income (*tinty*), with tax allowances (*tinta*), and with a positive tax base (*tintb*) all also remain unchanged because the three social benefits affected do not belong to taxable income. Only the number of tax payers that pay positive income taxes (*tin* and *tingt*) decreases slightly because the tax rate is affected by take-up correction of unemployment benefits through progression clause (see Section 1.5.1).

²⁶ This estimate for the take-up rate has been taken from Bruckmeier, Wiemers (2011). Also see Section 3.4.3.

Table 44. Simulated Benefits -- Number of Recipients (in thousands) – Limited Take-Up

	EM Var.	EM Output (I)	EU-SILC	External Source (III)				Ratio (I/III)				
		[2007]		[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Disability B.		--	--	--	--	--	--	--	--	--	--	
Pen. (St. Ac.)	<i>pdiss</i>	918	926	921	--	--	--	0.996	--	--	--	
LTC (St. Ac.)	<i>bhllac</i>	1 032	582	1 033	--	--	--	0.999	--	--	--	
Sickness B.		--	--	--	--	--	--	--	--	--	--	
Prv. Health I.	<i>bhlps</i>	980	1 058	1 630	1 690	1 694	--	0.601	0.580	0.569	--	
Sta. Health I.	<i>bhl01</i>	838	838	1 451	--	--	--	0.578	--	--	--	
Unempl. B.		--	--	--	--	--	--	--	--	--	--	
U. Insurance	<i>bunct</i>	1 169	1 176	1 080	917	1 141	1 024	1.083	1.275	1.025	1.142	
U. Assistance	<i>bunnc</i>	2 561	4 264	3 726	3 578	3 560	3 584	0.687	0.718	0.705	0.683	
Family B.		<i>bfa</i>	11 984	11 984	11 941	11 474	10 921	--	1.004	1.044	1.097	--
Child Ben.	<i>bch</i>	11 083	11 671	11 865	11 466	10 902	--	0.934	0.969	0.986	--	
Add. Child A.	<i>bchot</i>	158	101	124	82	118	--	1.274	1.948	1.321	--	
Maternity L.	<i>bmact</i>	589	727	543	666	468	--	1.086	0.885	1.258	--	
Parental L.	<i>bplct</i>	831	812	506	509	583	--	1.641	1.632	1.425	--	
Social Assis.		--	--	--	--	--	--	--	--	--	--	
General S. A.	<i>bsa00</i>	83	171	136	147	157	159	0.612	0.596	0.557	0.524	
Old-Age S.A.	<i>bsaaa</i>	462	762	682	733	768	764	0.677	0.654	0.610	0.607	
Education B.		<i>bed</i>	874	1 365	909	898	1 165	--	0.961	0.948	0.823	--

Notes: Number of individuals for *pdiss*, *bhllac*, *bhlps*, *bhl01*, *bunct*, *bmact*, *bplct*. Number of households for *bunnc*, *bfa*, *bch*, *bchot*, *bsa00*, *bsaaa*, *bed*.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics (*pdiss*, *bhlps*, *bhllac*, *bunct*, *bunnc*, *bsa00*, *bsaaa*) as well as micro data from GSOEP (*bmact*, *bplct*, *bchot* for 2008 and 2009, *bed*) and from EVS 2008 (*bhl01*, *bch*).

Table 45. Simulated Taxes and Social Security Contributions -- Number of Recipients (in thousands) – Limited Take-Up

	EM Var.	EM Output (I)	EU-SILC	External Source (III)				Ratio (I/III)			
		[2007]		[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]
Taxes / SSC	<i>tis</i>	36 374	34 827	--	--	--	--	--	--	--	--
SSC	<i>tsc</i>	54 936	--	--	--	--	--	--	--	--	--
Employer	<i>ils_sicer</i>	34 124	--	--	--	--	--	--	--	--	--
Employee	<i>ils_siceo</i>	29 796	--	--	--	--	--	--	--	--	--
Self-Empl.	<i>ils_sics</i>	3 325	--	--	--	--	--	--	--	--	--
Pensioners	<i>ils_sicpo</i>	19 834	--	--	--	--	--	--	--	--	--
Income Tax	<i>tin</i>	34 086	--	35 221	--	--	--	0.968	--	--	--
Taxable Inc.	<i>tinty</i>	59 110	--	50 122	--	--	--	1.179	--	--	--
Tax Allow.	<i>tinta</i>	58 937	--	50 122	--	--	--	1.176	--	--	--
Tax Base	<i>tintb</i>	58 078	--	46 199	--	--	--	1.257	--	--	--
Gross Inc Tax	<i>tingt</i>	34 086	--	35 221	--	--	--	0.968	--	--	--

Notes: Number of individuals for all variables, except for *tis*, where it is number of households. Number of tax payers (*tin*, *tinty*, *tintb*, *tingt*) for 2004.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official Income Tax Statistics (Statistisches Bundesamt, 2004).

Aggregate benefit amounts for the version of limited benefit take-up at *bunnc*, *bsaoa*, and *bsaoo* are presented in Table 46. As for the number of recipients, also aggregate amounts are only affected significantly by the take-up correction at those social benefits where the take-up rate has been corrected. Now, benefit amounts do not necessarily need to be reduced at the exact rate at which non-take-up has been assumed (41.3%). The assumed underlying take-up rate applies to the number of recipients. If benefit amounts are distributed unequally over recipients, a reduction of the number of recipients of *bunnc* by about 42% does not necessarily induce a 42%-reduction in the aggregate amount of *bunnc*. In fact, aggregate amounts of *bunnc* have been reduced by 44% as a result of take-up correction in 2007. Again, coverage ratios are reduced significantly in turn, now lying between 0.55 and 0.59.

Aggregate amounts of *bsaoa* and *bsaoo* are again affected in a more complex way by take-up corrections, because they both condition eligibility on no receipt of *bunnc*, and *bsaoo* in addition on no receipt of *bsaoa*. As a result, sums for *bsaoa* are reduced by 39% in 2007, from 2.51bn euros to 1.53bn euros, and sums for *bsaoo* are reduced by 48% in 2007, from 0.61bn euros to 0.32bn euros. These reductions are largely constant over all policy years, such that coverage ratios are reduced significantly for *bsaoa* (now ranging between 0.54 and 0.61) and for *bsaoo* (between 0.42 and 0.45). The correction effect on additional child benefits (*bchot*) goes in the opposite direction, increasing the aggregate benefit amount for 2007 by 29%, from 0.24bn euros to 0.31bn euros, bringing the coverage ratio now close to one, at least for the years 2009 and 2010, while over-shooting significantly in 2007 and 2008 now.

Table 46. Simulated Benefits – Aggregate Amounts (in bn. euros per year) – Limited Take-Up

	EM Var.	EM Output (I)	EU-SILC	Uprated Input (I)			External Source (III)				Ratio (I/III)			
		[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Disp. Income	<i>ils_disp</i>	1157.5	1209.1	1182.7	1184.7	1207.8	1180.9	1198.1	1204.7	--	0.980	0.987	0.983	--
Disability B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pen. (St. Ac.)	<i>pdiss</i>	6.24	4.39	6.29	6.42	6.42	5.40	5.40	5.40	--	1.155	1.164	1.189	--
LTC (St. Ac.)	<i>bhllac</i>	5.35	3.92	5.59	5.33	5.58	4.80	5.00	5.10	--	1.113	1.117	1.046	--
Sickness B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Prv. Health I.	<i>bhllps</i>	6.18	3.83	6.26	6.22	6.23	6.19	6.85	7.33		0.999	0.914	0.849	--
Sta. Health I.	<i>bhll01</i>	3.04	3.04	3.13	3.13	3.17	3.66	--	--	--	0.831	--	--	--
Unempl. B.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U. Insurance	<i>bunct</i>	8.94	9.19	9.01	9.20	9.20	9.91	8.21	10.38	9.74	0.902	1.097	0.886	0.944
U. Assistance	<i>bunnc</i>	16.38	27.46	16.63	16.42	16.25	29.66	28.49	29.09	29.12	0.552	0.584	0.564	0.558
Family B.	<i>bfa</i>	39.69	39.69	39.80	42.23	41.33	38.19	38.55	38.60	--	1.039	1.033	1.094	--
Child Ben.	<i>bch</i>	32.85	36.90	32.89	35.87	38.45	33.15	32.12	32.38	--	0.991	1.024	1.108	--
Add. Child A.	<i>bchot</i>	0.31	0.16	0.31	0.37	0.36	0.11	0.15	0.36	0.40	2.805	2.094	1.016	0.905
Maternity L.	<i>bmact</i>	0.43	0.59	0.43	0.43	0.43	1.30	1.30	1.40	--	0.333	0.333	0.309	--
Parental L.	<i>bpplct</i>	2.61	2.03	2.61	2.62	2.62	3.64	4.98	4.45	4.48	0.716	0.524	0.588	0.584
Social Assis.	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General S. A.	<i>bsa00</i>	0.32	0.84	0.32	0.36	0.35	0.71	0.76	0.80	--	0.444	0.424	0.450	--
Old-Age S.A.	<i>bsaoa</i>	1.53	3.41	1.59	1.63	1.65	2.54	2.75	2.97	--	0.604	0.579	0.549	--
Education B.	<i>bed</i>	3.72	4.04	3.66	4.37	4.26	2.93	2.99	4.07	--	1.271	1.223	1.072	--

Notes: Estimations for 2008 and 2009 for these variables: *pdiss*, *bhllac*, *bmact*. Social benefits for children are included in *bunnc*. For 2007 and 2008, *bpplct* includes fading out payments of the old *Erziehungsgeld*. Sums for *bsa00* and *bsaoa* exclude people in institutions.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official statistics (*bhllac*, *pdiss*, *bhllps*, *bunct*, *bunnc*, *bchot*, *bmact*, *bpplct*, *bsa00*, *bsaoa*,) as well as micro data from GSOEP (*ils_dispy*, *bch*, *bed*) and from EVS 2008 (*bhll01*).

Disposable household incomes are lowered slightly by take-up correction, primarily because now many households have a zero benefit receipt, where before they had a positive benefit amount, at the three social benefits under consideration at the take-up correction. This reduction in incomes will also have an effect on the income distribution as well as on poverty rates, as will be shown in the next section. Firstly, effects of take-up correction on aggregate amounts of simulated taxes and social security contributions are presented in Table 47.

As for recipients, it becomes apparent that there are only minor changes at aggregate taxes by take-up corrections. Sums of social security contributions (*tsc*) are again totally unaffected, as they are a function of market incomes only, and not of benefits. This also holds for each of the single components of contributions (*ils_sicee*, *ils_sicer*, *ils_sicse*, *ils_sicpe*). Aggregate amounts of taxable income (*tinty*), as well as tax allowances (*tinta*), and the tax base (*tintb*) all also remain unchanged because the three social benefits affected do not belong to taxable income. Only the sum of taxes paid (*tin* and *tingt*) decreases very slightly because the tax rate is affected by take-up correction of unemployment benefits through progression clause (see Section 1.5.1). This decrease, however, amounts to less than 0.1%.

Table 47. Simulated Taxes and Social Security Contributions – Aggregate Amounts (in bn. euros per year) – Limited Take-Up

	EM Var.	EM	EU-SILC	Uprated Input (I)			External Source (III)				Ratio (I/III)			
		Output (I)		[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Taxes / SSC	<i>tis</i>	451.70	408.57	469.22	454.55	463.37	403.46	--	--	--	1.120	--	--	--
SSC	<i>tsc</i>	395.57	--	401.09	400.75	407.24	369.55	385.97	392.39	401.85	1.070	1.039	1.021	1.013
Employer	<i>ils_sicer</i>	174.43	--	175.60	175.88	178.92	159.09	162.38	162.82	168.24	1.096	1.081	1.080	1.063
Employee	<i>ils_sicee</i>	176.75	--	179.73	179.00	182.32	163.16	171.40	176.79	182.06	1.083	1.049	1.013	1.001
Self-Empl.	<i>ils_sicse</i>	16.24	--	16.92	15.62	16.02	16.64	18.28	22.04	22.15	0.976	0.926	0.709	0.723
Pensioners	<i>ils_sicpe</i>	28.14	--	28.84	30.26	29.98	30.67	33.92	30.74	29.41	0.918	0.850	0.984	1.019
Income Tax	<i>tin</i>	230.56	--	243.73	229.67	235.05	193.00	--	--	--	1.195	--	--	--
Taxable Inc.	<i>tinty</i>	1373.76	--	1421.9	1397.0	1432.2	1067.1	--	--	--	1.287	--	--	--
Tax Allow.	<i>tinta</i>	176.21	--	178.41	179.26	180.87	201.10	--	--	--	0.876	--	--	--
Tax Base	<i>tintb</i>	1197.55	--	1243.5	1217.7	1251.3	866.00	--	--	--	1.383	--	--	--
Gross I. Tax	<i>tingt</i>	230.56	--	243.73	229.67	235.05	193.00	--	--	--	1.195	--	--	--

Notes: In the sum of taxes and social contributions (*tis*), contributions from employers are excluded.

Sources: EU-SILC 2008 and own simulations based on EUROMOD. For external figures: Official Income Tax Statistic (Statistisches Bundesamt, 2007) and national accounts (Statistisches Bundesamt, 2011).

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 results are presented for the two versions of take-up correction, either assuming full benefit take-up, or limited take-up.

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 48 in mean equivalised incomes by income deciles. These results refer to the simulation version, in which full benefit take-up has been assumed. Simulated incomes for the four policy years (EUROMOD) are compared to incomes from the EU-SILC data for 2007 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 waves 2007, 2008, 2009, and 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). Thus, there remains a systematic deviation between household incomes simulated in EUROMOD and in the GSOEP (which can also be found when comparing EU-SILC and GSOEP), which is present all over the income distribution.

This is one reason why simulated disposable incomes are somewhat larger in all years 2007 to 2009 compared to the external data from the GSOEP. This over-simulation is present in all deciles of the income distribution, and it is significantly greater in the lowest decile and in the highest decile. It is also relatively great in the second and the third decile (between 14% and 28%). In all other deciles, over-simulation amounts to between 5% and 9%. For 2010, there has been no micro data available yet (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 (S_{80}/S_{20}), 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 0.95 and 0.97 over all policy years. There is a slightly greater deviation with respect to income inequality. Ratios for the Gini index range between 0.89 and 0.94 over the years and for the inter-quantile ratio between 0.80 and 0.87.

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 limited benefit take-up has been accounted for in the second simulation version, for which results with respect to income distribution are presented in Table 49.

Table 48. Income Distribution: Equivalised Disposable Household Income (euros per year) – Full Take-Up

	EUROMOD (I)				EU-SILC	External Source (II)				Ratio (I/II)			
	[2007]	[2008]	[2009]	[2010]	[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Decile													
Mean:													
...1	9 558	9 714	9 782	9 936	9 021	4 413	4 207	4 014	--	2.166	2.309	2.437	--
...2	11 999	12 205	12 337	12 598	11 829	9 809	9 864	9 656	--	1.223	1.237	1.278	--
...3	13 874	14 123	14 308	14 607	14 122	12 169	12 383	12 330	--	1.140	1.141	1.160	--
...4	15 179	15 879	16 065	16 398	15 975	14 149	14 348	14 460	--	1.073	1.107	1.111	--
...5	17 400	17 780	17 921	18 287	17 991	16 106	16 356	16 573	--	1.080	1.087	1.081	--
...6	19 490	19 915	20 092	20 495	20 276	18 239	18 532	18 751	--	1.069	1.075	1.072	--
...7	22 010	22 490	22 626	23 077	22 913	20 558	21 036	21 373	--	1.071	1.069	1.059	--
...8	25 406	26 004	26 103	26 637	26 481	23 760	24 323	24 720	--	1.069	1.069	1.056	--
...9	31 059	31 759	31 891	32 516	32 705	28 864	29 623	30 284	--	1.076	1.072	1.053	--
...10	74 791	77 312	74 075	75 834	89 081	54 183	54 266	55 764	--	1.380	1.425	1.328	--
Overall:													
...Median	17 609	17 988	18 113	18 484	18 221	18 309	18 586	18 797	--	0.962	0.968	0.964	--
...Mean	20 146	20 592	20 625	21 046	20 896	21 086	21 223	21 470	--	0.955	0.970	0.961	--
...Gini	27.07	27.27	26.83	26.86	30.04	30.20	29.10	29.30	--	0.897	0.937	0.916	--
...S80/S20	3.86	3.90	3.84	3.85	4.71	4.80	4.50	4.50	--	0.803	0.866	0.853	--

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 2007. 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 waves 2007, 2008, 2009, and 2010, adjusted to EUROMOD concept of disposable income.

If take-up of the three social benefits, *bunnc*, *bsaoo*, and *bsaoa*, is assumed to be limited (see Section 2.4.1 for more details), simulated equivalised disposable household incomes are slightly lower on average (Table 49). The mean household income is reduced by about 1.1% in 2007, from 20,146 euros per year to 19,913 euros. As non-take up of social benefits mainly affects households in the lower income deciles, the effect is greater in lower income deciles. The median is only reduced by some 0.5% in 2007, from 17,609 euros per year to 17,527 euros. Incomes in the highest decile are unaffected by take-up correction.

Take-up correction slightly changes the coverage ratios. Most ratios are slightly lowered, while some are unaffected. Coverage ratios for the overall figures (mean, median, Gini, S80/S20) are slightly reduced and thus now even a bit lower than one compared to full take-up. Coverage ratios over the income distribution are somewhat closer to one now in the lower income deciles, while ratios are virtually unaffected in higher deciles. A significant over-simulation in EUROMOD, compared to the income distribution in the GSOEP, remains even after take-up correction. The deviation still is more pronounced in the lower deciles, especially in the first decile, and also in the highest decile. It is relatively great in the second and third decile. In the central deciles, ratios range between 1.06 and 1.10.

Table 49. Income Distribution: Equivalised Disposable Household Income (euros per year) – Limited Take-Up

	EUROMOD (I)				EU-SILC	External Source (II)				Ratio (I/II)			
	[2007]	[2008]	[2009]	[2010]	[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
Decile Mean:													
...1	9 047	9 162	9 245	9 432	9 021	4 413	4 207	4 014	--	2.050	2.178	2.303	--
...2	11 771	11 973	12 116	12 373	11 829	9 809	9 864	9 656	--	1.200	1.214	1.255	--
...3	13 735	13 985	14 174	14 476	14 122	12 169	12 383	12 330	--	1.129	1.129	1.150	--
...4	15 472	15 765	15 952	16 289	15 975	14 149	14 348	14 460	--	1.094	1.099	1.103	--
...5	17 319	17 690	17 847	18 214	17 991	16 106	16 356	16 573	--	1.075	1.082	1.077	--
...6	19 441	19 867	20 048	20 454	20 276	18 239	18 532	18 751	--	1.066	1.072	1.069	--
...7	21 971	22 454	22 587	23 042	22 913	20 558	21 036	21 373	--	1.069	1.067	1.057	--
...8	25 381	25 975	26 080	26 619	26 481	23 760	24 323	24 720	--	1.068	1.068	1.055	--
...9	31 024	31 732	31 860	32 489	32 705	28 864	29 623	30 284	--	1.075	1.071	1.052	--
...10	74 791	77 312	74 075	75 834	89 081	54 183	54 266	55 764	--	1.380	1.425	1.328	--
Overall:													
...Median	17 527	17 903	18 042	18 433	18 221	18 309	18 586	18 797	--	0.957	0.963	0.960	--
...Mean	19 913	20 335	20 395	20 817	20 896	21 086	21 223	21 470	--	0.944	0.959	0.950	--
...Gini	28.23	28.42	27.94	27.94	30.04	30.20	29.10	29.30	--	0.935	0.977	0.954	--
...S80/S20	4.25	4.29	4.22	4.22	4.71	4.80	4.50	4.50	--	0.885	0.954	0.937	--

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 2007. 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 waves 2007, 2008, 2009, and 2010, adjusted to EUROMOD concept of disposable income.

4.2.2 Poverty Rates

Poverty rates by gender and age are presented in Table 50. 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 50. At-Risk-of-Poverty Rates by Gender and Age (percent) – Full Take-Up

of Median HDI	EUROMOD (I)				EU- SILC	External Source (II)				Ratio (I/II)			
	[2007]	[2008]	[2009]	[2010]	[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
40%													
Total	1.31	1.40	1.50	1.51	4.94	4.90	4.60	4.00	--	0.268	0.304	0.375	--
Males	1.10	1.16	1.29	1.28	4.97	4.90	4.80	4.00	--	0.224	0.241	0.323	--
Females	1.52	1.63	1.70	1.72	4.91	5.00	4.50	4.10	--	0.304	0.362	0.414	--
50%													
Total	6.09	6.44	6.42	6.55	9.24	9.20	9.40	9.20	--	0.662	0.685	0.698	--
Males	5.78	6.11	6.11	6.21	9.58	8.80	9.20	9.00	--	0.657	0.664	0.679	--
Females	6.38	6.76	6.71	6.89	8.88	9.60	9.60	9.30	--	0.665	0.704	0.722	--
60%													
Total	12.91	13.12	13.08	13.11	15.19	15.20	15.50	15.60	--	0.849	0.846	0.838	--
Males	12.10	12.17	12.17	12.22	16.14	14.20	14.70	14.90	--	0.852	0.828	0.817	--
Females	13.69	14.03	13.95	13.96	14.21	16.20	16.30	16.40	--	0.845	0.861	0.851	--
70%													
Total	20.53	20.83	20.55	20.62	22.88	22.80	22.60	23.20	--	0.900	0.922	0.886	--
Males	19.06	19.38	19.23	19.25	24.32	21.40	21.30	22.10	--	0.891	0.910	0.870	--
Females	21.94	22.23	21.83	21.93	21.38	24.20	23.90	24.30	--	0.907	0.930	0.898	--
60%													
0-15 years	12.34	12.63	12.14	11.92	14.99	15.20	15.00	17.50	--	0.812	0.842	0.694	--
16-29 years	18.75	18.76	18.83	18.90	20.19	20.20	21.10	18.90	--	0.928	0.889	0.996	--
30-44 years	11.68	11.97	11.82	11.81	13.37	13.40	14.10	14.10	--	0.872	0.849	0.839	--
45-64 years	12.52	12.43	12.72	12.75	16.79	16.80	16.70	17.00	--	0.745	0.744	0.748	--
65+ years	13.48	13.85	14.03	14.33	14.97	14.90	15.00	14.10	--	0.905	0.924	0.995	--

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 2007. 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 48 as well as Table 49), poverty rates, which are based on this income distribution, are significantly under-simulated (Table 50), at least for the 40% and 50% definitions. Ratios range between 22% and 41%, for the 40%-definition, and between 66% and 72% for the 50%-definition. Under-simulation is less severe, the closer we are to the median: ratios range between 82% and 86%, for the 60%-definition, and between 87% and 93% for the 70%-definition. For the 60%-definition, differentiated by age groups, the greatest deviations are found for the group of individuals aged 45-64 years, while the smallest deviations are found for individuals aged 65 years and older.

The respective poverty rates for the simulation version of limited benefit take-up are presented in Table 51. As the income distribution has been shifted downwards slightly, and more significantly so in the lower income deciles (see Section 4.2.1 and Table 48 as well as Table 49), poverty rates consequently increase due to the take-up correction. Coverage ratios are now much closer to one, already for the 40%-definition (ranging between 0.73 and 1.00). For the 50%-definition, they range between 0.86 and 0.93; for the 60%-definition between 0.89 and 0.94, and for the 70%-definition, between 0.90 and 0.96. There is now a bit more heterogeneity in the coverage ratios for the 60%-definition, across the age distribution. Ratios range between 0.80 and 1.01.

Table 51. At-Risk-of-Poverty Rates by Gender and Age (percent) – Limited Take-Up

of Median HDI	EUROMOD (I)				EU- SILC	External Source (II)				Ratio (I/II)			
	[2007]	[2008]	[2009]	[2010]	[2007]	[2007]	[2008]	[2009]	[2010]	[2007]	[2008]	[2009]	[2010]
40%													
Total	3.82	3.95	3.94	3.94	4.94	4.90	4.60	4.00	--	0.779	0.859	0.985	--
Males	3.62	3.72	3.74	3.74	4.97	4.90	4.80	4.00	--	0.739	0.775	0.934	--
Females	4.00	4.17	4.14	4.13	4.91	5.00	4.50	4.10	--	0.801	0.927	1.009	--
50%													
Total	8.08	8.37	8.27	8.41	9.24	9.20	9.40	9.20	--	0.878	0.890	0.899	--
Males	7.73	7.99	7.91	8.01	9.58	8.80	9.20	9.00	--	0.878	0.868	0.879	--
Females	8.42	8.73	8.62	8.79	8.88	9.60	9.60	9.30	--	0.877	0.909	0.926	--
60%													
Total	14.03	14.22	14.15	14.18	15.19	15.20	15.50	15.60	--	0.923	0.918	0.907	--
Males	13.26	13.36	13.31	13.31	16.14	14.20	14.70	14.90	--	0.934	0.909	0.893	--
Females	14.77	15.05	14.97	15.01	14.21	16.20	16.30	16.40	--	0.912	0.924	0.913	--
70%													
Total	21.20	21.43	21.28	21.40	22.88	22.80	22.60	23.20	--	0.930	0.948	0.917	--
Males	19.72	19.92	19.92	19.98	24.32	21.40	21.30	22.10	--	0.922	0.935	0.902	--
Females	22.63	22.89	22.60	22.76	21.38	24.20	23.90	24.30	--	0.935	0.958	0.930	--
60%													
0-15 years	14.77	15.15	14.28	14.04	14.99	15.20	15.00	17.50	--	0.972	1.010	0.816	--
16-29 years	20.09	20.09	20.17	20.13	20.19	20.20	21.10	18.90	--	0.995	0.952	1.067	--
30-44 years	12.99	13.12	13.00	12.96	13.37	13.40	14.10	14.10	--	0.969	0.930	0.922	--
45-64 years	13.48	13.33	13.70	13.77	16.79	16.80	16.70	17.00	--	0.802	0.798	0.806	--
65+ years	13.18	13.75	13.95	14.31	14.97	14.90	15.00	14.10	--	0.885	0.917	0.989	--

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 2007. External source is Eurostat statistics.

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.

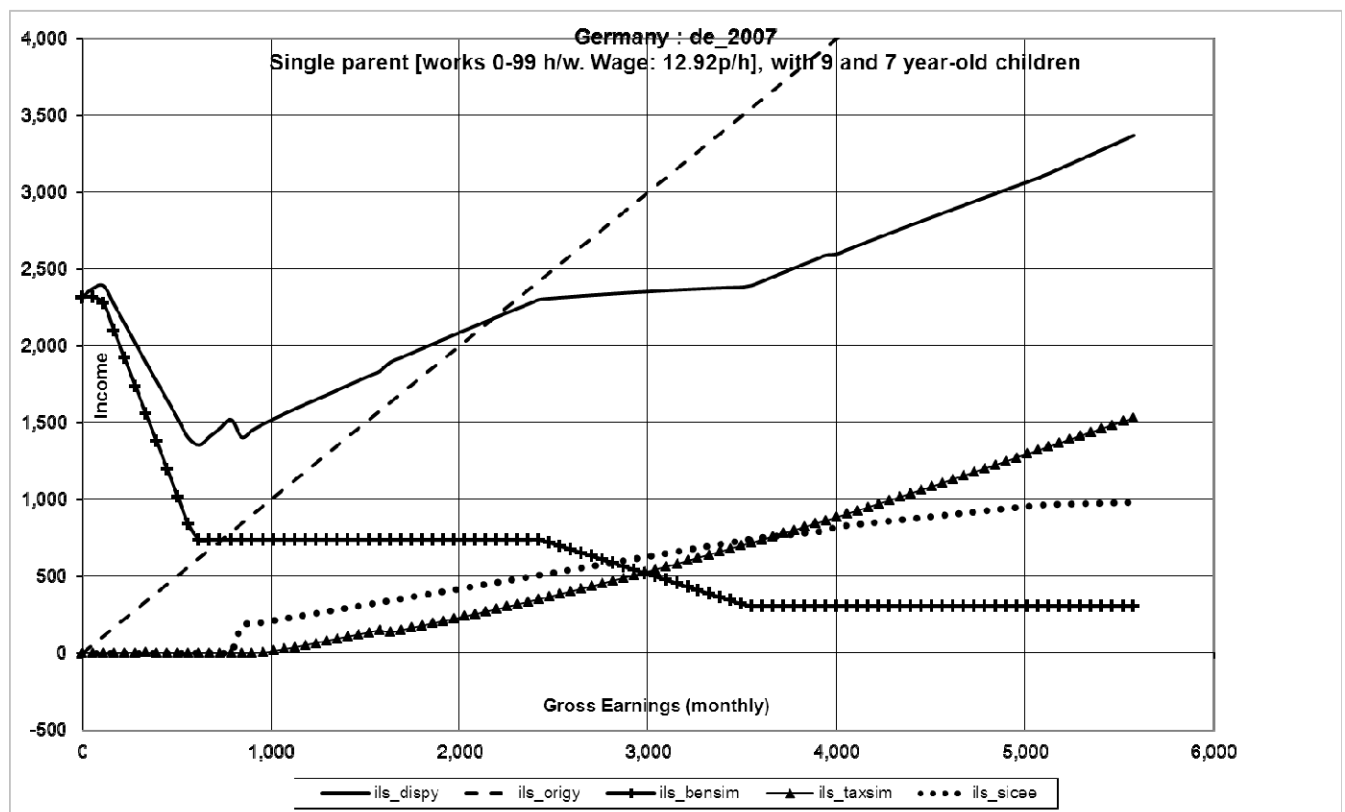
4.3 Budget Constraint Charts

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 2007. 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 (12.92 euros per hour, or 26.77 euros per hour).

Table 52 plots the budget constraint for single parents, working at an hourly wage of 12.92 euros per hour, with two children, aged 7 and 9, in the household. This is a relatively low hourly wage (average conditional wage in the sample is 15.18 euros per hour, predicted from a wage regression). In the lower income region, up to gross monthly earnings of about 600 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 308 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 705 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*).

Table 52. Budget Constraints (for 2007) – Single Parents with two Children



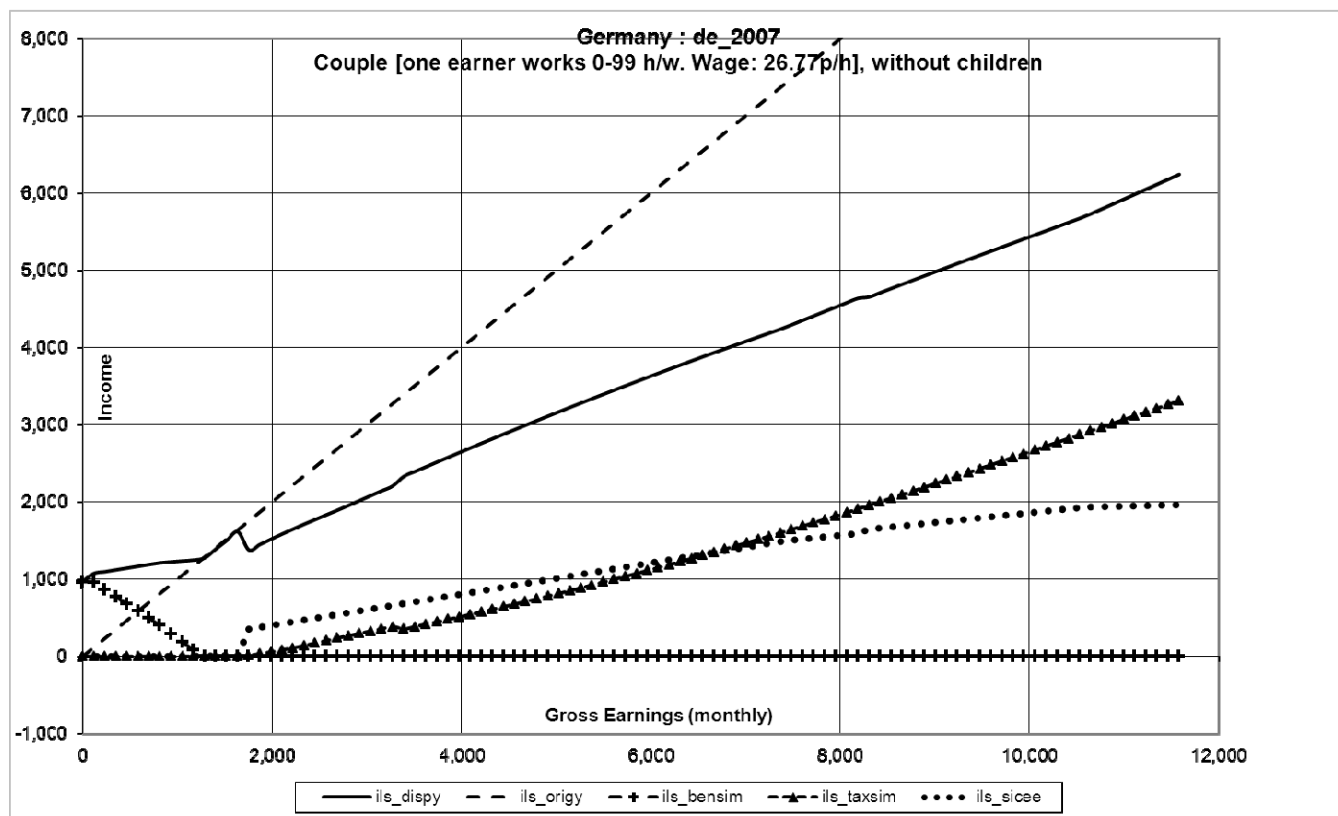
Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2007.

When market incomes exceed the region of marginal employment (mini and midi jobs), social security contributions kick in, and income taxes are paid, once general tax-free allowances are exceeded. Then, taxes (*ils_tax*) and social contributions (*ils_sicæe*) increase, while benefits (*ils_bensim*) remain constant between 600 euros and about 2,400 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 3,563 euros), and it further falls to almost zero once the assessment ceiling of the statutory pension insurance is reached (at 5,099 euros). After 2,400 euros, benefits start decreasing again, down to their intercept at the child benefits (308 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 2,200 euros), indicating the generosity of the tax and benefit system towards lone parents.

Table 53 plots the budget constraint for couples without children, where one spouse is working at an hourly wage of 26.77 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 1,400 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.

Table 53. Budget Constraints (for 2007) – Couple without Children



Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2007.

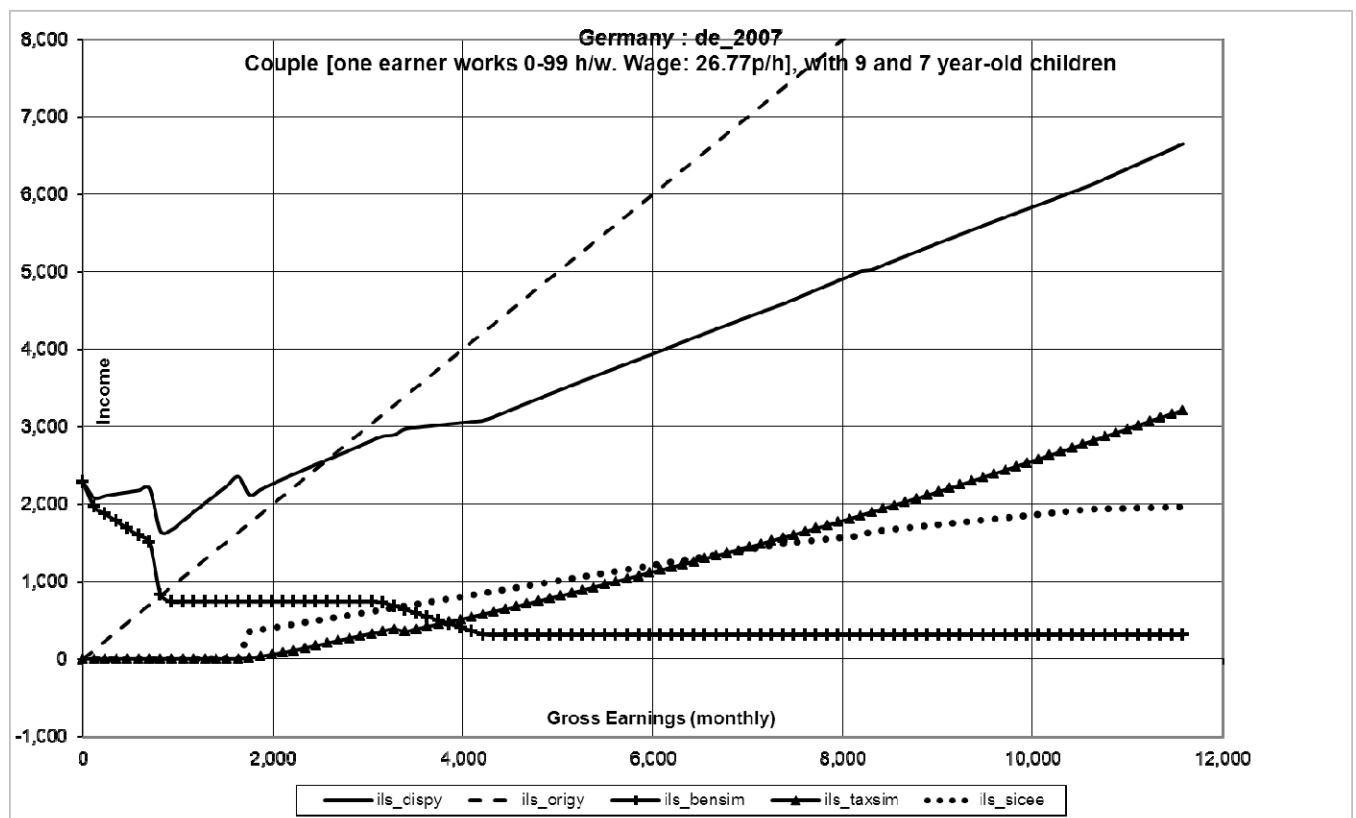
Again, taxes (*ils_taxsim*) and social security contributions (*ils_sicee*) begin to kick in just below a couples' gross income of about 2,000 euros. These curves evolve in a similar way as for single

parents. The 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.

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 54 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 26.77 euros per hour. In the lower income region, up to gross monthly earnings of the couple of about 800 euros, this household benefits from the relatively generous benefit system. Already with a zero market income, this household has a disposable income of about 2,000 euros, where the couple without kids had a disposable income of only 1,000 euros. Only the single parent had an even greater income. This is again related to the social benefits for minimum income (*bunnc*, *bsaoo*) 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 3,100 euros. These are withdrawn thereafter, and only the child benefits (*bch*) for the two children (208 euros) remain.

Table 54. Budget Constraints (for 2007) – Couple with two Children



Source: Own calculations with the standard EUROMOD budget constraint tool for the policy year 2007.

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 53 and Table 54, one can see that couples without children have a tax burden of about 2,700 euros (Table 53), whereas couples with children have a tax burden of only about 2,500 euros (Table 54).

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 relatively lower than the 2,200 euros for the single parent, but it is relatively higher compared to the 1,500 euros for the childless couple. This indicates that the tax and benefit system is generous to children, but it is much more generous to children living with single parents.

4.4 Summary of “Health Warnings”

As it has become apparent in Sections 4.1.2.1 and 4.1.2.2 when the simulation results for the various benefits have been validated with external information on benefit receipt, benefit take-up (at least a uniform estimate for take-up), and aggregate benefit amounts, and in Section 4.2 when income inequality over the income distribution as well as poverty rates have been validated, the simulations of the major social benefits, which are relevant in the lower income deciles, does probably not mirror the actual benefit receipt perfectly. This becomes clear when coverage ratios of *bunnc*, *bsaoo*, and *bsaoa*, i.e. the three social benefits for which take-up has been corrected, are relatively close to external figures *before* take-up has been corrected (i.e. assuming full take-up), whereas they are significantly under-simulated, numbers of recipients as well as aggregate amounts, after take-up has been corrected.

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 straightforward way. On the one hand, receipt of the three focussed social benefits (*bunnc*, *bsaoo*, and *bsaoa*) appears to be under-simulated, if the applied estimates for (limited) take-up of these benefits correspond to the true take-up rates. On the other hand, poverty rates appear to be somewhat under-simulated, even after take-up has been corrected. As a result, if the true receipt rates of the social benefits are much larger than the ones simulated, there must be a different reason why the true poverty rates are larger than the simulated ones. Anyhow, these deviations should be kept in mind when using the model, especially when the focus is on benefit receipt in the lower tails 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 only been considered in a limited way at the simulation of unemployment assistance (*bunnc_ge*), where income from housing benefits has been considered at the means test. However, in reality interactions between housing benefits and unemployment assistance are more complex.

As it has also been pointed out in Sections 4.1.2.1 and 4.1.2.2, incomes taxes are slightly over-simulated by the model. Extensive discussion of possible channels for this over-simulation has been given in Section 4.1.2.1.

5 References

Bach, S., M. Broer, and F. M. Fossen (2010) "Sollen Freiberufler und Landwirte Gewerbesteuer zahlen? Steuersystematische Überlegungen und empirische Wirkungsanalysen", *Jahrbuch für Regionalwissenschaft – Review of Regional Research* 30(1), 71-90.

Bruckmeier, K. and J. Wiemers (2011): A new targeting: a new take-up? Non-take-up of social assistance in Germany after social policy reforms. *Empirical Economics (forthcoming)*. <http://dx.doi.org/10.1007/s00181-011-0505-9>.

Bundesagentur für Arbeit (2009). Annual report: Labour market 2009 (Arbeitsmarkt 2009) <http://statistik.arbeitsagentur.de/Navigation/Statistik/Arbeitsmarktberichte/Jahresbericht-Arbeitsmarkt-Deutschland-Nav.html>.

Bundesagentur für Arbeit (2011) – Beschäftigungsstatistik: Sozialversicherungspflichtig Beschäftigte nach ausgewählten Merkmalen – Zeitreihe.

Bundesagentur für Arbeit (2011a) – Beschäftigungsstatistik: Geringfügig entlohnte Beschäftigte nach ausgewählten Merkmalen – Zeitreihe.

Bundesagentur für Arbeit (2011b) – Arbeitslosigkeit im Zeitverlauf 2010, Arbeitsmarkt in Zahlen, Jahreszahlen (<http://statistik.arbeitsagentur.de>).

BMAS (2009) -- Bundesministerium für Arbeit und Soziales (2009): Sozialbericht 2009. http://www.bmas.de/portal/46628/property=pdf/a230-09_sozialbudget_2009.pdf.

Deutsche Bundesbank (2011) - Ergebnisse der Gesamtwirtschaftlichen Finanzierungsrechnung für Deutschland 2005-2010: Nettogeldvermögen privater Haushalte; Housing expenditures: Statistisches Bundesamt: Verbraucherpreise - Verbraucherpreisindex für Deutschland.

Deutsche Rentenversicherung (2009): Annual report of the German statutory pension insurance for 2009 and 2008 http://www.deutsche-rentenversicherung-bund.de/cae/servlet/contentblob/30000/publicationFile/19088/aktuelle_daten_2011.pdf.

Deutsche Rentenversicherung: Rentenversicherung in Zeitreihen. http://www.deutsche-rentenversicherung-bund.de/cae/servlet/contentblob/29974/publicationFile/19039/rv_in_zeitreihen_pdf.pdf.

Eurostat (2010) – 2008 Comparative EU Intermediate Quality Report – Version 2 – June 2010.

Eurostat (2010) – EU-SILC o65 (2008 operation) – Description of Target Variables: Cross-sectional and longitudinal, 2008 operation (Version January 2010).

Fossen, F. M. (2009), "Would a Flat-Rate Tax Stimulate Entrepreneurship in Germany? A Behavioural Microsimulation Analysis Allowing for Risk", *Fiscal Studies* 30(2), 179-218.

Fossen, F. M., and S. Bach (2008) "Reforming the German Local Business Tax: Lessons from an International Comparison and a Microsimulation Analysis", *FinanzArchiv – Public Finance Analysis* 64(2), 245-272.

Grabka, M. (2010): Codebook for the SPEQUIV File 1984-2009. CNEF variables with extended income information for the SOEP. Data Documentation 49, DIW Berlin.

Institut für Arbeitsmarkt- und Berufsforschung (2008) – Projektion 2009: Der Arbeitsmarkt tritt auf der Stelle, IAB-Kurzbericht 13/2008.

Schulze Buschhoff, K. (2007), „Neue Selbstständige‘ und soziale Sicherheit: ein europäischer Vergleich“, *WSI Mitteilungen* 7, 387–93.

Statistisches Bundesamt: Statistical Year Books 2009; 2010.

Statistisches Bundesamt (2008) – Drei Jahre Panelerhebung EU-SILC, Wirtschaft und Statistik 8/2008.

Statistisches Bundesamt (2009) – Gemeinschaftsstatistik über Einkommen und Lebensbedingungen – LEBEN IN EUROPA 2007 – Qualitätsbericht.

Statistisches Bundesamt, (2009a) – Finanzen und Steuern – Lohn- und Einkommensteuer 2004. Fachserie 14, Reihe 7.1.

Statistisches Bundesamt (2009b): Finanzen und Steuern – Steuerhaushalt, Fachserie 14, Reihe 4.

Statistisches Bundesamt (2009c) – Sozialleistungen – Sozialhilfe, Fachserie 13, Reihe 2.

Statistisches Bundesamt (2011): Finanzen und Steuern 2007 – Jährliche Einkommensteuerstatistik, Sonderthema: Steuerermäßigungen. Fachserie 14, Reihe 7.1.1.

Statistisches Bundesamt (2011): Volkswirtschaftliche Gesamtrechnungen 2010: Inlandsproduktberechnung, Detaillierte Jahresergebnisse. Fachserie 18, Reihe 1.4.

Steiner, V., K. Wrohlich, P. Haan, and J. Geyer (2008) “Documentation of the Tax-Benefit Microsimulation Model STSM: Version 2008”, DIW Data Documentation 31, German Institute for Economic Research.

Sources for Tax and Benefit Regulations and Laws

<http://www.gesetze-im-internet.de/>

<http://www.gesetze-im-internet.de/estg/>