EUROMOD
COUNTRY REPORT

GERMANY (DE)
2018-2021

Dorine Boumans, Max Lay

December 2021

EUROMOD version I4.0

EUROMOD is the tax-benefit microsimulation model for the European Union (EU). It 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 covers the 27 Member States and is yearly updated to cover the most recent changes in countries' policy systems. It uses input databases which are also updated on a yearly basis, coming mainly from the European Union Statistics on Income and Living Conditions (EU-SILC). The model yearly update is supported by the following Directorate-Generals of the European Commission: DG EMPL, DG ECFIN, DG TAXUD, DG REFORM, DG JRC, DG ESTAT.

Originally maintained, developed and managed by the Institute for Social and Economic Research (ISER), since 2021 these responsibilities are taken over by the Joint Research Centre (JRC) of the European Commission, in collaboration with Eurostat and 27 national teams from the EU countries.

The EUROMOD governance structure consists of a Steering Committee, allowing partner DGs to monitor the process of the EUROMOD update, and a Scientific Advisory Board to monitor and guide the scientific development of the model.

This report documents the work done in the most recent annual update for Germany. This work was carried out by the EUROMOD core development team, based at the JRC in Seville, in collaboration with the national team.

JRC B2 head of unit: Salvador Barrios
EUROMOD project leader: Alberto Tumino/Fidel Picos
EUROMOD coordination assistant: Daniela Hupteva/Marta Jędrych
EUROMOD software developer: Estefanía Vázquez Torres
EUROMOD developer responsible for Germany: Tine Hufkens, Vanda Almeida
National team for Germany: Dorine Boumans, Max Lay, Mathias Dolls, Andreas Peichl

The results presented in this report are derived using EUROMOD version I4.0. EUROMOD is continually being improved and the results presented here may not match those that would be obtained with earlier or later versions of EUROMOD.

For more information see https://euromod-web.jrc.ec.europa.eu/

CONTENTS

1. BASIC INFORMATION

1.1 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 is adjusted annually on 1st of July.
- The statutory pension age in Germany is 65. This age will be gradually increased, for entry into old-age pension between 2012 and 2031, by one month each year, so that the statutory pension age will be 67 in 2031. Generally, entering retirement earlier is only possible with reduction in the pension level. This used to be different for women ("Altersrente für Frauen"). However, since 2004, there is no possibility anymore for women – as it is for men -- to enter retirement earlier, without accepting reductions.
- Students in Germany may leave secondary schools with a general-school-leaving degree at the age of 15, and the Youth Employment Protection Act ("Jugendarbeitsschutzgesetz") settles the minimum employment age at 15. However, till the age of 18, school leavers are obliged to pursue secondary education in the framework of vocational training or apprenticeships, at least on a part-time basis.
- The definition of dependent children that is most commonly applied in the German tax and transfer system relates to the definition in the context of child benefits ("Kindergeld"). According to these regulations, dependent children are biological, adopted, or foster children, aged 18 or younger, who live in the same household with their parents. They can at maximum be aged 25 in case they are still in tertiary education and do not work more than 20 hours a week on average.
- Lone parents are generally eligible to a household allowance for single parents in German income taxation law. Single parents, in this context, are not married and not widows or widowers. They must be living in a household together with a dependent child which is eligible for child benefits and actually belongs to the household. No other adult person – not even a grandparent -- is allowed to live in this household. Parents may though prove that they do not pool money with other adults in the household. Only the parent who is eligible to the allowance can receive it and it cannot be assigned to the other parent in any case.
- Generally, individuals are taxed individually in German income tax law. Married couples are assessed to joint taxation in the form of full income splitting. Taxable income of the spouses is added up, the tax schedule is applied to half of this sum, and the resulting tax burden is doubled.

- A specific element of German income tax law is the progression clause (Progressionsvorbehalt). This is relevant for some types of income which are not directly subject to income tax, e.g. unemployment benefits I. Even though these incomes are not included in the tax base, they are included in the base used to determine the tax bracket of the progressive income tax schedule. This way these incomes may increase the income tax rate used for the other income sources which are subject to the income tax.
- There is a final withholding tax on capital income ("Abgeltungssteuer"), which consists of a flat tax rate of 25% on capital income exceeding an allowance that is collected at source.
- Taxes on income from dependent employment are collected at source, i.e. directly at the employer every month, in the form of pay-roll tax ("Lohnsteuer"). Monthly income is also the reference figure for most of the means-tested benefits in German benefit law. Usually a past time frame of three to 24 months is applied, where monthly income may not exceed specific thresholds, on average. As pay-roll taxes are not final in Germany, it is common to file income tax returns in order to apply tax allowances and deductions. This is usually done altogether at the end of the year (or even in the following year).
- There is no systematic statutory indexation of tax schedules and benefit levels to inflation in general in Germany. Tax schedules and benefit levels are rather adjusted irregularly by discretionary policies, usually in the framework of broad tax reforms. This holds especially for the income tax schedule. The current pension value ("Rentenwert"), which represents the current old-age pension claims for one year of average contributions and determines the basis for the level of old-age pensions, is adjusted annually according to the growth rate of gross earnings from dependent employees. The basic benefit rate for unemployment benefits II and social assistance is adjusted annually through an inflation index calculated for a basket of goods and services which are determined by law to be necessary to cover basic needs.

1.2 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.

1.2.1 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. The duration of entitlement to "unemployment benefits I" depends on the individual's age and number of months contributions were made in the previous 5 years. Unemployment benefits are subject to progression clause in income taxation (see Table 2.18).

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 (67% for employees with at least one child), usually for a time of up to twelve months. This time frame may be extended up to 24 months. Contributions to statutory social insurances are also paid for. Short-term work compensations are subject to progression clause in income taxation (see Table 2.18).

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 2.18).

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 2.18).

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 – 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. Insolvency benefits are subject to progression clause in income taxation (see Table 2.18).

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 2.18).

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 onwards. This can be implemented either continuously or blocked in years of full and zero hours. In this case, part-time earnings are increased by 20% in the form of benefits for early retirement, which are paid by the unemployment insurance provided that employees entered this arrangement before the end of 2009 and that the employer hires an additional employee to cover for the recipient of early retirement benefits. Otherwise, the employer has to pay for the benefits. Benefits for early retirement are income tax exempt, but they are subject to progressive taxation (see Table 2.18).

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 and a monthly lump-sum of 300€ for 6 months. The time frame for the lump-sum transfer may be extended up to 15 months if the business proves to be viable. Benefits are tax-free and not subject to progression clause in income taxation.

Benefits for Re-training (*Umschulungszuschüsse, Bildungsgutschein*): Unemployed individuals are generally eligible to re-training benefits, paid for by employment agencies, while they receive unemployment benefits I (or unemployment benefits II or if they are threatened by unemployment). 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.

1.2.2 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. 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 2.18).

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 2.18).

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 2.18).

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. The concrete monthly amount of the benefit is determined by taking into account the nature or severity of health damage and the extent of assistance required.

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 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.

1.2.3 Benefits from Statutory Pension Insurance

Old-Age Pensions (*Altersrente*): Individuals who contributed to the statutory pension insurance for at least five years are entitled to the regular old-age pensions from the age of 65 on. This regular age for entry into old-age pension is gradually increasing for the younger cohorts up to 67, which will be the regular age in the year 2031. There are a few specific old-age pension schemes, in which entitlement may start some years earlier, e.g. severe disabilities or unemployment so that actual entries into old-age pensions may vary considerably over the individuals. The level of old-age pensions is determined individually by the contributions made, the age of entry into pension, and the current pension value.

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

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

Survivor's (Widow's and Orphan's) Pensions (*Hinterbliebenenrente, including Witwenrente and Waisenrente*): Survivor's pensions include pensions for widows/widowers and pensions for orphans. There is a regular pension for widows and an extended one. The regular widow's pensions are paid to the surviving partner if the deceased person contributed to the statutory pension insurance for at least five years. 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 spouses upon the death of their ex-partner 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.

1.2.4 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 employer commits to paying pensions from employer schemes this can be explicitly agreed upon in individual work contracts or in collective agreement contracts. Benefits can be paid on a regular, or an irregular basis, typically to pension funds.

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

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

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

1.2.5 Public Transfers to Private Households

Child Benefits (*Kindergeld*): Parents with dependent children are eligible to child benefits. Married couples can choose who receives the benefits. In case of parents living separately, the one with whom the child stays most of the time, or the one who bears the larger share of the maintenance, receives the benefits. Benefits are paid for biological, adopted, or foster children who live in the same household with their parents. They are paid up to the age of 18. Eligibility is prolonged up to the age of 25, in case children are still in education and do not work more than 20 hours a week in dependent employment. 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.

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 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 2.18).

Unemployment Benefits II (*Arbeitslosengeld II*): All individuals aged between 15 and their pensionable age who are able to work for at least three hours per day are eligible for "unemployment benefits II". "Unemployment benefits II" are means tested with respect to income and wealth and they are determined by the needs of the family (partner – married or not – and dependent children, *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. 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. 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.

Additional Child Benefits (*Kinderzuschlag*): The additional child benefit 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 benefits depends on the children's needs and the household's income and wealth. Eligible children are unmarried, live in the household, and are younger than 25 years. They also need to be eligible for child benefits. Own income of the child, market or replacement income, reduces the benefit amount. Household income must fall in a range in order for parents to be eligible to additional child benefits.

Social Assistance (*Sozialhilfe*): Individuals who are not able to work at least three hours per day – either because they are aged 65 or older, or because they are aged 18-65 and physically not able to work – are entitled to social assistance in order to secure a minimum income for everybody. These benefits are means tested with respect to income and wealth and they are determined by the needs of the entire household. This means that the household's income and wealth are considered for the determination of needs, except for allowances. In the case of general social assistance for reduced work, the income threshold per month is calculated by the amount of the basic rates and the monthly rent including heating with regard to the number of household members. The basic social assistance rate is identical to the basic rate from "unemployment benefits II". Basically, social assistance is supposed to secure a minimum income for individuals who are not eligible for "unemployment benefits II", i.e. those younger than 65 and not able to work at least three hours per day. Those 65 and older with very low pension income are however entitled to basic old-age assistance.

Means-tested Basic Old-Age Assistance (*Bedarfsorientierte Grundsicherung im Alter oder bei Erwerbsminderung*): The basic old-age assistance ensures the basic needs for living for older people and for those individuals, who are permanently fully incapacitated for work. Recipients must have 65 years of age, or 18 years of age and simultaneously be permanently fully incapacitated for work due to medical reasons. Claim for basic old-age assistance have individuals, who cannot support themselves with their own income and assets or with the income and assets of the non-separated spouse or consensual partner.

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*): Up to 2016 (included), 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. If relevant, benefits are reduced by received child benefits and respectively by widow's pensions. As of 1 July 2017, children between 12 and 18 are also eligible to advances on alimony payments if they are not dependent on means-tested transfers or if they do receive means-tested benefits but their parent has a gross income of minimum 600 euros (as described in the Sozialgesetzbuch II, SGB II). The maximum payment period of 72 months will no longer be applied.

Benefits from Non-Profitable Charity Organizations (*Geldleistungen von Wohlfahrtsorganisationen, e.g. AWO*): Non-profitable charity organizations support disadvantaged groups in the country. Their field typically includes social work (for children and young people, marginal groups, migrants, seniors, families, disabled, etc.), social care and poverty reduction, health promotion and prevention, care, counselling 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 do not receive "unemployment benefits II" or social assistance. 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.

Education Benefits (*Ausbildungshilfen/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. 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.

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

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

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 falls below an upper limit. Savings to eligible contracts are subsidized up to a maximum amount per year, which differs for single individuals and married couples.

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 a given threshold. The level of bonuses depends on the type of savings contract.

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

1.3 Social contributions

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 1.2). 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.

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

Family insurance (*Familienversicherung*): 1) Partners (married or registered) with no or low income and 2) children of a (compulsory or voluntary) member of statutory health insurance enjoy health insurance coverage without having to pay contributions.

Mini job / midi job: Mini jobs (marginal or short-term employment) are tax-free and free of social insurance contributions for the employee. However, the employer has to pay contributions to statutory health and pension insurance. Mini jobs do not include contributions to the long-term care and unemployment insurance. In the case of midi jobs, employee's social insurance contributions are faded in linearly until they reach the full rates at a gross monthly wage of €850 (€1,300 since July 2019). 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.

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 fulfill the minimum requirement of previous contributions to statutory health insurance. The self-employed are not generally obliged to contribute to compulsory pension insurance, although specific groups of the self-employed (about a quarter of all self-employed) are obliged to contribute to statutory pension insurance (Schulze Buschoff, 2007). 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.

Others: Since 2009, all individuals are obliged to contract a health insurance. This implies that individuals who do not qualify for any of the categories listed also need to contract a health insurance. They are free to decide whether they would like to contract a public or a private health insurance.

1.4 Taxes

1.4.1 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. Income from single components is added up and certain expenditures are credited against income, as well as certain allowances are granted. 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. 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*, from 2009 onwards called *Abgeltungsteuer*). However, these taxes need not be final. It is common to file income tax returns, for example to claim income-related expenses which exceed the tax allowable lump sum for income-related expenses.

Solidarity Surcharge (*Solidaritätszuschlag*): Up to 2021 there was a surcharge of 5.5% on the income tax and the capital tax, which was originally motivated with the costs of the German re-unification. The solidarity surcharge will be partly abolished as of the year 2021. No solidarity surcharge is due on income tax up to €16,956 (€33,912 for married couples). For exceeding amounts, a sliding scale is applied for taxable income up to €96,802 (€193,641 for married couples). Taxpayers with taxable income above €96,802 are fully subject to solidarity surcharge. The sliding scale will work as follows: (the yearly income tax – the freezone) x 0.119 = solidarity surcharge.

Church Tax (*Kirchensteuer*): Members of the catholic and protestant churches (and some smaller churches) pay this tax to finance their churches, which is collected by the government together with the income tax (respectively, the payroll tax and the withholding tax on capital income). The tax base is the income tax, which is used to apply a flat tax rate of 8% (in Bavaria and Baden-Württemberg) or 9% (in the other Federal States). Taxpayers can avoid paying the church tax by officially leaving church, which is why church tax may be regarded as voluntary.

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

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

Motor Vehicle Tax (*Kfz-Steuer*): Tax paid by owners of motor vehicles, depending on cylinder capacity and carbon dioxide emissions. Lorries and trailers are additionally assessed on the basis of their maximum permissible gross weight.

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

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. Tax rates vary over municipalities, as the local jurisdictions apply their own multipliers (similarly to the Property Tax, see above). 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.

1.4.2 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*). Further excise taxes, like the beer tax (*Biersteuer*), are of comparably minor importance.

2. Simulation of taxes and benefits in EUROMOD

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 1.2, 1.3 and 1.4. 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. Furthermore, the German SILC does not include information on the region of residency. This information would be useful for the calculation of social security contributions as well as housing benefits.

Table 2.1 and Table 2.2 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 2.1 and Table 2.2 into such that are simulated and such that are not simulated. For the latter, relevant information on the main limitations for simulation are provided.

Generally, most of the social benefits, which merely condition on a means test, are simulated, some with more or less restrictive assumptions (Table 2.1). More on these assumptions will be said in Sections 2.4, 2.5, 2.5 and 2.7. However, most of the contributory benefits, most of them relating to all kind of pensions, are not simulated, due to lack of sufficient information on the contribution history. Moreover, many benefits for sickness or disability are not simulated, as there is not enough information reported on the duration and type of sickness or injury, and on the degree of disability. Furthermore, the degree of loss of the earnings capacity in relation to injury or disability would be valuable information that is not sufficiently observed in the data.

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

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

Table 2.1 Simulation of benefits in EUROMOD

	Variable name(s)	2018	2019	2020	2021	Why not fully simulated? Missing Data on…
		Treatment in EUROMOD				
Benefit for early retirement	byr	I	I	I	I	Contribution history & wage history
Unemployment benefit II	bunnc_s	S	S	S	S	Contribution history
Unemployment benefits I	bunct_s	PS	PS	PS	PS	Contribution history
Severance pay	ysv	I	I	I	I	Job termination
Covid-related wage compensation for employees	bwkmcee_de	-	-	-	S	Need to simulate transitions into wage compensation scheme
Covid-related financial help for self-employed	bencovidse_de	-	-	-	S	Policy is turned off in the baseline due to missing information on Covid-related decrease in self-employed income.
Benefit for start-ups	bunot	I	I	I	I	Self-employed & their business history
Benefit for re-training	buntr	I	I	I	I	Unemployed; eligibility for re-training
Lump-sum unemploy. benefits	bunls	I	I	I	I	Job termination
Old-age statutory pension	poass	I	I	I	I	Contribution & wage history
Old-age pension (employees)	poa00	I	I	I	I	Contribution history
Foreign old-age pension	poaab	I	I	I	I	Occupation in a foreign country
Old-age pension (self-employed)	poaps	I	I	I	I	Contribution history
Old-age pension (empl. pub. serv.)	poapu	I	I	I	I	Employment history
Old-age pension (civil servants)	poacs	I	I	I	I	Employment history
Old-age pension (disability)	poadi	I	I	I	I	Employment history; degree of injury
Benefits for war victims (older than 65 years)	poawr	I	I	I	I	Participation in military services
Orphan's pension	psuor	I	I	I	I	Biography; contributions of deceased
Survivor's pension	psuwd	I	I	I	I	Biography; contributions of deceased
Benefits for war victims (younger than 65 years)	pdiwr	I	I	I	I	Participation in military services
Sickness benefits	bhl_s	PS	PS	PS	PS	Employment history; sickness severity
Care benefits from long-term care insurance	pdica	I	I	I	I	Degree of injury; cash and in-kind benefits
Disability pensions for civil servants	pdiot	I	I	I	I	Employment history; injury
Pensions for reduced work ability	pdi00	I	I	I	I	Employment history; injury
Pension from accident insurance	pdiss_s	PS	PS	PS	PS	Injury and remaining earnings capacity
Maternity-leave benefit	bmact_s	PS	PS	PS	PS	Contribution history
Parental-leave benefit	bplct_s	PS	PS	PS	PS	Employment history

Add. child benefit (*Kinderzuschlag*)	bchot_s	S	S	S	S	
Child benefits	bch00_s	S	S	S	S	
Covid-related benefit for children *(Kinderbonus)*		-	-	-	S	
Educational allowance	bched_s	PS	PS	PS	PS	Mix of cash and in-kind benefits
Advances on alimony payments	bcham	I	I	I	I	Alimony payments
Other family benefits	bfaot	I	I	I	I	Aggregate of very minor benefits
Social benefits (*Sozialgeld*)	bsaot_s	S	S	S	S	
Social assistance (*Sozialhilfe*)	bsa00_s	S	S	S	S	
Basic old-age assistance	bsaoa_s	S	S	S	S	
Benefits from charity organizations	bsapu	I	I	I	I	Such payments
Contributions to agricultural pension funds	bsa01	I	I	I	I	
Education benefits	bed_s	PS	PS	PS	PS	Data on parents' income (if on their own)
Housing Benefits	bho00_s	S	S	S	S	
Professional Training Ben.	-	E	E	E	E	Professional training & parental income
Subsidies for prv. old-age savings	-	E	E	E	E	Savings
Home-building allowances	-	-	-	-	-	Housing purchases
Building society premiums	-	E	E	E	E	Savings
Savings bonuses for employees	-	E	E	E	E	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.

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 2.2 Simulation of taxes and social contributions in EUROMOD

	Variable name(s)	Treatment in EUROMOD				Why not fully simulated?
		2018	2019	2020	2021	
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	S	S	S	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	tsceeui_s	S	S	S	S	
to accident insurance	tsceeac_s	S	S	S	S	
Self-employed	tscse_s	S	S	S	S	Many social contributions for the self-employed are voluntary, and they are not observed.
to pension insurance	tscsepi_s	S	S	S	S	Pension insur. for self-
Pensioner	tscpe_s	S	S	S	S	
to health insurance	tscpehl_s	S	S	S	S	
Other						
to health insurance	tscot_s	S	S	S	S	People with no or low earnings; minimum amount assumed

Notes: "-" policy did not exist in that year; "E" policy is *excluded* from the model's scope as it is neither included in the microdata 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.

2.1.1 Part-simulated tax-benefit components

The *unemployment benefit I* (EUROMOD variable bunct_s) is part-simulated. As information on past earnings is not available in SILC, we impute them using information on the reported receipt of the benefit (bunct) in SILC. Thus, the simulation is restricted only to those individuals who have reported the unemployment benefit I in the micro-data.

Sickness benefits (EUROMOD variable bhl_s) are also part-simulated. This is for the following two reasons: First, as information on prior earnings is not available in SILC, we impute them using information on the reported receipt of the benefits (bhl) in SILC. Thus, the simulation is restricted only to those individuals who have reported sickness benefits in the micro-data. Second, as information on the degree of disability is not available in SILC, we simplify the simulation by assuming that each entitled individual gets the minimum benefit amount.

For similar reasons (missing information on the contributory history, the entitlement basis and the degree of disability) the *disability pension from the statutory accident insurance* (EUROMOD variable pdiss_s) is part-simulated.

The *maternity leave benefit* (EUROMOD variable bmact_s) and *parental leave benefit* (EUROMOD variable bplct_s) are also part-simulated because for full simulation more information on when the child was born, the contributory history and the hours worked is needed. As with the benefits mentioned above, information on past earnings is imputed using information on the reported benefit receipts (bmact and bplct) in the SILC data.

The *education benefit* (EUROMOD variable bed_s) is part-simulated because parents' income and wealth is not observed for the students who no longer live with their parents. Although efforts have been made to impute parents' income for this sample of students, the simulation of the benefit is restricted to those students who report the benefit (bed) in the SILC data. The benefit is fully simulated for students who still live with their parents.

The *education allowance* (EUROMOD variable bched_s) is part-simulated. Although we simulate the main benefit component, there are additional amounts which are a mixture between cash and in-kind benefits and depend on the region. As we cannot distinguish between the cash and in-kind benefits, we cannot simulate the entitlement to them.

The *deduction of childcare expenses* (EUROMOD variable tintace_s) is part-simulated because there is no information on the actual childcare expenses. Instead, we make assumptions about which families may be entitled to the deduction and simulate for them the maximum deduction amount.

Finally, the *deduction of income-related expenses* (EUROMOD variable tintaee_s) is part-simulated because we simulate only the minimum lump-sum amount, as we do not have information on other types of expenses.

- ***Structural changes between 2017 and 2018***

None.

- ***Structural changes between 2018 and 2019***

From January 1 2019 the company specific additional contributions to the public health insurance are paid in equal parts by employee and employer. These additional contributions were introduced in 2015 and originally had to be paid solely by the employees.

- ***Structural changes between 2019 and 2020***

From July 1, 2019 the maximum gross monthly wage for midi jobs was increased from €850 to €1,300. Employee's social insurance contributions are faded in linearly until they reach the full rates at a gross monthly wage of €1300 (€850 before July 1, 2019). 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. This change is simulated in EUROMOD from 2020 on.

Due to the corona crisis and the increased relevance of wage compensation schemes, in 2020 Euromod also simulates Germany's largest wage compensation scheme (Kurzarbeitergeld). It is important to note that this benefit already existed before 2020.

- ***Structural changes between 2020 and 2021***

The solidarity surcharge will be partly abolished as of the year 2021. No solidarity surcharge is due on income tax up to €16,956 (€33,912 for married couples). For exceeding amounts, a sliding scale is applied for taxable income up to €96,802 (€193,641 for married couples). Taxpayers with taxable income above €96,802 are fully subject to solidarity surcharge.

2.2 Order of simulation and interdependencies

Table 2.3 tabulates the order in which the single policies are simulated in EUROMOD. The order in which the policies are simulated is made explicit in Table 2.3. This order is mainly determined by interdependencies between the policies, as far as these could have been considered in the model. These interdependencies shall be briefly described in the following.

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

Then comes a benefit that does not condition on any of the benefits simulated so far, but that is itself an input into benefits simulated at a later stage. Sickness benefits are a function of unemployment benefits I when benefit levels are calculated. Thereafter, maternity leave benefits and parental leave benefits are simulated. Both are a function of employment income as well as unemployment benefits I.

Then, taxation is simulated. Thereby, all relevant 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.

Next education benefits are simulated. They condition on income and wealth of the students as well as their parents, where observed current income is applied. In addition, simulated social security contributions and taxes paid by students and their parents are taken into account, as they play a role in determining the amount of the benefit.

Next, housing benefits are simulated. Relevant income in the sense of housing benefits is computed taking into account whether individuals pay income taxes and/or social security contributions.

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 and taxes simulated earlier are an input, and on ability to work.

Next, 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.

Finally, additional child benefits and educational allowances are simulated.

Table 2.3 EUROMOD Spine: order of simulation

Policy	2018	2019	2020	2021	Description of the instrument and main output
setdefault_de	on	on	on	on	DEF: SET DEFAULT VALUES
UAA_de	switch	switch	switch	switch	SWITCH: Uprating by Average Adjustment for public pensions (POLICY IS OFF IN THE BASELINE)
uprate_de	on	on	on	on	DEF: UPRATING FACTORS
constdef_de	on	on	on	on	DEF: constants
ilsdef_de	on	on	on	on	DEF: STANDARD INCOME CONCEPTS
ilsudbdef_de	on	on	on	on	DEF: STANDARD UDB INCOME CONCEPTS
ildef_de	on	on	on	on	DEF: NON-STANDARD INCOME CONCEPTS
Random_de	n/a	n/a	on	on	DEF: random assignment for Covid-related policies
InitVarsLMA_de	n/a	n/a	on	on	DEF: select individuals that do the transitions to wage compensation/unemployment (LMA transition)
tudef_de	on	on	on	on	DEF: ASSESSMENT UNITS
yem_de	switch	switch	switch	switch	INC: Minimum Wage
neg_de	on	on	on	on	INC: recode negative values of incomes to zero
bunct_de	on	on	on	on	BEN: unemployment benefits I (ALG I)
bwkmcee_de	n/a	n/a	on	on	BEN: Wage compensation scheme (Kurzarbeitergeld)
bencovidse_de	off	off	off	off	BEN: financial help for self-employed
yseadj_de	off	off	off	off	INC: Self-employment income recalculation after financial help
pdiss_de	on	on	on	on	BEN: disability pension from stat. acc. Insurance (Rente der gesetzlichen Unfallversicherung)
tscer_de	on	on	on	on	SIC: employer social insurance contribution
tscee_de	on	on	on	on	SIC: employee social insurance contribution
tscse_de	on	on	on	on	SIC: self-employed social insurance contribution
tscpe_de	on	on	on	on	SIC: pensioner social insurance contribution
tscot_de	on	on	on	on	SIC: other social insurance contribution
bch00_de	on	on	on	on	BEN: child benefits (Kindergeld)
bencovidch_de	n/a	n/a	on	on	BEN: covid benefit for children (Kinderbonus)
bunct_de	on	on	on	on	BEN: unemployment benefits I (ALG I)(repetition of policy with order 8)
bhl_de	on	on	on	on	BEN: Sickness Benefits (Krankengeld der GKV, prvt. Pflegezusatz- oder Krankentagegeldversicherung)
bmact_de	on	on	on	on	BEN: maternity leave
bplct_de	on	on	on	on	BEN: parental leave
tinkt_de	on	on	on	on	TAX: capital income taxation
tin_de	on	on	on	on	TAX: income taxation (Einkommensteuer): taxable income
tinit_de	on	on	on	on	TAX: income taxation (Einkommensteuer): individual taxation
tinjt_de	on	on	on	on	TAX: income taxation (Einkommensteuer): joint taxation
bed_de	on	on	on	on	BEN: education benefits (BaFöG)
bho00_de	on	on	on	on	BEN: housing benefits (Wohngeld)
bunnc_de	on	on	on	on	BEN: unemployment benefits II (ALG II)

bsaot_de	on	on	on	on	BEN: social assistance: social benefits (Sozialgeld)
bsaoa_de	on	on	on	on	BEN: old-age social assistance (Grundsicherung im Alter)
bsa00_de	on	on	on	on	BEN: general social assistance (Sozialhilfe)
bchot_de	on	on	on	on	BEN: additional child benefits (Kinderzuschlag)
bched_de	on	on	on	on	BEN: child benefits: educational allowance (Bildungspaket)
output_std_de	on	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
output_std_hh_de	off	on	on	on	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

2.3 Policy switches

- Minimum Wage Adjustment (MWA), allowing the user to switch on/off the minimum wage simulation. The default for the baselines is off. See Section 2.4.1 for a detailed description of the minimum wage policy.

2.4 Social benefits

2.4.1 Minimum Wage (yem_*de*)

A minimum wage was introduced on 1 January 2015 in Germany. It applies to each individual aged at least 18 and it amounts to 8.50 euros per hour in 2015 and 2016 and was increased to 8.84 euros per hour in 2017 and 2018 and then further increased to 9.19 euros per hour in 2019 and to 9.35 euros in 2020. This increased further to 9.50 euros in 2021. Compulsory internships in the context of University education are excluded from the minimum wage.

The simulation of a minimum wage in EUROMOD is switched off in the baseline scenario for all years. It can be switched on with the Minimum Wage Adjustment (MWA) Extension (see Section 2.3). When switched on, a parameter for an hourly minimum wage, valid for all employees, must be specified. The policy then simulates minimum earnings based on the minimum wage and assigns the greater of minimum wage and actual earnings to the individual, for all months in the base year in which the individual was employed.

2.4.2 Child Benefits (*bch00_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

There are two groups of eligible children.[1] 1) Generally, eligible children can at maximum be aged 17. 2) The age limit is extended to 24 in case children are still in tertiary education and, until

[1] 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

2011, in case their income did not exceed a threshold (see Income Test). From 2012 on, the income limit has been replaced by a limit on hours worked by the child. If the child is disabled, and has been disabled since the age of 24 at least, no age limit applies. In case of parents living separately, the one with whom the child stays most of the time, or the one who bears the larger share of the maintenance, receives the benefits.

- ***Income Test***

N/a.

- ***Benefit Amount***

The benefit is paid monthly to one of the parents. The benefit amounted to 192 Euro for the first two children, 198 Euro for the third child, and 223 Euro for the fourth and all following children in 2017. In 2018 and the first half of 2019, benefits amounted to 194 Euro per month for the first two children, 200 Euro for the third child, and 225 Euro for the fourth and all following children. From July 2019 on, benefit amounts are further increased by 10 Euros per month and child, however, these changes will only be modelled from 2020 onward, since they enter into force after June 30 2019. From 1.01.2021 the benefit amounted to 219 Euro for the first two children, 225 euro for the third child and for the fourth and following children parents receive 250 Euro.

- ***EUROMOD Notes***

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

2.4.3 Unemployment Benefits I (*bunct_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

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

- ***Income Test***

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

children, and in the simulation benefits are first assigned to the children, too, and later aggregated at household level and assigned to the head.

- ***Benefit Amount***

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

- ***Benefit Duration***

The duration of entitlement to "unemployment benefits I" depends on the individual's age and number of months contributions were made in the previous 5 years. Generally, contributions made for 12 months entitle to six months of benefits, whereas benefits are paid for a maximum of 12 months for individuals who paid contributions for 24 months. People aged between 50 and 55 are eligible to a maximum of 15 months benefit receipt for 30 months of contributions. For individuals who are aged 55 or older, 16 months of contributions entitle to 8 months of receipt, 20 months of contributions entitle to 10 months of receipt, and 36 months of contributions entitle to 18 months. People aged 58 or older are entitled to 24 months of benefit receipt in case they contribute for 48 months.

Table 2.4.3 provides a summary of the benefit rules:

Table 2.4.3 Characteristics of the unemployment benefit

		2018-2021
Eligibility	Contribution period	Min of 12 months over the last 2 years
	Other conditions	Less than 65, able to work 15 hours per week, no receipt of old-age pension
	Eligibility of self-employed	n/a
Payment	Contribution base	Net (of income tax and employee SIC) earnings
	Basic amount	60% of previous net earnings for childless individuals and 67% of previous net earnings if with at least 1 child
	Additional amount	The health insurance contribution (tscot_s) is paid with the benefit
	Floor	n/a
	Ceiling	The ceiling is applied on previous gross earnings (EUR per months: 6,214 in 2017, 6,353 in 2018, 6,587 in 2019, 6,812 in 2020, 7022 in 2021)
Duration	Standard (in months)	6 months (if contributed for 12 months) up to 12 months (if contributed for 24 months)
	Special cases (in month)	8 months (if aged 55+ and contributed for 16 months), 10 months (if aged 55+ and contributed for 20 months) (other special cases are not simulated as entitlements exceeds 12 months)
Subject to	Taxes	Enters the 'progression clause' income list
	SIC	n/a

- ***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 and in receipt (*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 and 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.

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*), and a maximum of 15 hours worked per week (*lhw*). Now the entitlement basis is applied. As it is not observed, a proxy for it, which has been generated by inverting the benefit function for several contributory benefits, is applied (*i_ntpy*, also see Section 3.3.4). This proxy is applied for all individuals.

Based on the entitlement basis, the thresholds for additional earnings from employment are considered. For those individuals earning less than the threshold (165 euros per month), the benefit amounts result 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*).

2.4.4 Disability Pension from the Statutory Accident Insurance (*pdiss_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

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

- ***Income Test***

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

- ***Benefit Amount***

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

- ***EUROMOD Notes***

The main problem when simulating contributory disability benefits from the statutory accident insurance is that neither the contribution history, nor the entitlement basis that determines the benefit amount, nor the degree of disability, are observed in the data. While the contribution history and the disability level have been approximated with the help of other observed information, for the entitlement basis, more needs to be done. Pre-spell net employment income has been approximated by inverting the benefit function for several contributory benefits (*i_ntpy*, also see Section 3.3.4). Furthermore, in order to avoid double-counting of benefits, disability pensions from the accident insurance can only be simulated for individuals aged up to 65. The reason for this is that in the input dataset disability pensions from the accident insurance for individuals aged 65 and older are part of old-age benefits instead of disability benefits. The solution chosen to overcome this problem is that we use simulated disability benefits for individuals younger than 65 whereas we use observed disability benefits for those individuals older than 65.

2.4.5 Education Benefits (*bed_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

All students entering higher education before the age of 30 are generally eligible to education benefits. The age limit has been extended to 35 years for those students entering a Master (e.g. MA, MSc) programme.

- ***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 spouse and in most cases also parents. Moreover, it depends on the presence of siblings in the household as well as their age and income. Parents' income is not taken into account for students older than 30 years old and for students that have worked at least 5 years after the age of 18. The relevant income is generally the individual taxable income (*il_taxy*, added income from capital), added widows' and orphans' pensions, minus an allowance for social security contributions, minus actual taxes paid and minus an allowance for income-related expenses. The allowance for social security contributions differs depending on whether the contributor is compulsory insured by the pension insurance or not. Allowances have changed as of August 2019. These changes will be modelled from 2020 onward, since they enter into force after June 30th, 2019. For individuals with earnings from marginal employment, the allowance amounts to 37,0% for the years 2017-2019 and 37,7% in 2020 and 2021. For individuals that are insured by the statutory pension insurance, the allowance for them amounts to 21.2% for the years 2017-2019 and 21,3% in 2020. Last, for pensioners the allowance amounts to 15,0% for the years 2017-19 and to 15,5% in 2020 and 2021. In all cases, these allowances are capped by a maximum amount, which is 7,300, 13,000 and 22,400 euros for the years 2017-2019. In 2020 and 2021 the maximum amounts are 8,500, 14,600 and 25,500 euros, respectively. The allowance for income-related expenses corresponds to the allowance from personal income taxation (1,000 euros per year, see Section 2.6.1).

There are moreover lump-sum allowances on own income and parents' income. Allowance amounts have changed as of August 2019. These changes will be modelled from 2020 onward, since they enter into force after June 30 2019. If the parents of the recipient are married, the income allowance for them is up to 1,715€ per month for the years 2017-2019, 1,835€ in 2020 and €1,890 in 2021. For single parents, or parents married who live with a partner (not the mother or the father of the recipient), the allowance is 1,145€ per month for the years 2017-2019 and 1,225€ in 2020, and €1,260 in 2021. Moreover, the amount of 520€ per month for the years 2017-2019 and 555€ for 2020 and 570€ for 2021 is added to the income allowance of the recipient's parents for each non-eligible sibling. The student's own income allowance is 290€ per month for the years 2017-2020, plus 520€ for each own child for the years 2017-2019 and 555€ in 2020 and 570€ in 2021. All of these allowances will be changed again from August 2020 on. These changes will be modelled from 2021 onward, since they enter into force after June 30 2020. 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. The resulting relevant income is divided by the number of children eligible for education benefits.

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 7,500€ for the years 2017-2020 and 8,200€ for 2021, and for the spouse of a married student to 2,100 €, plus 2,100€ for each own child for the years 2017-2020. For 2021 this is 2,300€ for the spouse of a married student as well as 2,300€ for each own child.

- ***Benefit Amount***

Benefit amounts have changed as of August, 2019. The changes are modelled from 2020 onwards. The basic amount for university students who do not live with their parents is 649 euros per month for the years 2017-2019 and 744 euros in 2020 and 752€ in 2021. 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 on their own get an increased rate of 250 euros per month for the years 2017-2019 and 325 euros in 2020 and 2021. For non-university students living alone there are lower rates.

For recipients aged 25 and older, the basic rate is topped up by a lump-sum social insurance rate which is 86 euros per month for the years 2017-2019 and 109 euros per month in 2020 and 2021.

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. Since the year 2017 the benefit rate is topped up by 130 euros for each own child under the age of 10 years. From August 1, 2019 on an add-on of 140 euros is granted for children younger than 14 years. On August 1, 2020 this amount will be further increased to 150€. These changes are simulated from 2020 and 2021 on, respectively.

- ***EUROMOD Notes***

Education benefits for students are granted for two groups of students in Germany. The first group still lives with their parents. For this group, the relevant information for determining eligibility is (partly) observed, or can be estimated, i.e. their parents' income and wealth. The second group of students does not live with their parents. The receipt of education benefits for students living without their parents has been conditioned on observed positive education benefits. 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, for those students for which we observe the receipt of education benefits in the data, income and wealth of their parents 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 46 and 59 (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.

In the income test, also assets of the recipients and their parents are relevant. Imputed 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 3.3.5).

As explained above, all students entering university education before the age of 30 (or 35 in the case of Master studies) are eligible for education benefits. However, in EU-SILC data we do not observe when students have entered education. Therefore, eligibility is granted in terms of current age instead of age at the beginning of studies. Furthermore, education benefits are only paid for the regular number of semesters that a study programme is supposed to last. Given that we do not observe this information in EU-SILC data, EUROMOD ignores this eligibility criterion.

2.4.6 Long-Term Care Benefits from Statutory Accident Insurance (*pdiac_de*)

Starting from release H2.0+ onwards, this policy has been dropped. New information regarding the benefits included in EU-SILC has indicated that these benefits are not part of the input dataset.

2.4.7 Sickness Benefits (*bhl_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

Individuals need to fulfil the status of sickness, which is checked for in the simulation by conditioning on the variable for economic status (*les=8*), i.e. individuals report being in the status "sick or disabled". They should not be civil servants, and they should be employed for less than 12 months during the observed year (*liwmy<12*), which is supposed to indicate that there is a relevant spell of sickness. They are further categorised in either statutory or private health insurance, in self-employed and not self-employed, and in employed or unemployed.

- ***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 (*i_ntpy*, also see Section 3.3.4) and the threshold for statutory health insurance.

- ***Benefit Amount***

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

The resulting benefit amount moreover differs for those employed and those unemployed. It is also different for the self-employed. Generally, the health insurance has to pay the employee share of social security contributions on the benefit amount. For those who are not self-employed, contributions to statutory pension insurance for employees (9.3% in 2018-2021), to long-term care insurance (1.275% in 2017 and 2018 and 1.525% in 2019 - 2021), and to unemployment insurance (1.5% for the period 2017 and 2018 and 1.25% in 2019- 2021) 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 (18.7% in 2017 and 18.6% for the period 2018-2021). For the unemployed, the social security contributions are covered by the health insurance, and thus benefit amounts are not reduced.

- ***EUROMOD Notes***

Severity of the illness is not observed. Thus, for all entitled individuals only the minimum benefit level (70% for statutory health insurance and 80% for private health insurance) is assumed. The benefit entitlement basis is approximated differently for those employed and for those unemployed. For those employed, i.e. those who are not in receipt of unemployment benefits I (*bunct_s=0*), the general proxy for pre-spell income is applied (*i_ntpy*, also see Section 3.3.4).

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.

2.4.8 Unemployment Benefits II and Social Benefits (*bunnc_de and bsaot_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 (or whose contributory unemployment benefits do not entirely cover their basic needs). In addition, social benefits are supposed to capture people who live together with recipients of unemployment benefits II but who are themselves not eligible to them, typically children, in order to cover their needs as well.

- ***Definitions***

Unemployment benefits II are means tested with respect to income and wealth. Means are determined by the needs of the "community" (*Bedarfsgemeinschaft*), which includes – if applicable - the partner (married or not, but living in the same household) and dependent children up to 25 years of age. This is the unit of analysis.

- ***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. Dependent children need to be aged younger than 25, not be married and do not have earnings that cover their basic needs in order to be eligible to social benefits. They need to live in households receiving unemployment benefits II.

- ***Income Test***

Unemployment benefits II are means tested with respect to income and wealth of the unit of analysis. 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.

Relevant income: The income of the household that is relevant for the means test is disposable household income (*il_dispyc*), including market income from employment, pension income, most benefits (except for social assistance, housing benefits and additional child benefits), as well as social security contributions and income tax.[2]

Income allowances: There are allowances granted for earnings from employment. Benefits are unaffected by an additional (gross) employment income of 100 euros per month. Employment income between 101 and 1,000 euros reduces benefits at a rate of 80%, income between 1,000 and 1,200 euros at a rate of 90% (1,500 euros for households with children). Above this level, earnings are deducted at 100%.

Wealth allowances: Wealth allowances depend on the year of birth of each individual. The particular age categories for which different allowances apply changed in 2008. Thus, up to 2007 (incl.), wealth allowances were different for those born before and after 1948. From 2008 (incl) up to present, the wealth allowances defer for four groups: those born before 1948, those born between 1948 and 1958, those born between 1958 and 1963, and those born after 1963. For each

[2] 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 not simulated at all (*ils_pen, byr, ysv, bunot, buntr*), are applied in its observed amount.

individual, a basic allowance of 750€ per year applies. For each life year, the wealth allowance increases by 520€ for those born before 1948 and 150€ for those born thereafter. However, this allowance is at minimum 3100 € per year. The maximum amount the allowance can reach is 33,800 euros for those born before 1948; 9,750 euros for those born between 1948 and 1958; 9,900 euros for those born between 1958 and 1963; and 10,050 euros are granted for those born after 1963. The allowance for minors is 3,100 euros. In addition, for every eligible member of the "community" (usually the household) there is an allowance of 750 euros per person for basic purchases.

If the wealth of the household is greater than the permitted allowances, then the household loses its entitlement to this benefit. The relevant income of the household minus the income allowances cannot exceed the overall benefit amount described below for the household to receive the benefit. If the relevant income minus the allowances are smaller than the overall benefit amount, then the benefit amounts to the difference between the two.

- ***Benefit Amount***

The maximum benefit amount is made up of the basic benefit rates (which vary with age), actual housing and heating costs and, if applicable, health and long-term care social security contributions.

Table 2.4.8 Basic benefit rates (in Euro per month)

	2018	2019	2020	2021
Single Adult	416	424	432	446
Adult in a Couple (per Person)	374	382	389	401
Dependent child aged 0 to 5	240	245	250	283
Dependent child aged 6 to 13	296	302	308	309
Dependent child aged 14 to 17	316	322	328	373
Dependent child aged 18 to 25	332	339	345	357

In addition to the basic benefits, costs for actual housing and heating (as long as reasonable) are also covered.

This benefit also foresees benefits to cover additional needs of the household (*Mehrbedarfe*), which are granted in specific situations such as pregnancy, lone parenthood as well as disabilities and sicknesses. In EUROMOD, only benefits to cover additional needs because of lone parenthood are included (as there is no information on pregnancies and on medical and nutrition expenses incurred by people with disabilities or sicknesses which are not covered by the regular health and long-term care insurance). Additional benefits for lone parents amount from 12% to 60% of the single adult basic rate, depending on the number and ages of the dependent children living in the household. These rates have been constant over the years.

Table 2.4.8.2 provides a summary of the benefit rules:

Table 2.4.8.2 Characteristics of the unemployment assistance

		2018-2021
Eligibility	Contribution period	n/a
	Other conditions	Adults: aged 15+ and less than 65, able to work for at least 3 hours a day; children within the assessment unit: aged less than 25, not married and little/no earnings; assessment unit should fulfil an income and wealth test
	Eligibility of self-employed	The same as for employed
Payment	Contribution base	No contribution base. There is an income and wealth test. Income and wealth allowances are applied.
	Basic amount	Basic benefit rate (varies with age, see Table 2.4.8)
	Additional amount	Costs for actual housing and heating are covered as well as additional needs of the household due to lone parenthood
	Floor	n/a
	Ceiling	Employment income between 101 and 1,000 euros reduces benefits at a rate of 80%; between 1,000 and 1,200 euros at a rate of 90% (1,500 euros for households with children); above this level, at 100%
Duration	Standard (in months)	until eligibility no longer fulfilled
	Special cases (in month)	n/a
Subject to	Taxes	No
	SIC	No

- ***EUROMOD Notes***

As mentioned above, this benefit is meant to cover heating costs too. Given that we do not observe heating costs in the EUROMOD input database, we apply average heating costs by household size from the German Socio-Economic Panel.

Actual housing costs are covered by the benefit as long as they are reasonable. Given that housing costs vary a lot depending on the location of the flat, without further geographical information on where the household is located is not possible to apply a meaningful maximum. Therefore, in EUROMOD the totality of housing costs is covered for every recipient of this benefit.

2.4.9 Maternity Leave Benefits (*bmact_de*)

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

- ***Definitions***

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

- ***Eligibility Conditions***

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

- ***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 (*i_ntpy*, also see Section 3.3.4).

- ***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 2017 to 2021. 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.

- ***Subject to taxes/SIC***

Exempt but enters the progressivity clause (i.e. it is itself not taxed away, but contributes to determining which tax rate is applied to the taxable income).

- ***Take up***

Almost 100%.

- ***EUROMOD Notes***

In the simulation, the identification of eligible mothers suffers from the problem that eligible mothers cannot easily be identified *before* they gave birth. Eligibility conditions on female gender (*dgn=0*), being a parent, not working (*liwmy=0*), and the presence of dependent children aged one year or younger in the family. By the latter condition, on the one hand eligible mothers that did not give birth to their first child yet are excluded, although they should be included. But, on the other 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 (*i_ntpy*, also see Section 3.3.4), and current receipt of unemployment benefits I (*bunct_s*). Those who have either zero pre-spell income (*i_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 (*i_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, 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.

2.4.10 Parental Leave Benefits (*bplct_de*)

Parental-leave benefits were implemented in 2007 and substituted 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. The latest reform entered into force in July 2016 and allows parents the choice between the benefit the way it was defined up to then and the possibility to receive half the previous benefit but for a period twice as long. Given that there are not yet external figures on take-up of this new possibility and that it would require strong assumptions on the data in order to be programmed, this new possibility has not (yet) been programmed into EUROMOD.

- ***Definitions***

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

- ***Eligibility Conditions***

Parental-leave benefits are paid – in addition to child benefits -- for a time frame of up to 12 months following the birth of the child. Benefit duration can be prolonged for another two months if parents share parental-leave time such that each of them suspends work for at least two months. Alternatively to suspension, part-time work of up to 30 hours per week is allowed.

- ***Income Test***

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

- ***Benefit Amount***

The minimum level of parental-leave benefits is 300 euros per month, which is paid in case the recipient was unemployed before the child's birth or net income was below 300 euros. The maximum benefit level is 1,800 euros per month, which is paid if net income was 2,770 euros or more. In between, benefits generally amount to 67% of net income, considerably more for low income and slightly less for high incomes. These rates have been constant over the years 2017 to 2021. (When someone was in "kurzarbeit" due to COVID-19, this will not be taken into account).

- ***Subject to taxes/SIC***

Exempt from both SIC and taxes but enters the progressivity clause (i.e. it is itself not taxed away, but contributes to determining which tax rate is applied to the taxable income).

- ***Take up***

Very high (almost 100%, no concrete figures available).

- ***EUROMOD Notes***

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

Moreover, it is not observed who of the two parents is currently in receipt of benefits, the mother, or the father, even in case a receipt of the couple if observed. Therefore, the simulation differentiates between the cases that the mother works more hours than the father and the opposite situation. It is accounted for the fact that the mother is in receipt of parental-leave benefits for some months in any case, whereas the father can opt to take the father months or not. It is assumed that in case the mother is observed working more hours (*lhw*), than the father takes some of the father months so that the average joint income of the spouses is the relevant income for benefit entitlement. However, in case the father works more hours, which is the dominant case in the data, it is assumed that the mother is in parental leave most time of the year so that only her income determines the amount of parental leave benefits. The respective relevant pre-spell income is determined by the general proxy for pre-spell income for contributory benefits (*i_ntpy*, also see Section 3.3.4).

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

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

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

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

2.4.11 Housing benefits *(bho00_de)*

- ***Definitions***

- ***Housing benefits (*****Wohngeld*****) provide financial help for covering part of the costs of accommodation and are means-tested.Eligibility Conditions***

Eligibility is based on household income. Additionally, recipients of unemployment benefits II (*bunnc_s*), old-age social assistance (*bsaoa_s*) and basic social assistance (*bsa00_s*) cannot receive housing benefits (and vice versa). Some individuals may qualify for both benefits, in which case they have to decide for one of them.

- ***Income Test***

The relevant income for receiving housing benefits (Y in the formula below) is made up of all sources of gross income (including contributive benefits) with some deductions. Deductions amount, at least, to 6% of all gross earnings. The deduction goes up to 10% if either health and long-term care insurance contributions, or pension insurance contributions, or income taxes are paid. The deduction amounts to 20% for those individuals that pay health, long-term care and pension contributions, or for those that pay income taxes plus some kind of social security contributions. Finally, the deduction is 30% for those individuals that pay both taxes and all three kinds of social security contributions. Furthermore, the following quantities can be deducted in three cases: (1) 1500 Euros (1800 Euros from 2020 on) per year for each disabled person living in the household that has either the maximum degree of disability or is in need of home or inpatient care, (2) 1320 Euros per year per lone parent household, (3) 100 Euros per month per child under the age of 25 with own income.

- ***Benefit Amount***

The monthly benefit amount (in Euro) is calculated through the following formula: 1.15*[M-(a+b*M + c*Y)*Y], where M stands for the relevant housing rent, Y for the relevant income, and Z, a, b, and c are parameters that vary according to household size and have stayed constant for the years 2017-2019 and were changed in 2020.

The relevant housing rent, M, is computed as the actual rent as long as it does not exceed a maximum determined by law, which varies across municipalities. These maximum amounts were constant for the years 2017-2019 and were increased in 2020.

If the formula above yields less than 10 Euro per month, no housing benefits are paid.

- ***EUROMOD Notes***

The housing benefits law defines six possible categories of rent prices (from very low rents to very high rents) for the years 2017-2019 and seven possible categories of rent prices in 2020. Each municipality determines which category reflects its rent prices. Due to missing regional information in SILC, the model assumes that the maximum rent eligible to be financially supported by the housing benefits is that of the median price category.

In order to grant the deduction in the case of disability, the model requires a disability of minimum 80%. This is meant to account for the formulation used in the law "highest degree of disability or in need of home or inpatient care".

Both housing benefits (*bho00_s*) and additional child benefits (*bchot_s*) cannot be received simultaneously with either unemployment benefits II (*bunnc_s*), old-age social assistance (*bsaoa_s*) or basic social assistance (*bsa00_s*). However, some individuals – especially those with own low market earnings and/or with children – may qualify for both, in which case the model assumes individuals decide for the alternative that yield the highest financial help. This correction is carried out at the end of the additional child benefits policy, *bchot_de*.

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

Social assistance for old-age and for reduced ability to work ensures the basic needs for living for older people and for those individuals who are permanently fully incapacitated for work. This benefit is closely related to unemployment benefits II – as the benefit amounts are identical under both regimes – but eligibility criteria and income test are stricter under social assistance.

- ***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 concept of "community" (*Bedarfsgemeinschaft*) used for unemployment benefits II (*bunnc_de*).

- ***Eligibility Conditions***

Old-age social assistance: 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 not receiving unemployment benefits II (*bunnc_s=0).*

Social assistance for reduced ability to work: Individuals need to be at least 18 but not older than 65 and be disabled and not working *(lhw=0 & liwmy=0*).

- ***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 and are detailed below.

Relevant income: Disposable income (including market income from employment, pension income, most benefits and accounting for social security contributions and income tax), excluding unemployment benefits II, additional child benefit, housing benefits and disability benefits for war victims.

Income allowances: 30% on earned income, up to 50% of the basic benefit rate (see benefit amount below).

Wealth allowances: From 2017 onwards, the wealth allowance has been raised to 5000€ per adult in the household and 500€ per child (irrespective of their ages).

If the wealth of the household is greater than the permitted allowances, then the household loses its entitlement to this benefit. The relevant income of the household minus the income allowances cannot exceed the overall benefit amount described below in order for the household to receive the benefit. If the relevant income minus the allowances are smaller than the overall benefit amount, then the benefit amounts to the difference between the two.

- ***Benefit Amount***

Benefit amounts are exactly the same as under Unemployment Benefits II (see Section 2.4.8.).

The maximum benefit amount is made up of the basic benefit rates (which vary with age), actual housing and heating costs and, if applicable, health and long-term care social security contributions.

Table 2.4 Basic benefit rates (in Euro per month)

	2018	2019	2020	2021
Single Adult	416	424	432	446
Adult in a Couple (per Person)	374	382	389	401
Dependent child aged 0 to 5	240	245	250	283
Dependent child aged 6 to 13	296	302	308	309
Dependent child aged 14 to 17	316	322	328	373
Dependent child aged 18 to 25	332	339	345	357

In addition to the basic benefits, costs for actual housing and heating (as long as reasonable) are also covered.

This benefit also foresees benefits to cover additional needs of the household (*Mehrbedarfe*), which are granted in specific situations such as pregnancy, lone parenthood as well as disabilities and sicknesses. In EUROMOD, only benefits to cover additional needs because of lone parenthood are included (as there is no information on pregnancies and on medical and nutrition expenses incurred by people with disabilities or sicknesses which are not covered by the regular health and long-term care insurance). Additional benefits for lone parents amount from 12% to 60% of the single adult basic rate, depending on the number and ages of the dependent children living in the household. These rates have been constant over the years.

- ***EUROMOD Notes***

As mentioned above, this benefit is meant to cover heating costs too. Given that we do not observe heating costs in the EUROMOD input database, we apply average heating costs by household size from the German Socio-Economic Panel.

Actual housing costs are covered by the benefit as long as they are reasonable. Given that housing costs vary a lot depending on the location of the flat, without further geographical information on where the household is located is not possible to apply a meaningful maximum. Therefore, in EUROMOD the totality of housing costs is covered for every recipient of this benefit.

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. Income test and benefit amounts are exactly the same as under social assistance for old-age and for reduced ability, only the eligibility conditions differ.

- ***Definitions***

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

- ***Eligibility Conditions***

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

- ***Income Test***

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 and are detailed below.

Relevant income: Disposable income (including market income from employment, pension income, most benefits and accounting for social security contributions and income tax), excluding unemployment benefits II, additional child benefit, housing benefits and disability benefits for war victims.

Income allowances: 30% on earned income, up to 50% of the basic benefit rate (see benefit amount below).

Wealth allowances: From 2017 onwards, the wealth allowance has been raised to 5000€ per adult in the household and 500€ per child (irrespective of their ages).

If the wealth of the household is greater than the permitted allowances, then the household loses its entitlement to this benefit. The relevant income of the household minus the income allowances cannot exceed the overall benefit amount described below in order for the household to receive the benefit. If the relevant income minus the allowances are smaller than the overall benefit amount, then the benefit amounts to the difference between the two.

- ***Benefit Amount***

Benefit amounts are exactly the same as under Unemployment Benefits II (see Section 2.4.8.).

The maximum benefit amount is made up of the basic benefit rates (which vary with age), actual housing and heating costs and, if applicable, health and long-term care social security contributions.

Table 2.5 Basic benefit rates (in Eur per month)

	2018	2019	2020	2021
Single Adult	416	424	432	446
Adult in a Couple (per Person)	374	382	389	401
Dependent child aged 0 to 5	240	245	250	283
Dependent child aged 6 to 13	296	302	308	309
Dependent child aged 14 to 17	316	322	328	373
Dependent child aged 18 to 25	332	339	345	357

In addition to the basic benefits, costs for actual housing and heating (as long as reasonable) are also covered.

This benefit also foresees benefits to cover additional needs of the household (*Mehrbedarfe*), which are granted in specific situations such as pregnancy, lone parenthood as well as disabilities and sicknesses. In EUROMOD, only benefits to cover additional needs because of lone parenthood are included (as there is no information on pregnancies and on medical and nutrition expenses incurred by people with disabilities or sicknesses which are not covered by the regular health and long-term care insurance). Additional benefits for lone parents amount from 12% to 60% of the single adult basic rate, depending on the number and ages of the dependent children living in the household. These rates have been constant over the years.

- ***EUROMOD Notes***

As mentioned above, this benefit is meant to cover heating costs too. Given that we do not observe heating costs in the EUROMOD input database, we apply average heating costs by household size from the German Socio-Economic Panel.

Actual housing costs are covered by the benefit as long as they are reasonable. Given that housing costs vary a lot depending on the location of the flat, without further geographical information on where the household is located is not possible to apply a meaningful maximum. Therefore, in EUROMOD the totality of housing costs is covered for every recipient of this benefit.

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. (“Kinderzuschlag”)

- ***Definitions***

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

- ***Eligibility Conditions***

To be eligible, dependent children need to be eligible to child benefits (*bch00_s>0*), be aged 25 or younger, and in addition be unmarried and live in the same household with their parents. Note how this condition varies from the eligibility condition at child benefits, where dependent children may live in an own household.

- ***Income Test***

The level of the additional child benefits 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 a 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. Starting from 2020, for each euro of income above the previous maximum amount, the additional child benefits are lowered by 0.45 euros instead of being dropped completely like before.

For the period 2016-2019, this lower income threshold of the income test is a lump-sum amount of 600 euros per lone parent and 900 euros per couple. In 2020 the lower income threshold stays the same. As mentioned before, with additional income above the upper threshold the additional child benefits will be reduced gradually. The respective upper limit is the amount equivalent to the basic benefits of the parents under Unemployment Benefits II plus the number of children multiplied by the maximum benefit amount (170 euros per month for the period 2017-2019 and 185 euros starting from July 1, 2019, which will be implemented from 2020 on). 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 and whether it is a lone/couple parent household.

Table 2.6 reports these coefficients.

Table 2.6 Proportion of housing expenses which are deemed to cover parents' needs (BMFSFJ 2020)

	2018	2019	2020	2021
Lone parent with 1 child	0.7725	0.7710	0.77	0.77
Lone parent with 2 children	0.6293	0.6273	0.63	0.63
Lone parent with 3 children	0.5309	0.5288	0.53	0.53
Lone parent with 4 children	0.4592	0.4570	0.46	0.46
Lone parent with 5+ children	0.4045	0.4024	0.40	0.40
Couple parents with 1 child	0.8316	0.83160	0.84	0.83
Couple parents with 2 children	0.7117	0.7183	0.72	0.71
Couple parents with 3 children	0.6220	0.6296	0.63	0.62
Couple parents with 4 children	0.5524	0.5604	0.56	0.55
Couple parents with 5 children	0.4969	0.5049	0.50	0.50

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

Starting from 2020, the eligibility for families to receive additional child benefits was widened. Now, also families, who only lack up to 100 euros to prevent being dependent on benefits like unemployment benefits II or social benefits, after accounting for their labour income, child benefits, additional child benefits and if applicable housing benefits, are eligible to additional child benefits.

- ***Benefit Amount***

Benefits were 170 euros per month and child until 30.06.2019 and have been increased to €185 on 01.07.2019 (which is modelled in the system of 2020). It is paid if households pass the income test. It is reduced by the family's income as far as it exceeds the lower threshold for benefit eligibility, by a fraction of 50% (45% starting from 2020). 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. Starting from 2020 the additional child benefit is not dropped entirely when the income reaches an upper threshold, instead it is further reduced by a fraction of 45% of the family's income until it equals zero.

- ***EUROMOD Notes***

When benefit amounts are simulated, receipt is conditioned on receipt of child benefits (*bch00_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 (170 euros for the years 2017-2019 and 185 euros in 2020) is assigned for each dependent child in the household. Relevant assets, after accounting for allowances, and averaged per month, are subtracted from benefit amounts.

In addition, the simulation of this policy includes an adjustment mechanism that checks whether households are better off receiving any combination of *bunnc_s*, *bsaoa_s* or *bsa00_s* or receiving any combination of *bho00_s* and *bchot_s*. Households within a determined income range – usually households with children - may qualify for both kinds of state assistance but necessarily need to choose one. The program here assumes that households do choose the option that yields the highest financial gain and sets the benefit amount of the other option to zero. In reality, households that do qualify for both systems are free to choose the system they like the most (for instance, in terms of reporting requirements) and might not choose the best financial option.

2.4.15 Educational Allowance (*bched_de*)

- ***Definitions***

The educational allowance is part of a broader category of benefits (the so-called *Bildungs- und Teilhabepaket*) which aim at improving the educational and cultural chances of children living in households who receive means-tested benefits. Most of these benefits are in-kind benefits, which are not simulated in EUROMOD.

- ***Eligibility Conditions***

All children in school age living in households who receive any of the following means-tested benefits: bunnc, bsaot, bsa00, bsaoa, bho00, bchot.

- ***Income Test***

None, but eligibility depends on the household receiving means-tested benefits.

- ***Benefit Amount***

The benefit amount is 100 Euro per year for each child in school age. From 1 August 2019 onwards, the benefit amount will amount 150 Euro per year (this will be modelled for 2020 policies, as it will be implemented after the 30th June).

2.4.16 Wage Compensation Scheme (bwkmcee_de)

- ***Definitions***

The wage compensation scheme (Kurzarbeitergeld) compensates wage losses from unvoluntary reduced work hours. It is a contributory benefit from the social security unemployment insurance. This benefit is paid for a maximum of 12 months.

- ***Eligibility Conditions***

All dependent employees with earnings above the minijob threshold whose employers apply for reduced work hours.

- ***Income Test***

None.

- ***Benefit Amount***

In principle, the benefit amount is 60% of the difference in net earnings (gross earnings minus taxes and social security contributions). For individuals with children, the benefit amount is 67%.

Due to the corona crisis in 2020, the replacement rate has been increased for individuals who receive wage compensation for more than 4 months, provided that the hours reduction is at least 50% of their original work hours. Thus, the replacement rate amounts to 70% in the fifth and sixth months (77% for parents) and to 80% from the seventh month onwards (87% for parents).

- ***EUROMOD Notes***

Given that the benefit replaces the difference in net earnings, policy “bwkmcee_de” computes net earnings under the observed earnings and under the simulated reduced hours. To this end, Euromod uses a simplified tax tariff and SSC computations (which is how state agencies compute the benefit amount).

This policy can only produce results if the model is run in combination with the LMA add-on. The individuals that are selected to undergo transitions to monetary compensation schemes are defined in the TransLMA_de policy, which is switched on automatically by the add-on. For more information about the modelling of labour market transitions please consult the *‘Simulating labour market transitions in EUROMOD’* document.

2.4.17 Covid-related one-off child bonus (bencovidch_de)

- ***Definitions***

The child bonus is a one-off benefit paid to families with children.

- ***Eligibility Conditions***

All children eligible for child benefits (bch00_s) are eligible for this benefit.

- ***Income Test***

None. However, in contrast to the usual child benefits (bch00_s), the child bonus is not deducted from any means-tested benefits.

- ***Benefit Amount***

This benefit amounts to one-off 300 Euro per child.

- ***EUROMOD Notes***

This benefit is saved in variable bchls_s.

2.4.18 Covid-related one-off benefit for the self-employed (bencovidse_de)

- ***Definitions***

This is a one-off payment aimed to help self-employed to pay for current expenses during the lock-down and, therefore, compensating parts of operating losses. This payment does not need to be paid back to the government.

- ***Eligibility Conditions***

Self-employed individuals with firms up to 10 employees can apply for this payment.

- ***Income Test***

None. However, self-employed individuals need to assure/submit proof of being in severe financial distress as a consequence of the lockdown.

- ***Benefit Amount***

Individuals can apply for a maximum of 9,000 Euro in firms up to 5 employees and for a maximum of 15,000 Euro in firms up to 10 employees.

- ***EUROMOD Notes***

Given that we do not have information on the individual amount of operating losses, i.e. the decrease in self-employment income, the benefit is turn off by default. In case this benefit is turned on, a random variable determines whether a self-employed individual applies for this funding. This benefit is then saved in variable bwkmcse_s. For individuals applying for this benefit, their income is reduced downwards in policy "yseadj_de".

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 Tables 2.7 to 2.13.

In Table 2.7, 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 2.7 Social Security: Contribution Rates[1] and Assessment Ceilings

	2018	2019	2020	2021
Statutory pension insurance (*gesetzliche Rentenversicherung*)				
Contribution rate	18.6	18.6	18.6	18.6
Assessment ceiling (western Germany), € per month	6,500	6,700	6,900	7,100
Assessment ceiling (eastern Germany) , € per month	5,800	6,150	6,450	6,700
Average Assessment ceiling [2]	6,353	6,587	6,812	7,022
Statutory health insurance (*gesetzliche Krankenversicherung*)				
Contribution rate[3]	15.6	15.5	15.7	15.8
Assessment ceiling, euros per month	4,425	4,537.5	4,687.5	4837,5
Threshold for compulsory insurance, euros per month (*Versicherungspflichtgrenze*)	4,950	5,062.5	5,212.5	5362,5
Statutory long term care insurance (*soziale Pflegeversicherung*)	2.55	3.05	3.05	3.05
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)	0.50	0.50	0.50	0.50
Statutory unemployment insurance (*ges. Arbeitslosenversicherung*)	3.00	2.50	2.40	2.40
Statutory accident insurance (*gesetzliche Unfallversicherung*)	1.60	1.60	1,60	1.60

Notes: [1] Contribution rates refer to the entire rate paid, i.e. the rate paid for by the employer, plus the rate paid for by the employee. [2] Weighted average with the census population shares. [3] From 2015 on, average additional rates have been assumed (these amount to 1.1% in 2017, 1.0% in 2018, 0.9% in 2019 and 1.1% in 2020).

Table 2.8 tabulates contribution rates to the statutory pension insurance over the years 2017 to 2020, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 2.8 Social contributions: Statutory Pension Insurance (Rates in %)

	2018	2019	2020	2021
Employer Contribution Rate				
Regular Employment (and Midijobs)	9.30	9.30	9.30	9.30
...Minijobs	15.00	15.00	15.00	15.40
Employee Contribution Rate	9.30	9.30	9.30	9.30
Self-employed (in certain services) Contribution Rate[1]	18.60	18.60	18.60	18.60
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 2.9 tabulates contribution rates to the statutory health insurance over the years 2017 to 2020, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners. Starting from 2015 onwards, public health insurance companies (*gesetzliche Krankenkassen*) are able to set company-specific additional contributions. These additional contributions are paid solely by the insured person (i.e. employees, self-employed and pensioners, but not their employers) in the period until 2018 and paid equally by the employer and the employee since 2019. EUROMOD assumes for each year the average additional contribution as published by the German government. These amount to 1.1% in 2017, 1.0% in 2018,0.9% in 2019 and 1,1% in 2020.

Table 2.9 Social contributions: Statutory Health Insurance (Rates in %)

	2018	2019	2020	2021
Employer Contribution Rate				
Regular Employment (and Midijobs)	7.30	7.30	7.30	7.30
...Minijobs	13.00	13.00	13.00	13.00
Employee Contribution Rate	8.30	8.20	8.40	8.40
Self-employed Contribution Rate[1]	15.60	15.50	15.70	15.90
Pensioner Contribution Rate	8.30	7.75	7.85	7.95

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 2.10 tabulates contribution rates to the statutory long-term care insurance over the years 2017 to 2020, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 2.10 Social contributions: Statutory Long-term Care Insurance (Rates in %)

	2018	2019	2020	2021
Employer Contribution Rate				
Regular Employment (and Midijobs)	1.275	1.525	1.525	1.525
Minijobs	0.000	0.000	0.000	0.000
Employee Contribution Rate				
Regular Rate	1.275	1.525	1.525	1.525
Additional Contribution Rate (for childless older 23)	0.250	0.250	0.250	0.250
Self-employed Contribution Rate[1]	-	-	-	-
Pensioner Contribution Rate				
Regular Rate	2.550	3.050	3.050	3.050
Additional Contribution Rate (for childless older 23)	0.250	0.250	0.250	0.250

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

Table 2.11 tabulates contribution rates to the statutory unemployment insurance over the years 2017 to 2020, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 2.11 Social contributions: Statutory Unemployment Insurance (Rates in %)

	2018	2019	2020	2021
Employer Contribution Rate				
Regular Employment (and Midijobs)	1.50	1.25	1.20	1.20
...Minijobs	0.00	0.00	0.00	0.00
Employee Contribution Rate	1.50	1.25	1.20	1.20
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 2.12 tabulates contribution rates to the statutory accident insurance over the years 2017 to 2020, differentiated by contribution rates for employers (for regular employment and for minijobs), employees, the self-employed, and pensioners.

Table 2.12 Social contributions: Statutory Accident Insurance (Rates in %)

	2018	2019	2020	2021
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.[3]

[3] 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.

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 1.0 percentage points lower (until 2018), 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 2.13.

Table 2.13 Employers' Social Security Contribution Rates (in %)

	2018	2019	2020	2021
1. Pension social insurance (*tscerpi_s*)	9.300	9.300	9.300	9.300
2. Compulsory statutory health insurance (*tscerhl_s*)	7.300	7.300	7.300	7.300
3. Statutory long-term care insurance (*tscerci_s*)	1.275	1.525	1.525	1.525
4. Statutory unemployment insurance (*tscerui_s*)	1.500	1.250	1.200	1.200
5. Statutory accident insurance (*tscerac_s*)	1.600	1.600	1.600	1.600
6. Compulsory statutory health insurance (Minijob) (*tscerhl_s*)	13.000	13.000	13.000	13.000
7. Statutory pension insurance (Minijob) (*tscerpi_s*)	15.000	15.000	15.000	15.000
Total (*tscer_s*)	**20.975**	**21.425**	**20.925**	**20.925**
Total (Minijob) (*tscer_s*)	**28.000**	**28.000**	**28.000**	**28.000**

For mini jobs, employers have to pay contributions to statutory health and pension insurance. In 2017, the employer paid a lump sum contribution rate of 31.29%, which was reduced to 31.2% in 2018 and to 31.15% in 2019 and 2020 (starting from June 1, 2019). It consists of health insurance (13ppt), pension insurance (15ppt), a lump sum for payroll tax, solidarity surcharge, and church tax (2ppt), and certain levies (1.29ppt in 2017, 1.2ppt in 2018, and 1.15ppt in 2019 and 2020) (see Minijob-Zentrale 2019). 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. 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 2.14. 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 levied on fictitious earnings and are faded in until they reach the full rates at a gross wage of €850 (€1300 from 01.07.2019 on, which will be modelled from 2020 onward). Fading-in of social contributions is determined by population-average social contribution rates (factor 0.7509 in 2017, 0.7547 in 2018, 0.7566 in 2019 and 0.7547 in 2020). The fictitious earnings are based on the following formula (since Jan 2013):

$$FE = R * Mini + \left(\left(\frac{Midi}{Midi - Mini}\right) - \left(\frac{Mini}{Midi - Mini}\right) * R\right) * (E - Mini),$$

where FE stands for fictitious earnings, R is the population-average social contribution rate, $Midi$ is the midi job threshold (of EUR 850 per month until June 2019 and EUR 1,300 starting from July 2019), $Mini$ is the mini job threshold (of EUR 450 per month) and E are actual earnings.

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 1.3 for more details on these thresholds). In case of private health insurance, an average contribution is imputed for all employees, for whom income exceeds the threshold. The imputed mean contribution is the average contribution to private health insurance, paid for by employees in the SOEP data.

Table 2.14 Employees' Social Security Contribution Rates (in %)

	2018	2019	2020	2021
1. Compulsory statutory pension insurance (*tsceepi_s)*	9.3000	9.3000	9.3000	9.3000
2. Compulsory statutory health insurance *(tsceehl_s)*	8.3000	8.200	8.4000	8.6000
3. Statutory long-term care insurance *(tsceeci_s)*	1.2750	1.5250	1.5250	1.5250
4. Add. LTC contribution: childless older 23 *(tsceeci_s)*	0.2500	0.2500	0.2500	0.2500
5. Statutory unemployment insurance *(tsceeui_s)*	1.5000	1.2500	1.2000	1.2000
6. Statutory accident insurance *(tsceeac_s)*	0.0000	0.0000	0.0000	0.0000
7. Contributions factor for fading-in at Midi Jobs *(tsceehl_s)*	0.7547	0.7566	0.7547	0.7509
Total (tscee_s)	**20.625**	**20.075**	**20.125**	**21.1509**

2.5.3 Self-Employed Social Contributions (*tscse_de*)

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

Thus, only contributions to the statutory pension insurance and to statutory as well as private health insurance have been simulated for the self-employed. Mandatory contributions to the statutory pension insurance have been limited to those specific groups obliged to contribute, i.e. eligibility to pension insurance contribution is restricted to working either in education services, or in health services (*lindi*=10 or *lindi*=11), assuming that all income from self-employment in these services is subject to mandatory contributions to the statutory pension insurance. It is assumed that those obliged to contribute have to pay the entire rate (18.7% in 2017 and 18.6% in 2018-2020).

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 2.15 Self-employed Social Security Contribution Rates[1] (in %)

	2018	2019	2020	2021
1. Compulsory statutory pension insurance (*tscsepi_s)*	18.6	18.6	18.6	18.6
2. Compulsory statutory health insurance (*tscsehl_s*)	15.6	15.5	15.7	15.9
Total *(tscse_s)*	**34.2**	**34.1**	**34.3**	**34.5**

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

Self-employed with income from self-employment (*yse*) below the threshold for statutory health insurance, who do not report to be employees or civil servants, are assumed to contribute *voluntarily* to the statutory health insurance. They have to pay double the rate of employees as they have to pay the employer's share, too. For them, the income base that determines the contribution is the sum of income from self-employment, income from capital, and income from renting and leasing. Since 2009, there is a minimum and a maximum amount for this income.

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 EUROMOD simulations, average contributions to private health insurance by the self-employed have been imputed. These averages are taken from the SOEP micro data.

Contribution rates for self-employed in the statutory systems are tabulated in Table 2.15. Income thresholds and contributions have *not* been adjusted according to the actual number of months spent in employment (*yemmy*) during the year, in order to account for the fact that income from self-employment is distributed highly unevenly over the year. Unit of analysis is the individual.

2.5.4 Pensioner Social Contributions (*tscpe_de*)

Pensioners only have to contribute to the health insurance and to long-term care insurance. Depending on their pension income, they are assumed to be either insured compulsorily in the statutory health and thereby also the long-term care insurance, or in the respective private insurances (see the thresholds above). If pensioners are insured in the statutory insurances, they must pay 7.95% for health insurance and 3.05% for long-term care insurance in 2021. Accordingly to employees, childless pensioners, born after 1939 and older than 23, have to pay an add-on of 0.25% to long-term care insurance. The rates are tabulated in Table 2.16.

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 2.16 Pensioners' Social Security Contribution Rates (in %)

	2018	2019	2020	2021
1. Compulsory statutory health insurance *(tscpehl_s)*	8.30	7.75	7.85	7.95
2. Statutory long-term care insurance *(tscpeci_s)*	2.55	3.05	3.05	3.05
3. Additional LTC contribution: childless older 23 *(tscpeci_s)*	0.25	0.25	0.25	0.25
Total *(tscpe_s)*	**11.10**	**11.05**	**11.15**	**11.25**

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.

2.5.5 Other Social Contributions (*tscot_de*)

Individuals who do not fall into the categories employees, self-employed and pensioners and who are not family insured (*familienversichert*, see Section 1.3) are required by law to contract a health and long-term care insurance. These individuals are free to choose between public and private insurances. In EUROMOD it is assumed these individuals are publicly insured with the lowest possible health insurance contribution (as they have no or very low earnings). That is computed as the regular contribution rates for health and long-term care insurances for both employers and employees, which are then applied to a fictional minimum monthly income which is determined by the government each year (i.e. set by legislation) and deemed necessary to cover the most basic needs. Students who are older than 25 are offered a special – cheaper – contribution amount to the health and long-term care insurance. The students' contribution is also set by legislation by the government. Table 2.17 tabulates the fictional minimum monthly amount to which the regular contribution is applied and the special contribution amount for students older than 25.

Table 2.17 Minimum health and long-term care insurance contributions (in Euro per month)

	2018	2019	2020	2021
1. Fictional minimum monthly income	1015	1038.33	1061.67	1096.67
2. Contribution of students older than 25	86	92	108.7	106.56

Civil servants or the partners of civil servants are not liable for the contribution.

The following benefits cover the contribution (*tscot_s*): (most of) the old-age (*poa*) and disability benefits (*pdi*), Unemployment Benefits I (*bunct_s*), sickness benefits (*bhl_s*), parental leave benefits (*bplct_s*), Unemployment Benefits II (*bunnc_s*), social assistance for old-age and for reduced work ability (*bsaoa_s*) and general social assistance (*bsa00_s*). If the person or their family receive any of these benefits, then the contribution is set to zero (because the state pays the contribution).

Education benefits (*bed_s*) also cover the contribution. If a student is liable for the contribution, then the benefit amount is increased to cover the tscot_s amount. *Tscot_s* is also taken into account when calculating the relevant income for the means test of housing benefits (*bho00_s*) and additional child benefits (*bchot_s*), and it is (at least partially) covered by the benefits to the extent that the contribution lowers the relevant income for the means test.

- ***EUROMOD Notes***

If a person cannot afford to pay the contribution but they do not qualify for any benefit covering it (e.g. because of too much wealth, or because they have not claimed the benefits they are entitled to), then they are obliged to sell part of their wealth to pay for the contribution. Such behavioural response is complicated to model (e.g. there can be feedback effects to the level of income tax/ benefit entitlement). Thus, at the expense of not modelling accurately the contribution policy, we assume that if the family's net income is less than the contribution, the person would not pay it (or they have sold part of their wealth, paid for the contribution and broke even w.r.t net income).

2.6 Personal income tax

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

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

2.6.1 Taxable Income (*tin_de*)

In this policy, taxable income is derived. First of all, parameters for the tax schedule, as well as for allowances and deductions are defined. Then, income from the various sources, as far as it is taxable, is collected (see Table 2.18). 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.

Table 2.18 Determination of taxable income according to German Income Tax Law (§ 2 EStG)

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

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

- ***Tax Base***

Income from employment, from self-employment, from property,[4] from other sources, and income in kind is entirely taxable and thus added up as observed (*il_taxy*). Since 2005, income

[4] 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 2017 to 2020. The change at the taxation of capital income does not apply to income from property.

from pensions is only taxable with a pre-defined share, which depends on the (calendar) 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.

- ***Tax Allowances***

Then, various allowances and deductions, which are assessed at the individual level, are deducted from "taxable income before allowances". Below there is an explanation of all simulated allowances and deductions.

a) Allowance on income from pensions *(Rentenfreibetrag)* (EUROMOD variable tintape_s)

The tax treatment of pension income depends on the year in which each individual enters retirement. Given that information on retirement entry is not available, the simulation of this allowance assumes that individuals have entered retirement at age 65. For those individuals for whom we observe pension income at a younger age in the input data, we assume that they have entered retirement in each policy year. The amount of the allowance on pension income also depends on the concrete source:

- pensions from statutory sources (poass, poa00, poaps, poapu): for those entering retirement in 2005 or before, the allowance amounts to 50% of their pension. Every year, this rate diminishes by 2 percentage points (e.g. for those entering retirement in 2020, the allowance amounts to only 20% of their pension).
- pensions for civil servants (poacs): for those entering retirement in 2005 or before, the allowance amounts to 40% of their pension, capped at a maximum of 3,000 Euros per year. Every year, this rate diminishes by 1.6 percentage points (e.g. for those entering retirement in 2020, the allowance amounts to only 16.0% of their pension, capped at a maximum of 1,200 Euro per year).
- private pensions (ypp): under the assumption that all individuals enter retirement at age 65, the allowance on private pensions amounts to 82% and has stayed constant over the years.

b) Tax-exemption from Minijob earnings (EUROMOD variable tintcly_s)

Earnings from Minijobs (i.e. dependent employment paying up to 450 Eur per month) are tax exempt.

c) Allowance on income from the elderly (*Altersentlastungsbetrag*; EUROMOD variable tinta00_s)

This allowance applies to all income sources with the exception of pension income received by people aged 65 and older. The amount of the allowance depends on the individuals' year of birth and decreases the younger individuals are. For each cohort, the allowance is calculated as a percentage of income, capped at a maximum.

d) Deduction of income-related expenses (*Werbungskostenpauschale*; EUROMOD variable tintaee_s)

There is a lump-sum allowance of 1,000 euros per year that is applied in case income from employment (yem) exceeds 1,000 euros and the individual does not claim higher expenses. In EUROMOD only this lump-sum allowance is simulated, which has stayed constant over the period 2017-2020. This decision is likely to undersimulate the deduction of income-related expenses for certain groups of people, such as those with a long commute to work whose costs exceed the 1,000 euros per year. Unfortunately, there is no information available which could be used to simulate this deduction more accurately.

e) Allowance on earnings from agriculture (EUROMOD variable tintaag_s)

There is also a tax allowance for tax-payers in the agriculture and forestry sector. It amounts to 900 euros per year for a single person (1,800 euros for couples), but it is only granted in case total income from employment does not exceed 30,700 euros per year (61,400 euros for couples). This allowance was constant over the years.

f) Allowance for lone parents (*Entlastungsbetrag für Alleinerziehende*; EUROMOD variable tintalp_s)?

There is an allowance for lone parents which amounted to 1,908 Eur/year for the period 2017-2019. For years 2020 and 2021, this allowance amounts to 4008 Eur/year due to Corona. In addition, the allowance is further increased by 240 Eur/year for each additional child in the household.

g) Deduction of special expenses (EUROMOD variable tintapv_s)

Deductions of old-age expenses are made up of the sum of two components: one based on the contributions made to the pension insurance and one based on the contributions made to health and long-term care insurance. The first component is computed as follows in two steps: first, all contributions (including employers' contributions) made to the pension insurance up to a maximum, which changes every year (23,362 Eur/year in 2017; 23,712 Eur/year in 2018; 24,305 Eur/year in 2019 and 25,046 Eur/year in 2020, and 25,787 Eur/year in 2021), are computed. Then, the allowance is computed as a percentage of this amount, which increases by 2 percentage points every year (i.e. was 88% in 2019; 90% in 2020; etc), minus the employer's contribution. The second component consists of all contributions made to health and long-term care insurance, regardless of the (non-) employment status of individuals. Until 100% in 2025. Then these special expenses are completely tax free.

h) Deduction of childcare expenses (EUROMOD variable tintace_s)

Parents also can deduct two thirds of their childcare expenses up to a maximum of 4,000 Eur/year. Given that we do not have any information on actual childcare expenses, EUROMOD simulates the totality of the deduction for working parents with children up to the age of 12 who attend pre-school or primary school combined with paid childcare. For couple parents, the deduction is only simulated if both parents work. This is no part of the policy but rather a calibration of the simulation, as families with a stay-home parent are likely to use less hours of paid childcare.

i) Deduction of alimonies (EUROMOD variable tintasp_s)

Alimony payments (variable *xmpam*) can also be deducted up to a maximum of 13,805 Euros per year, which has stayed constant over the years.

j) Child tax allowance (*Kinderfreibetrag*) (EUROMOD variable tintach_s)

The child tax allowance is granted to parents instead of child benefits in case the allowance is more beneficiary for the tax payers than the child benefits. The allowance per couple amounted to 7,428 euros per year and child in 2018 and has been increased yearly afterwards (to 7,620 in 2019,7,812 in 2020 and 8,388 in 2021). Since 2000, it includes an allowance for child care. In the case of couple's separation, each parent is entitled to half of the allowance (3,714 in 2018, 3,810 in 2019, 3,906 in 2020 and 4,194 in 2021).

EUROMOD Notes: In the case of couple's separation, if one of the parents does not pay at least 75% of the maintenance allowance, then the other parent can claim the full amount of the tax allowance. Since we do not have detailed information on maintenance payments, we assume that lone parents always claim half of the allowance. Furthermore, we can only identify eligible parents if the children reside with them.

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

2.6.2 Individual Taxation (*tinit_de*)

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

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

2) Secondly, the child allowance is accounted for, in case it applies. It applies if the individual has at least one dependent child in the household that is eligible for child benefits (see Section 1.2.5 for eligibility criteria). The child allowance reduces taxable income if it applies. The tax burden is derived again. Again, progression clause must be accounted for, i.e. benefits are considered when the tax rate is determined, but they are excluded from the actually taxed income.

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

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

5) Then, the solidarity surcharge is computed (variable *txc_s*). If the income tax liability is less than the tax exemption threshold (of EUR 81 per month), no solidarity surcharge is due. If the income tax exceeds the tax exemption threshold, a solidarity surcharge of 5.5% is levied on the income tax. However, the solidarity surcharge cannot be higher than 20% of the income tax amount exceeding the tax exemption threshold. **Solidarity Surcharge** (*Solidaritätszuschlag*): Up to 2021 there was a surcharge of 5.5% on the income tax and the capital tax, which was originally motivated with the costs of the German re-unification. The solidarity surcharge will be partly abolished as of the year 2021. No solidarity surcharge is due on income tax up to €16,956 (€33,912 for married couples). For exceeding amounts, a sliding scale is applied for taxable income up to €96,802 (€193,641 for married couples). Taxpayers with taxable income above €96,802 are fully subject to solidarity surcharge.

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

- ***Tax Unit***

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

- ***Tax Exemptions***

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

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

- ***Tax Allowances***

The tax allowances are described in Section 2.6.1.

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

- ***Tax Base***

Income from six different sources is summed up for each individual. After loss compensation and several allowances and deductions are considered, taxable income, i.e. the tax base, is taxed according to a progressive tax schedule.

Table 2.19 Personal Income Tax Schedule (2017) shows in more detail how taxable income is determined. Income from single components is added up and certain expenditures are credited against income, as well as certain allowances are granted. This has been described in detail in Section 2.6.1. In this policy (*tinit_de*), in addition capital income is added, and the relevant taxable income results.

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

- ***Tax Schedule***

The tax schedule from the personal income taxation in Germany has progressive elements (see Table 2.19 and Table 2.20). Due to a basic tax-free allowance (8,820 in 2017, 9,000 in 2018, 9,168 in 2019,9,408 in 2020, and 9,744 in 2021) and several tax brackets beyond this allowance, the entire schedule has a progressive effect.

Table 2.19 Personal Income Tax Schedule (2017)

Bracket	Lower limit (for *Y*)	Upper limit (for *Y*)	Marginal Tax Rate (%)	Tax Burden (TAX)
1	0	8,820	0	*TAX* = 0 *(tax-free allowance)*
2	8,821	13,769	14-24	$TAX = (1{,}007.27 * Z_1 + 1{,}400) * Z_1$ $Z_1 = (Y – 8{,}820)/10{,}000$
3	13,770	54,057	24-42	$TAX = (223.76 * Z_2 + 2{,}397) * Z_2 + 939.57$ $Z_2 = (Y – 13{,}769)/10\ 000$
4	54,058	256,303	42	$TAX = 0.42 * Y – 8{,}475.44$
5	256,304	-	45	$TAX = 0.45 * Y – 16{,}164.53$

Table 2.20 Personal Income Tax Schedule (2020)

Bracket	Lower limit (for *Y*)	Upper limit (for *Y*)	Marginal Tax Rate (%)	Tax Burden (TAX)
1	0	9,408	0	*TAX* = 0 *(tax-free allowance)*
2	9,409	14,532	14-24	$TAX = (972.87 * Z_1 + 1\ 400) * Z_1$ $Z_1 = (Y – 9{,}408\ )/10\ 000$
3	14,533	57,051	24-42	$TAX = (212.02 * Z_2 + 2\ 397) * Z_2 + 972.79$ $Z_2 = (Y – 14{,}532\ )/10\ 000$
4	57,052	270,500	42	$TAX = 0.42 * Y – 8{,}963.74$
5	270,501	-	45	$TAX = 0.45 * Y – 17{,}078.74$

Table 2.21 Personal Income Tax Schedule (2021)

Bracket	Lower limit (for *Y*)	Upper limit (for *Y*)	Marginal Tax Rate (%)	Tax Burden (TAX)
1	0	9,744	0	*TAX* = 0 *(tax-free allowance)*
2	9,745	14,753	14-24	$TAX = (995.21 * Z_1 + 1\ 400) * Z_1$ $Z_1 = (Y – 9{,}744\ )/10\ 000$
3	14,754	57,918	24-42	$TAX = (208.85 * Z_2 + 2\ 397) * Z_2 + 950.96$ $Z_2 = (Y – 57{,}918\ )/10\ 000$
4	57,919	274,612	42	$TAX = 0.42 * Y – 9{,}136.63$
5	274,613	-	45	$TAX = 0.45 * Y – 17{,}374.99$

Taxable income falls into five different tax brackets. There is a basic tax allowance. Within the progressive tax schedule, the lowest marginal tax rate is at 14% and the highest at 45%. The latter applies to a taxable income above €270,500 in 2020. The only flat areas, where the tax rate is constant, are in this highest bracket and in the second highest bracket, 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.

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

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

- ***Tax Credits***

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

2.6.3 Joint Taxation (*tinjt_de*)

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

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

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

2) Secondly, the child allowance is accounted for, in case it applies. It applies if the married couple has at least one dependent child in the household that is eligible for child benefits (see Section 1.2.5 for eligibility criteria). The amount of the allowance is doubled for married spouses (also see below at Tax Allowances). The child allowance reduces taxable income if it applies. The tax burden is derived. Again, progression clause must be accounted for, i.e. benefits are considered when the tax rate is determined, but they are excluded from the actually taxed income.

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

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

Next, the solidarity surcharge is computed (variable *txc_s*). The solidarity surcharge for joint taxation is calculated in the same way as for individual taxation. The tax exemption threshold is EUR162 per month (twice the amount for individual taxation) (for more details see Section 2.6.2). Analogously to the regular tax burden, it is first computed at the couple level and then allocated among the two married spouses according to their taxable income. It is then added to the regular tax burden.

Solidarity Surcharge (*Solidaritätszuschlag*): Up to 2021 there was a surcharge of 5.5% on the income tax and the capital tax, which was originally motivated with the costs of the German re-unification. The solidarity surcharge will be partly abolished as of the year 2021. No solidarity surcharge is due on income tax up to €16,956 (€33,912 for married couples). For exceeding amounts, a sliding scale is applied for taxable income up to €96,802 (€193,641 for married couples). Taxpayers with taxable income above €96,802 are fully subject to solidarity surcharge.

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

- ***Tax Unit***

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

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

- ***Tax Exemptions***

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

- ***Tax Allowances***

The tax allowances are described in Section 2.6.1.

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

- ***Tax Base***

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

- ***Tax Schedule***

The same tax schedule, as for individual taxation, also applies to joint taxation (see Table 2.19 and Table 2.20. At the latter it applies to the mean income of the spouses. This means that the bracket thresholds are, loosely speaking doubled in case of joint taxation.

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

- ***Tax Credits***

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

2.7 Capital Income Taxation

Since 2009 there is a final withholding tax on capital with a flat tax rate of 25%[5], which is simulated in policy tinkt_de. This rate applies above a saver's tax allowance, which amounts to €801 for single persons – for couples, it is doubled. The saver's tax allowance has stayed constant for the period 2017-2020.

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 2017-2020. It is again assumed that married couples choose joint taxation. Thus, capital income for married couples is joint income and accordingly, married couples get granted double the tax-free allowance on capital income.

2.7.2 Exemptions

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

2.7.3 Tax Allowances

There is a basic allowance for income from capital, which was not subject to changes over the past years (see Table 2.21). 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.

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

Table 2.21 Capital Income Taxation: Basic Allowance (2018-2021)

Allowances	2018	2019	2020	2021
- Singles	801	801	801	801
- Married Couples	1,602	1,602	1,602	1,602

2.7.4 Tax Base

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

2.7.5 Tax Schedule

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

2.7.6 Tax Credits

There are no tax credits for capital income taxation.

3. DATA

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. 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.

The survey consists of stratified random samples. 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.

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.

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 (e.g. *EU-SILC_UDB_c15 ver 2015-1*; after data manipulations, we labeled the input data base used for *EUROMOD DE_2015_a1*). This was the only source of micro data that has been utilized for the development of the German contribution to EUROMOD. There was no possibility for the national developer team to get any access to the national German SILC data (before harmonization) at the German statistical office at all.

The newest release of EUROMOD has been prepared for one input dataset based on EU-SILC 2019.

First we describe the main features of the dataset based on EU-SILC 2019. Some major facts about the data base are summarized in Table 3.1.1. The period of collection was April 2019 to September 2019. The reference period, over which households reported incomes and employment status, was the entire year 2018. For other information, such as social status, household composition, or living conditions, the reference period is the timing of the interview. As a result, the UDB data base consists of 23,602 individuals, living in 12,350 households. 20,859 of these individuals are aged 16 or older.

Table 3.1.1 EUROMOD database description (based on EU-SILC 2019)

EUROMOD database	DE_2019_a2
Original name	EU-SILC_UDB_c19
Provider	Eurostat
Year of collection	2019
Period of collection	April 2019 to September 2019
Income reference period	Year 2018
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	23,602 individuals in 12,892 households
Non-Response rate	11.8% for the overall sample (household level)

Notes: [1] This covers the entire population living in private households in Germany, except for people in institutions, i.e. for example soldiers living in military caserns, or old people living in nursing homes. Children born after the income reference period were dropped from the initial sample (41 in total).

3.2 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 and before the interview have been excluded from the data set. In the input dataset based on EU-SILC 2019, this drops 41 individual observations but leaves the number of households unaffected.

3.3 Imputations and assumptions

In this section, the reference time period is described, the relation between gross and net incomes is explained. 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.

3.3.1 Time period

The time over which the micro data for "*LEBEN IN EUROPA 2019*" has been collected was April 2018 to September 2018. 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 in both cases the entire previous year (i.e. year 2017 for SILC 2018). 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.

3.3.2 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.

3.3.3 Disaggregation of harmonized variables

In the framework of the UDB data, information on individual-/household-level benefit receipt and amounts 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. Therefore, the disaggregation procedure is explained next.

Disaggregation of input dataset based on EU-SILC 2019

The disaggregation of benefits in the input database based on EU-SILC 2018 differs substantially from the disaggregation carried out for older datasets (including EU-SILC 2015 and older ones). The reason is twofold. EU-SILC 2019 includes (roughly) disaggregated benefit variables according to the concepts '(non-)contributory' and '(non-)means-tested'. Starting with EU-SILC 2016, the national team has received information from EUROSTAT regarding which benefits are included in which EU-SILC disaggregated variables. The following table summarizes the detailed benefit disaggregation that is used in the EUROMOD newest input dataset:

Table 3.2 Disaggregation of Harmonized Benefit Data

EUROMOD variable	EU-SILC variable	COMMENTS
Old-age benefits		
poa00	PY102	Further disaggregation needed, as PY102 includes other old-age benefits
poacs	PY104	Directly identified in EU-SILC
poapu	PY102	Further disaggregation needed, as PY102 includes other old-age benefits
poaps	PY102	Further disaggregation needed, as PY102 includes other old-age benefits
poass	PY102	Further disaggregation needed, as PY102 includes other old-age benefits
poaab	PY100	Variable not disaggregated in EU-SILC; identified as the residual not contained in PY101-PY104
poadi	PY102	Further disaggregation needed, as PY102 includes other old-age benefits
poawr	PY103	Directly identified in EU-SILC
byr	PY100	Variable not disaggregated in EU-SILC; identified as the residual not contained in PY101-PY104

Disability benefits		
pdiss	PY132	Further disaggregation needed, as PY132 also includes *pdica*
pdi00	PY131	Directly identified in EU-SILC
pdica	PY132	Further disaggregation needed, as PY132 also includes *pdiss*
pdiwr	PY133	Directly identified in EU-SILC
pdiot	PY134	Directly identified in EU-SILC
Sickness benefits		
bhl	PY121 PY122	No disaggregation required
Unemployment benefits		
bunct	PY092	Further disaggregation needed, as PY092 also includes *ysv*
bunnc	PY093	Further disaggregation needed, as PY093 also includes *buntr*
bunot	PY091	Directly identified in EU-SILC
ysv	PY092	Further disaggregation needed, as PY092 also includes *bunct*
buntr	PY093	Further disaggregation needed, as PY093 also includes *bunnc*
bunls	PY090	Variable not disaggregated in EU-SILC; identified as the residual not contained in PY091-PY094
Family benefits		
bch00	HY054	Further disaggregation needed, as HY054 also includes bfaot, bmact and bcham
bchot	HY053	Further disaggregation needed, as HY053 also includes bplct and bched
bched	HY053	Further disaggregation needed, as HY053 also includes bchot and bplct
bmact	HY052 & HY054	Further disaggregation needed, as HY054 also includes bch00, bfaot and bcham
bplct	HY053	Further disaggregation needed, as HY053 also includes bchot and bched
bcham	HY054	Further disaggregation needed, as HY054 also includes bch00, bmact and bfaot
bfaot	HY054	Further disaggregation needed, as HY054 also includes bch00, bmact and bcham
Social assistance		
bsaoa	HY063	Further disaggregation needed, as HY063 also includes other social assistance benefits
bsa00	HY063	Further disaggregation needed, as HY063 also includes other social assistance benefits
bsaot	HY063	Further disaggregation needed, as HY063 also includes other social assistance benefits
bsa01	HY061	Directly identified in EU-SILC
bsapu	HY060	Variable not disaggregated in EU-SILC; identified as the residual not contained in HY061-HY064
Housing benefits		
bho00	HY073	Further disaggregation needed, as HY073 also includes bhoot.
bhoot	HY073	Further disaggregation needed, as HY073 also includes bho00.

For those variables requiring further disaggregation, information on the actual policies have been used. Generally, the procedure was to infer eligibility and benefit amounts from observed information on individual/household characteristics, current activity, and receipt of aggregate benefits. 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. 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. These approaches shall be clarified in the following when disaggregation procedures are described in detail for the single aggregate benefit categories.

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

Similarly, there has been no need for disaggregation at income from rent (*ypr*), which only consists of income from rental of a property or land, and at income from capital (*yiy*), which only consists of income from interest, dividends, or profit from capital investments in unincorporated business. This means that these incomes have been treated as compound incomes 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.

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

- Firstly, the observed benefit amount in the SILC variable PY093 is assigned to "unemployment benefits II (ALG II)" (EUROMOD variable bunnc), up to the maximum legislated amount in 2016. Any amount above the maximum is assigned to "benefits for re-training" (EUROMOD variable buntr).
- Secondly, the observed benefit amount in the SILC variable PY092 is assigned to "unemployment benefits I (ALG I)" (EUROMOD variable bunct) as long as the respective individual reports to have spent at least a month in unemployment. The observed benefit in PY092 is assigned to "severance payments" (EUROMOD variable ysv) if the individual reporting non-zero amount in PY092 reports to have spent zero months in unemployment.
- Thirdly, the observed benefit amount in the SILC variable PY091 is assigned to "benefits for business start-ups" (EUROMOD variable bunot).
- Fourthly, the difference between i) all unemployment benefits reported in SILC variable PY090 (EUROMOD variable bun) and ii) the imputed unemployment benefits (bunnc,

bunot, bunct, buntr, ysv) is assigned to "lump-sum unemployment benefits" (EUROMOD variable bunls).

Old-age pensions (EUROMOD variable *poa*) have been disaggregated into eight components by the following procedure:

- Firstly, the benefit amount reported in SILC variable PY104 is assigned to "old-age pensions for civil servants" (EUROMOD variable poacs).
- Secondly, the benefit amount reported in the SILC variable PY103 is assigned to "benefits for war victims" (EUROMOD variable poawr).
- Thirdly, the benefit amount reported in the SILC variable PY102 is disaggregated into several benefits: The benefit amount is assigned to "Disability pensions for those aged over 65, that include the Disability pension from stat. accident insurance" (EUROMOD variable poadi) if the respective individual reports to have a disability and a non-zero amount in the SILC variable PY101. The amount reported in PY102 is assigned to "Pensions for employees in public service" (EUROMOD variable poapu) if poadi is zero for the respective individual and they report non-zero amount in the SILC variable PY104. The amount in PY102 is then assigned to "pensions for self-employed, farmers and freelancers" (EUROMOD variable poaps) if the individual has zero amount in poadi and poapu and fulfils one of the conditions: i) the individual reports to be a farmer, ii) the individual reports to be self-employed but not a farmer, iii) the individual reports non-zero amount in the SILC variable HY061.
- Fourthly, we calculate the difference between i) PY102 and ii) the sum of poadi, poapu and poaps. The sum of this difference and the amount reported in the SILC variable PY101 are assigned to "Old-age pensions from the statutory pension insurance" (EUROMOD variable poass), up to the maximum legislated amount in 2016. The amount above the maximum is then assigned to "Old-age pensions from employer schemes" (EUROMOD variable poa00).
- Finally, the difference between i) all old-age benefits reported in SILC variable PY100 (EUROMOD variable poa) and ii) the sum of old-age benefits in the SILC variables PY101, PY102, PY103 and PY104, is assigned to two benefits: 1) "old-age pensions from a foreign country" (EUROMOD variable poaab) if the individual is older than 65 and 2) "benefits for early retirement" (EUROMOD variable byr) if the individual is aged 65 or less.

Survivor pensions (EUROMOD variable *psu*) have been disaggregated into two components in the following way:

- The amount reported in the SILC variable PY110 (EUROMOD variable psu) are assigned to "orphaner's pension" (EUROMOD variable psuor) if the person is aged 18 or younger or aged 19 to 27 and not widowed.
- Remaining benefit amount is assigned to "widow(er)'s pension" (EUROMOD variable psuwd).

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

- Firstly, the benefit amount reported in the SILC variable PY131 is assigned to "pensions for reduced ability to work" (EUROMOD variable pdi00).
- Second, the benefit amount reported in the SILC variable PY133 is assigned to "Benefits for war victims and burden sharing" (EUROMOD variable pdiwr).
- Third, the benefit amount reported in the SILC variable PY134 is assigned to "Pensions for disability to work for civil servants" (EUROMOD variable pdiot).

- Fourth, the benefit amount reported in the SILC variable PY132 is split into two benefits: 1) “Long-term care benefits from pension insurance” (EUROMOD variable pdica) up to the maximum legislated amount in 2016; 2) the difference between PY132 and pdica is assigned to "Disability pension from statutory accident insurance" (EUROMOD variable pdiss).

Family benefits (EUROMOD variable *bfa*):

- First, “maternity benefits” (EUROMOD variable bmact) are directly identified from SILC variable HY052.
- Then, we proceed to disaggregate SILC variable HY054. To this end, we first impute the month of birth of children aged 0 by checking if the amount recorded in SILC variable HY054 coincides with child benefits being paid for a certain number of months. The result of this check indicates the month of birth of most children aged 0. This information is useful for the disaggregation of most family benefits reported by households with children aged 0.
- Thirdly, “child benefits” (EUROMOD variable bch00) are identified from SILC variable HY054 (for those aged 0, taking into account the imputed month of birth), as child benefits are an (almost) universal benefit.
- Fourth, the second component of “maternity benefits” (EUROMOD variable bmact) is identified from what remains from SILC variable HY054 for households with children aged 0.
- Then, we simulate eligibility criteria for the receipt of “alimony payments” (EUROMOD variable bcham) and identify them from the remainder of SILC variable HY054.
- Any remaining amount in SILC variable HY054, which has not been allocated to any of the three benefits above, is assigned to “family benefits: other: care allowance” (EUROMOD variable bfaot).
- Next we proceed to disaggregate SILC variable HY053. For families with children aged 0 and/or 1, which do not report receipt of housing benefits or social assistance benefits, we classify any amount reported in SILC variable HY053 as parental benefits (EUROMOD variable bplct). For those families with children aged 0 or 1, who report receipt of housing benefits, we assign them the minimum amount of parental benefits from SILC variable HY053 and the rest is allocated to “additional child benefits” (EUROMOD variable bchot).
- Then, we simulate the maximum possible additional child benefits for families whose children are aged 2 and older and assign any remaining amount in variable HY053 to “additional child benefits”, as long as this does not exceed the simulated amount.
- Next, we identify “children benefits: educational allowance” (EUROMOD variable bched) as the remainder of SILC variable HY053 for those families reporting receipt of unemployment benefits II, housing benefits or social assistance.
- Finally, adjustments to make ends meet are made on “parental benefits”.

Social assistance benefits (EUROMOD variable *bsa*) have been disaggregated into five components by the following procedure:

- Firstly, the amount reported in SILC variable HY061 is identified as “social assistance: pension for agriculture” (EUROMOD variable bsa01).
- Secondly, “social assistance: charities” (EUROMOD variable bsapu) is identified as the observed amounts listed in SILC variable HY060 which are not listed in any of these SILC variables (HY061, HY062, HY063, HY064).
- Thirdly, the amount reported in SILC variable HY063 is split into three social assistance benefits, namely EUROMOD variables bsaoa, bsaot and bsa00. In order to do so, SILC variable HY063 is identified as “social assistance: old-age” (EUROMOD variable bsaoa) if households reporting positive values include members aged 65 or older and/or members

with disabilities. Then, remaining amounts of HY063 are allocated to "social assistance: social benefits" (EUROMOD variable bsaot) if there are children living in the households. Finally, any remaining positive value of HY063 is allocated to "basic social assistance" (EUROMOD variable bsa00).

Housing benefits (EUROMOD variable *bho*) have been disaggregated into two components in the following way:

- Firstly, the benefit amount reported in the SILC variable HY073 is assigned to "other housing benefits" (EUROMOD variable bhoot) for all households who report being recipients of unemployment assistance or social assistance.
- The remaining benefit amount reported in SILC variable HY073 is assigned to "basic housing benefits" (EUROMOD variable bho00).

Survivor benefits (EUROMOD variable *psu*) have been disaggregated into two components, namely "survivor benefits: widows" (*psuwd*) and "survivor benefits: orphans" (*psuor*).

3.3.4 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 2018 to 2017 (for the input dataset based on EU-SILC 2018) by the growth rate of employee income from national accounts, have been applied. This has also been done for individuals with a zero proxy who do not report “employee”, but who earn positive income from employment. For those with zeros who do not report “employee” and who earn zero income from employment, estimated wages (*yivwg*) and current hours (*lhw*) have been applied.

3.3.5 Imputation of Tax Deductions/Allowances

From EUROMOD release H2.0+ onwards, tax deductions and allowances have no longer been imputed but simulated within the income tax policy (see Section 2.6.1 of this report). For the documentation of these old imputations, please refer to older versions of the EUROMOD Country Report for Germany.[6]

3.3.6 Other Imputed Variables

Housing expenditures (EUROMOD variable *xhcrt*) have no longer been imputed from EUROMOD version H2.0+ onwards (i.e. the original EU-SILC values of xhcrt are used).

Holdings of financial assets (EUROMOD variable *afc*) have been imputed, inferring them from the observed income from capital (*yiy*). It has been assumed that income from capital has been received as an average rate of return on the stock of financial assets. As a proxy for this rate of return, an average interest rate has been applied. This is the annual average of monthly rates for the year 2018 (EU-SILC 2018) of the interest rate on deposits for households, with maturity of 1-2 years.[7] It evaluates to 0.33% in 2018. Inverting the rate of return function, applying the calibration for the rate, returns the stock of financial assets, on average for the year 2017.

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.

3.4 Updating

To account for any time inconsistencies between the input dataset and the policy year, updating factors are used. Each monetary variable (i.e. each income component) is updated so as to account for changes in the non-simulated variables that have taken place between the year of the data and the year of the simulated tax-benefit system. Updating factors are generally based on changes in

6 To access previous versions of EUROMOD Country Reports, see here: https://www.euromod.ac.uk/using-euromod/country-reports

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

the average value of an income component between the year of the data and the policy year. For detailed information about the construction of each updating factor as well as the sources that have been used, see Annex I.

As a rule, updating factors are provided both for simulated and non-simulated income components present in the input dataset. Note however that in the case of simulated variables, the actual simulated amounts are used in the baseline rather than the uprated original variables in the dataset. Updating factors for simulated variables are provided so as to facilitate the use of the model in cases when the user wishes to turn off the simulation of a particular variable. The list of uprating factors as well as the sources used to derive them can be found in Table 3.5 in Annex I below.

4. VALIDATION OF INPUT DATASET BASED ON EU-SILC 2019

4.1 Aggregate Validation

EUROMOD results are validated against external benchmarks. Detailed comparisons of the number of people receiving a given income component and total yearly amounts are shown in the Annex. Both market incomes and non-simulated taxes and benefits in the input dataset as well as simulated taxes and benefits are validated against external official data. The main discrepancies between EUROMOD results and external benchmarks are discussed in the following subsections. Factors that may explain the observed differences are also discussed.

4.1.1 Components of disposable income

There are no major differences between the definitions of disposable income in EUROMOD and in the EU-SILC data (see **Table 4.1**). Almost all income components listed in **Table 4.1** are included in both income concepts. There is one exception. Disposable income in EUROMOD does not include fringe benefits (*kfb*), such as for example company cars, while the EU-SILC concept does include them. Apart from this deviation, 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 4.1** 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 3.3.3 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 benefits (*bfa*) and social assistance (*bsa*).

In **Table 4.1**, these variables are only listed in its aggregate form and the single income components are left out. Income taxes and social security contributions are only observed as a total in EU-SILC (variable *HY140G*). In EUROMOD, however, income taxes are simulated for income in general (*tin*) and income from capital (*tinkt*). Social security contributions are also simulated and broken down by social status, yielding separate simulated figures of social security contributions for employees (*ils_sicee*), for self-employed individuals (*ils_sicse*) and for pensioners (*ils_sicpe*). Repayments/receipts for tax adjustments (*HY145N*) as well as regular taxes on wealth (*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 2018 to 2021.

Table 4.1 Components of disposable income

	EUROMOD [2017-2020]	German EU-SILC 2018 [income year 2017]
	ils_dispy	HY020
Employee cash or near cash income	+	+
Employer's social insurance contribution	+	n/a
Company car	n/a	+
Contributions to individual private pension plans	+	+
Cash benefits or losses from self-employment	+	+
Pension from individual private plans	+	+
Unemployment benefits	+	+
Old-age benefits	+	+
Survivor' benefits	+	+
Sickness benefits	+	+
Disability benefits	+	+
Education-related allowances	+	+
Income from rental of a property or land	+	+
Family/children related allowances	+	+
Social exclusion not elsewhere classified	+	+
Housing allowances	+	+
Regular inter-household cash transfer received	+	+
Interests, dividends, etc.	+	+
Income received by people aged under 16	+	+
Regular taxes on wealth	n/a	-
Regular inter-household cash transfer paid	-	-
Tax on income and social contributions	-	-
Repayments/receipts for tax adjustment	n/a	-

Notes: Some variables in EUROMOD (namely poa, pdi, bun, bfa, bsa, bho) are aggregated variables. They consist of several components, some of which have been simulated in EUROMOD and some not.

Source: For EU-SILC, Eurostat (2018) – EU-SILC 065 (2018 operation) – Description of Target Variables: Cross-sectional and longitudinal, 2018 operation (Version August 2019).

4.1.2 Validation of incomes inputted into the simulation

First, 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 the Federal Employment Agency (see Table 4.2 in the Annex). The number of employed people includes people employed in jobs where full social security contributions have to be paid (*sozialversicherungspflichtige Beschäftigung*), people in marginal employment (*geringfügige Beschäftigung*) as well as self-employed individuals. The number of unemployed people includes those who are registered as unemployed at the employment agencies as actively searching for a job. Both EU-SILC data and external statistics are averages over all months.

The figure for employed individuals from the EU-SILC micro is lower than the corresponding figure from the employment agencies (86%). Given that in years 2018 through 2021 according to external figures the number of employed individuals increases, the inputted variable loses some precision over time (being 85% of the external figure in 2019).

The figure for unemployed individuals in 2018 from the EU-SILC micro data is somewhat lower than the corresponding external figure (86%). This discrepancy first decreases in 2019 and increases again in 2020 as a result of the pandemic's impact on the labour market.

Differences between EU-SILC and external figures are not due to comparability issues, as both figures are based on the same definition and unit.

Next, the components of market income in the EU-SILC data shall be validated with respect to the number of recipients as well as the aggregated total incomes received in the population in a year. Table 4.3 in the Annex tabulates the number of recipients for each component of market income, as it has been defined in EU-SILC for 2017 and compares it to figures from external statistics. 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 2018 in Table 4.3.

The sum of all components of market income, minus expenditures for alimony payments (*xmp*) is defined to be "original (market) income" in EUROMOD. About 60.5 million individuals 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*) in 2018 is slightly higher in EU-SILC (41,334) and in external figures from the Federal Employment Agency (40,495). Unfortunately, both figures are only partially comparable, as EU-SILC reports all individuals who have received income from employment whereas the Federal Employment Agency reports an average over all months. Therefore, one can conclude that EU-SILC possibly represents an accurate number of individuals with positive income from dependent employment. For income from self-employment (*yse*), the number of recipients in EU-SILC is lower than that in the external data (with a ratio of 86%). This discrepancy is likely to be even larger due to the comparability issue between EU-SILC and the data of the Federal Employment Agency described above.

For the next components of market income there are no official statistics. Therefore, these variables are validated against the German Socio-Economic Panel (GSOEP). The number of recipients of private pension income is much higher in the EU-SILC data than in the GSOEP (ratio of 256%). Both recipients of capital income and property income are significantly lower in EU-SILC than in the GSOEP (around 80% and 58% respectively).

Income from private transfers (*ypt*) is presented in Table 4.3 in terms of numbers of households receiving this income component, as it has been reported at the household level. This number is much higher in EU-SILC than in the external data (GSOEP). Unfortunately, there is no external data against which the number of individuals receiving other income (*yot*) or fringe benefits (*kfb*) can be validated. Other income includes mainly income from children aged 16 and younger. But it may also capture other income components that have not been reported elsewhere and that may significantly vary between the data sets. The same holds for fringe benefits, which consist for example of company cars.

The respective aggregate amounts for the components of market income are displayed in Table 4.4. All market income, after alimony payments have been subtracted, sums up to 1,642bn euros in the population captured by EU-SILC. Some 1,444bn of it relates to income from dependent employment (*yem*). This figure matches very well the corresponding number from external sources (1,463bn), which in this case are national accounts. The ratio for this variable also remains quite close to one for the years it has been uprated.

Unfortunately, it is not possible to macrovalidate the aggregate income from self-employment (*yse*), since national accounts report income from self-employment as well as capital- and property income jointly.

The fit of other minor income components is difficult to evaluate given that there is, at best, similar statistics from survey sources. The aggregate amount of private pension income (il_ppen) is substantially overestimated, although less so than the number of recipients (see Table 4.3). The aggregate amount of private transfers (*ypt*) is substantially lower in EU-SILC (ratio of 49%) than in the GSOEP.

Now it comes to benefits and taxes that have not been simulated in EUROMOD. They are all available in the model and they are also outputted from it, but they are not altered by the model simulations. Therefore, figures on recipients and aggregated 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 4.5 in the Annex.

Many of these benefits are minor benefits. Only a small group of people in the population receives them. Therefore, 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. For this reason, external data for many benefits could not be found. Therefore many of the columns of Table 4.5 are empty, while some of them are filled in for selected years only.

In addition, many of the variables listed in Table 4.5 are the result of the disaggregation carried out by the national team (for more methodological details, see Section 3.3.3). It should be noted, therefore, that any discrepancies in the number of recipients/aggregate spending estimated with EUROMOD (i.e. EU-SILC) vs based on official statistics can be attributed to both measurement error in the EU-SILC data as well as measurement error in the benefit disaggregation method. None of the old-age benefits has been simulated. Unfortunately, the number of recipients of old-age pensions (*poa*) cannot be validated against official statistics, as there is no available estimate that avoids double-counting of those individuals receiving more than one type of pension. However, official statistics are available for all disaggregated old-age benefits, i.e. the ones from the statutory pension insurance (*poass*), which somewhat understated in terms of number of recipients (ratio of 86%); the old-age benefits for civil servants (*poacs*), which are strongly over-represented in SILC data (ratio of about 193%).

Most of the disability benefits are also not simulated. Recipients of pensions for reduced work ability (*pdi00*) seem to be precisely. The number of recipients of care allowances (*pdica*) cannot be validated against official statistics because in EU-SILC this variable only includes individuals up to the age of 65 and official statistics are not broken down by age categories. The number of recipients of disability benefits for civil servants (*pdiot*) appears to be substantially over-represented (ratio of 157%), while that of war victims (*pdiwr*) is strongly under-represented (ratio of 29% for 2018) but given that those are minority benefits this should not have strong consequences for the simulation and the resulting income distribution.

Survivor's benefits (*psu*) are strongly under-represented in the EU-SILC 2019 dataset as we compared them to the external figure (ratio of 62%).

Among the unemployment benefits, only the minor ones have not been simulated. The fit in number of recipients of these benefits between EU-SILC and official statistics is quite good for re-training (*buntr*) whereas benefits for business start-ups (*bunot*) and severance payments (*ysv*) appear to be substantially over-represented. The exceptionally high number of recipients of severance payments in 2020 stems from the significant number of employees working within the short-time wage compensation scheme. Unfortunately, these discrepancies are likely to be the result of the disaggregation procedure and therefore have little interpretation as to how well particular benefits are represented in EU-SILC.

The number of recipients of alimony pay (*bcham)* in EU-SICL are represented reasonably similar to the ones of external validation statistics (108% in 2018).

Unfortunately, no official statistics for the number of and benefits from non-for-profit charities (*bsapu*) listed in Table 4.5 are available.

Aggregate amounts for the non-simulated taxes and benefits are compared between EU-SILC and external sources in Table 4.6. 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 (e.g. in the official budget), but they do not state the number of individuals or households receiving it.

The sum of all old-age pensions in the input dataset is somewhat larger than in the official statistics (ratio of 112%). All pension components appear to be under-represented in the input dataset with the exception of old-age benefits from the statutory pension insurance (*poass*), by far the largest old-age benefit, which is moderately over-represented (ratio of 118%) and civil servant pensions (*poacs*), which display a significantly high ratio of 133% in 2018. The large discrepancies in public service pensions (*poapu*), pensions from employer schemes (*poa00*) are likely to be driven by the disaggregation of pension benefits which are carried out by the national team. Unfortunately, the five types of pensions *poass*, *poa00*, *poaps*, *poapu* and *poaab* have been disaggregated from a single EU-SILC variable. Unfortunately, it is difficult to achieve better disaggregation results without further information on labour market biographies.

The major disability benefit, namely the disability benefit (pension) from the statutory pension system *(pdi00)*, is very well represented in the EUROMOD input database (ratio of 101%), as it was the case with the number of recipients reported in Table 4.5. Unfortunately, no comparable statistics for disability benefits for civil servants could be found.

Aggregate amounts of benefits for war victims and from burden sharing (*pdiwr) as well as* survivor's benefits (*psu*) are under-captured in the EU-SILC but correspond to the under-coverage of recipients.

The overall sum of unemployment benefits reported in the input dataset matches official statistics on the aggregated amount of unemployment benefits in Germany by a ratio of 72%. Unfortunately, no information on the amounts of benefits paid for early retirement (*byr*) and re-training (*buntr*) have been available for the respective years. In addition, unemployment benefits for small business start-ups match quite poorly the external figures (ratio of 47% for 2018). However, given that all these benefits are treated similarly by the general tax and transfer system and their aggregate matches well the external figure, these discrepancies should play no role in the baseline results. The reason for the poor matching quality is probably a lack of information for a more accurate disaggregation.

Among the minor benefits of social assistance that have not been simulated, there was no external information available for benefits from charities (*bsapu*). External information on benefits for advances on alimony payments (*bcham*) indicates that these are strongly under-captured in the input database (ratio of 47%).

4.1.3 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 aggregated amounts against external data. The simulations are based on the assumption that all benefits are taken up completely, i.e. individuals are assumed to actually receive income from all benefits in exactly the amount that they are assumed to be eligible for.

Results on the number of recipients for all benefits that have been simulated in EUROMOD are presented in Table 4.7. in the Annex. Compared to the previous tables containing figures on recipients of market income and non-simulated benefits, Table 4.7. has an additional column – as it is the case for all following tables. In this column, figures from EU-SILC data are displayed. These may now differ from corresponding output figures from EUROMOD (second column), as the latter have been simulated. Recipients may vary over time for means-tested benefits, as the means test changes.

According to the simulation, sickness benefits (*bhl_s*) in 2018 were received by 1,419,000 individuals. This figure matches very well the number of recipients observed in the input data. This is surprising because the simulation is independent of observing receipt of this benefit and in previous years the relation of simulated figures to external statistics were significantly higher.

Disability pensions from the statutory accident insurance (*pdiss_s*) have been received by 275,000 individuals in the simulated population in 2018. Unfortunately, it is not possible to truly validate this figure against official statistics, since the simulated figure only includes recipients up to age 65 and official statistics report the overall number of recipients. Still, for the reader's information, the official number of overall recipients amounts to 775,000; the simulated figure, being 35% of the overall figure, makes sense as this pension is mostly granted for life so that most recipients are aged older than 65 and we are not simulating this benefit for this group. In the simulations for 2018-2021 this figure stays constant because *pdiss_s* is a contributory benefit, and contributions have not been simulated.

For the major contributive unemployment benefit (*bunct_s*), the model overestimates the number of recipients. In 2018 the number of recipients of unemployment insurance (*bunct_s*) accounts for 121% of the official figure. This discrepancy arises since the model uses information on the actual number of recipients observed in the input data, which is substantially higher than the number of recipients in the official figure. Regarding the major unemployment assistance (*bunnc_s*), the model simulates 2,79 million household recipients, which amounts to 95% of the official recipient figure.

Next, we validate the five components of the aggregated variable family benefits (*bfa*). The most important family benefit, namely the child benefit (*bch00_s*), is quite precisely simulated for 2018 (ratio of 101% with respect to the external figure) and stays constant for years 2019-2021. The simulation of the additional child benefit (*bchot_s)* predicts 192,000 household recipients for 2018 and 194,000 for 2019, which is well above the 87,000 household recipients reported by official statistics. The reasons for this discrepancy are the same ones as for the discrepancy in unemployment assistance: too large number of recipients in the input dataset and potential non-take-up issues. Unfortunately, it is not possible to validate the educational allowance (*bched_s*) against official statistics, as in EUROMOD we are only simulating part of the allowance (the rest of the allowance are mostly in-kind benefits) and therefore our estimates are not comparable to the overall number of recipients listed in official statistics. In addition, no official statistics on the number of recipients of maternity leave benefits (*bmact_s*) are available. The number of recipients of parental leave benefits (*bplct_s*) is strongly under-simulated in EUROMOD (ratio of 34% in 2018).

The number of households in receipt of old-age social assistance (*bsaoa_s*) – one of the major components of social assistance – is somewhat under-simulated in EUROMOD (ratio of 83% in 2018). At the same time, the number of recipients of general social assistance (*bsa00_s*) is substantially over-simulated in 2018 (ratio of 158%). The reason for these discrepancies is that the eligibility rules for these two benefits are difficult to approximate without richer input data (as an example, *bsaoa_s* grants benefits to those permanently disabled whereas *bsa00_s* to those temporary disabled). However, it is important to note that the sum of recipients of *bsaoa_s* and *bsa00_s* matches better official statistics than the individual beneftis (simulated recipients add up to 890,000, whereas official statistics report 1,010,000 recipients). Given that these two benefits grant the same benefit amount and have very similar means tests (i.e. differ almost exclusively in the eligibility rules), these discrepancies should have at most a small effect on the simulated income distribution as in aggregated terms they achieve a reasonable precision.

The simulated number of household recipients of social benefits (*bsaot_s*) is strongly under-simulated in EUROMOD (ratio of 29% with respect to official statistics). There may be multiple reasons for this discrepancy. Next to the three potential channels for discrepancies described for unemployment assistance (*bunnc*), the discrepancy in terms of recipients of social benefits may be related to the fact that this benefit is simulated as the rest of needs not covered by the unemployment assistance. Therefore, if the household's needs are underestimated in *bunnc* (e.g. because someone is pregnant or sick and therefore entitled to additional allowances), this could reduce the number of social benefit recipients and the corresponding aggregated amounts.

Regarding education benefits (*bed_s*), the simulations estimate a somewhat too large number of recipients (ratio of 121%). This discrepancy already exists in the input dataset and the simulated figure is reasonably similar to that of the input dataset.

The number of recipients of housing benefits (*bho00_s*) resulting from the simulation for the baseline year is very accurate (ratio of 103% with respect to official statistics).

Now, it comes to the taxes and social security contributions that have been simulated in EUROMOD. The second panel of Table 4.7 displays numbers of contributors as simulated. No external data on the number of contributors could be found, except for social security contributions paid by employees (quite precisely simulated, ratio of 107%).

In the EU-SILC data for 2018, about 39m households pay either income taxes or contribute to any scheme of social security (*tis*). The respective number of households simulated for 2018 is almost identical to the EU-SILC figure. In terms of individuals, about 37.5m 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 (35.3m). 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). About 2.5m 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 18.1m pensioners have been simulated to contribute to social security for pensioners (*il_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 (apart from employees and pensioners), as national accounts usually only report aggregate sums but no numbers of contributors.

Unfortunately, there is less information available for the number of tax payers. Official statistics on income tax are only available every three years and only with a lag of about five years. The number of individuals paying positive income taxes (*tin_s*) is simulated to be about 48.5m.

Aggregate amounts for the simulated benefits are validated in Table 4.8. The aggregate amount of sickness benefits *(bhl_s)* reflects accurately that reported officially (ratio of 102% in 2018). Unfortunately, the aggregated amount of the major simulated disability benefit from the statutory accident insurance (*pdiss_s*) cannot be truly validated against external statistics because the simulated amount concerns uniquely those below the age of 65 and there is no comparable external statistic that considers this age threshold. However, just as an indication that the simulation is reasonable, Table 4.8. includes the external figure corresponding to all disability benefits from the statutory accident insurance and one can see that, as expected, the simulated aggregated amount is smaller than the official statistic.

Simulation results for the aggregate sums of the unemployment benefit I (*bunct_s*) are about 40% of those from external statistics for 2018. This is a major discrepancy, which can be explained by the fact that unemployment benefits I are only partially simulated and the aggregate sum of *bunct* in the input dataset is much lower than the external statistic. With regard to unemployment benefits II (*bunnc_s*), the simulated aggregated amounts are substantially under-simulated (ratio of 62% in 2018). It is not possible to identify a particular reason for this, but it is consistent with the also lower amount in the input dataset.

Next, we come to simulated family benefits (*bfa*). At the most important family benefit in terms of aggregate spending, namely the child benefits (*bch00_s*), simulated amounts match well external official statistics (ratio of 92% for 2018). At the minor family benefits, sums deviate somewhat between simulations and external data. Maternity benefits (*bmact_s*) appear to be strongly under-simulated (ratio of 54% with respect to the external figure). The reason behind this discrepancy is that EUROMOD only simulates the standard benefit amount. However, the benefit amount can be significantly higher for premature births (but unfortunately no information available in the input dataset) as well as for those mothers whose employers exceptionally cannot pay their maternity contribution. Aggregate sums of parental-leave benefits (*bplct_s*) are also under-simulated (ratio around 50% in 2018), which is consistent with the under-simulated number of recipients. This has probably to do with the fact that the benefit is calculated on imputed previous earnings of the recipients, as we observe these differences for most contributory benefits. The simulated aggregated amount of additional child benefits (*bchot_s*) is strongly over-simulated in 2018 (ratio of 152% in 2018), which is in line with the over-simulation of recipients and hints to severe benefit non-take-up. However, the simulation captures the structural changes in *bchot_s* in 2020 quite precisely.

In terms of aggregated amounts, we cannot macrovalidate old-age and reduced work ability social assistance *(bsaoa_s)* because official statistics do not differentiate between expenses for individuals living in care facilities (not included in EU-SILC) and individuals living in private accommodation. Basic social assistance (*bsa00_s*) is significantly under-simulated in all considered years (ratios between 50% and 62%). The aggregated amount of social benefits (*bsaot_s*) is substantially underrepresented for 2018 (ratio of 46%). A possible cause for this could be that households in the simulation switch from the scheme “bunnc_s + bsaot_s” to the scheme “bho00_s + bchot_s” due to minimal differences arising from the uprating.

Education benefits (*bed_s*) are over-simulated (the aggregated simulated amount being about 133% of the amount reported by official statistics in 2018), which is consistent with the over-simulated number of recipients. The over-simulation may derive from the too large number of recipients in the input dataset.

Finally, the aggregated amount of housing benefits *(bho00_s)* is under-simulated when compared to the figure from the external source (ratio of 70% in 2018).

Aggregate amounts of simulated taxes and social security contributions are compared to external figures in the second panel of Table 4.8. External information from national accounts has been utilised to validate the simulated social security payments. Employers’ social contributions have been simulated quite precisely (ratio of 101% with respect to external statistics). Employees’ social security contributions have been slightly under simulated (ratio of 96%). Social contributions made by self-employed individuals in contrast seem to be strongly under-simulated (ratio of 67%), despite of the relatively accurate number of individuals receiving self-employment income.

There is less information available for taxes[8]. For 2018, the coverage rate for the revenue from income tax (*tin_s*) was around 101%.

4.2 Income distribution

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 security contributions. The weights in the OECD scale 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 4.9 in the Annex as income shares hold by income deciles. Simulated incomes for the five policy years (EUROMOD) are compared to external data, for which ratios of coverage are tabulated. The external source for the decile income shares is Eurostat statistics.

EUROMOD strongly over-simulates the income share of the lowest decile in 2018 (where the ratio of the simulated to the external figure amounts to 160%) but captures quite accurately the second to ninth deciles of the distribution, with ratios of 98% to 102%. The highest decile is slightly under-simulated (ratio of 94% in 2018). It is not possible to identify a single cause for the inaccuracy in the simulation of the income share hold by the lowest decile as there is no single benefit which is so strongly over-simulated.

For the comparisons of the median, mean, Gini coefficient, and the inter-quantile ratio (S80/S20), external data again refers to official statistics from Eurostat. In terms of household disposable income, the mean and the median of the simulation are very close to the external figures (99%). The Gini coefficient is lower in the simulated distribution than in the external figures (ratio of 90% in 2018). As well, the simulated interquintile quotient islower than the external figures from Eurostat (ratio of 80% in 2018).

4.2.2 Poverty rates

Poverty rates by gender and age are presented in Table 4.10. They are compared for the EUROMOD simulations with 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, and for the usual 60%-definitions they are presented separately for age groups.

As a result of the over-simulation of equivalised household incomes in the lower income decile (see Table 4.9.), poverty rates – which are based on that income distribution – are also under-simulated. The model reaches a ratio of between 79% and 89% for the 40%-definition, and a ratio of about 90% for the 50%-definition. Under-simulation is less severe the closer we are to the median: ratios amount close to 95% for the 60%-definition as well as for the 70%-definition. For the 60%-definition differentiated by age groups, the greatest deviations are found individuals aged 50 to 64, for whom the poverty rate is somewhat under-simulated.

[8] For details on the imputation of tax allowances, please see section 3.3.5.

4.3 Validation of minimum wage

In January 2015, a minimum wage was introduced in Germany. Table 4.11 presents validation figures for the simulation of the minimum wage which assumes full compliance with the legislation. The simulations including the minimum wage adjustment generate slightly higher aggregated disposable income than the baseline simulations (with a ratio of 99%). Including the minimum wage simulation also raises the aggregated amounts of employment income and, subsequently, the revenues from income tax and employees' social security contributions. Furthermore, simulations including the minimum wage adjustment yield a slightly lower Gini coefficient and poverty headcount.

5. SUMMARY OF "HEALTH WARNINGS"

The model draws to a large extent on the disaggregation of harmonized variables (mostly benefits) described in Section 3.3.3. The fit of the disaggregated benefits is very good for some variables and rather poor for others. Fortunately, for input datasets based on EU-SILC 2016 and later datasets, the national team has received information on which benefits are contained under which SILC disaggregated benefit variables, which has improved the quality of the disaggregation procedure.

From this release onwards, tax allowances are no longer imputed but simulated within EUROMOD. A detailed description of the simulation of tax allowances can be found in Section 2.6.1 of this report. A description of the (old) imputed tax allowances is available in earlier versions of the Country Report for Germany.

In input datasets based on EU-SILC 2015 and older, early retirement benefit (byr) was disaggregated from unemployment benefits (bun). Thanks to new information provided by Eurostat, the early retirement benefit (byr) in the input dataset based on EU-SILC 2016 is identified as part of old-age benefits (poa).

Furthermore, the policy pdiac_de - and resulting variables *pdiac* and *pdiac_s* - have been dropped in the model. According to new information provided by Eurostat, EU-SILC does not contain information on this benefit.

In input datasets based on EU-SILC releases up to 2015, advances on alimony payments were disaggregated from social assistance benefits. Thanks to new information, we know that such benefits are classified in EU-SILC as family benefits. As a consequence, the benefit *bsaam* takes the name *bcham* from input dataset DE_2015_a* onwards.

In year 2020, the model includes the possibility of simulating Germany's most important wage compensating scheme (Kurzarbeit). This policy already existed before 2020 and information on these transfers are saved in variable ysv. The simulated version of the policy in 2020 has been named bwkmcee_s for harmonisation purposes.

The simulation of the wage compensation scheme (bwkmcee_de) is triggered by the simulation of labour market transitions defined in policy TransLMA_de. This policy becomes operational if the model is run in conjunction with the LMA add-on. The nature of these simulations is still experimental and only partially validated. Users are encouraged to refer to the "Simulating labour market transitions in EUROMOD" document prior to their use.

Labour market transitions are switched OFF in EUROMOD baselines. As a consequence, the simulation of monetary compensation schemes does not produce any effect in baseline simulations. Since all policies not linked to labour market transitions are fully functional, it is possible for disposable income in 2020 to be higher than disposable income in previous years.

6. References

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 (2018). Strukturen der Grundsicherung SGB II, Monats- und Jahreszahlen ab 2005

Bundesagentur für Arbeit (2015). Annual report: Labour market 2014 (Arbeitsmarkt 2014) http://statistik.arbeitsagentur.de/Navigation/Statistik/Arbeitsmarktberichte/Jahresbericht-Arbeitsmarkt-Deutschland-Nav.html.

Bundesagentur für Arbeit (2016). Annual report: Labour market 2015 (Arbeitsmarkt 2015) http://statistik.arbeitsagentur.de/Navigation/Statistik/Arbeitsmarktberichte/Jahresbericht-Arbeitsmarkt-Deutschland-Nav.html.

BMAS (2013) - Bundesministerium für Arbeit und Soziales (2013): Sozialbericht 2013. http://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen/sozialbericht-2013.pdf

BMAS (2017) - Bundesministerium für Arbeit und Soziales (2017): Alterssicherung in Deutschland 2015, Forschungsbericht 474/Z

BMAS (2017) - Bundesministerium für Arbeit und Soziales (2017): Sozialbericht 2017

BMAS (2019) – Bundesministerium für Arbeit und Soziales (2019): Sozialbudget 2019

BMFSFJ (2020) – Bundesministerium für Familien, Senioren, Frauen und Jugend (2020): online accessible: https://www.bmfsfj.de/blob/94322/f60b561001ddcab0190b02c86a109a0d/merkblatt-kinderzuschlag-data.pdf

Deutsche Bundesbank (2017) - Ergebnisse der Gesamtwirtschaftlichen Finanzierungsrechnung für Deutschland 2011-2016: Nettogeldvermögen privater Haushalte; Housing expenditures: Statistisches Bundesamt: Verbraucherpreise - Verbraucherpreisindex für Deutschland.

Deutsche Rentenversicherung: Rentenversicherung in Zahlen (2016): www.deutsche-rentenversicherung.de/cae/servlet/.../01_rv_in_zahlen_2013.pdf

Deutsche Rentenversicherung (2017): Aktuelle Daten (2016): http://www.deutsche-rentenversicherung.de/Allgemein/de/Inhalt/6_Wir_ueber_uns/03_fakten_und_zahlen/03_statistiken/02_statistikpublikationen/07_aktuelle_daten.html

EUROMOD Country Report for Germany (2009-2013): https://www.iser.essex.ac.uk/euromod/using-euromod/country-reports/

EUROMOD Country Report for Germany (2011-2016): https://www.iser.essex.ac.uk/euromod/using-euromod/country-reports/

Eurostat (2016) – EU-SILC 065 (2016 operation) – Description of Target Variables: Cross-sectional and longitudinal, 2016 operation (Version October 2017)

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. (2014): Codebook for the §PEQUIV File 1984-2013. CNEF variables with extended income information for the SOEP. Data Documentation 74, DIW Berlin.

Minijob Zentrale (2019): Abgaben für gewerbliche 450-Euro Minijobs; online accessible: https://www.minijob-zentrale.de/DE/01_minijobs/02_gewerblich/01_grundlagen/01_450_euro_gewerbe/02_abgaben_gewerbliche/node.html

Report of the Federal Government to the Parliament (2014): Zwanzigster Bericht nach § 35 des Bundesausbildungsförderungsgesetzes zur Überprüfung der Bedarfssätze, Freibeträge sowie Vomhundertsätze und Höchstbeträge nach § 21 Absatz 2

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

Statistisches Bundesamt: Statistical Year Books 2015;2016;2017.

Statistisches Bundesamt Deutschland (2016); Finanzen und Steuern – Versorgungsempfänger des öffentlichen Dienstes (2016), Fachserie 14, Reihe 6.1

Statistisches Bundesamt Deutschland (2017); Finanzen und Steuern – Steuerhaushalt (2016), Fachserie 14, Reihe 4.

Statistisches Bundesamt (2018): Volkswirtschaftliche Gesamtrechnungen: Inlandsproduktberechnung, Vierteljahresergebnisse. Fachserie 18, Reihe 1.2.

Statistisches Bundesamt (2019): Wirtschaftsrechnungen - LEBEN IN EUROPA (EU-SILC) Einkommen und Lebensbedingungen in Deutschland und der Europäischen Union. Fachserie 15, Reihe 3.

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-benefit descriptions/rules***

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

http://www.buzer.de/

ANNEX 1. UPRATING FACTORS

Table 3.5. Raw indices for deriving EUROMOD uprating factors

Index	Constant name	Years				Source	Income components uprated by the index
		2018	2019	2020	2021		
Consumer Price Index (2015=100)	$f_cpi	104.0	105.5	105.8	108.4	Eurostat; for 2020 indicator ZCPIH from DG ECFIN	yxy01 – yxy06, kfb, ypp, ysv, bunot, buntr, byr, bhl, bsaam, bsapu, bsaot, pdiot, pdiwr, poapu, poa00, poaps, poaps01, poaps02, poaab, tpr, tad, kivho, xmp, xpp, kfbcc, tinta*, all sim. ben.
Harmonized Consumer Price Index (2015 = 100)	$HICP	104.0	105.5	105.8	108.4	Eurostat; for 2020 indicator ZCPIH from DG ECFIN	
Average gross earnings; overall economy (EUR per year)	$f_yem0	43 569	44 876	45 131	46371.6	National Statistical Office, National Accounts	yem
Average gross earnings; agriculture and fishing (EUR per year)	$f_yem1	22 670	22 989	23 019	23651.7	National Statistical Office, National Accounts	yem
Average gross earnings; mining, manufacturing and utilities (EUR per year)	$f_yem2	57 474	58 729	57 481	59061.0	National Statistical Office, National Accounts	yem
Average gross earnings; construction (EUR per year)	$f_yem3	41480.0	42835.0	43630.0	44829.3	National Statistical Office, National Accounts	yem
Average gross earnings; wholesale and retail trade (EUR per year)	$f_yem4	33653.0	34889.0	34415.0	35361.0	National Statistical Office, National Accounts	yem
Average gross earnings; hotels and restaurants (EUR per year)	$f_yem5	33653.0	34889.0	34415.0	35361.0	National Statistical Office, National Accounts	yem

Average gross earnings; transport and communication (EUR per year)	$f_yem6	70324.0	73206.0	74475.0	76522.2	National Statistical Office, National Accounts	yem
Average gross earnings; financial intermediation (EUR per year)	$f_yem7	72860.0	75313.0	76621.0	78727.2	National Statistical Office, National Accounts	yem
Average gross earnings; real state and business (EUR per year)	$f_yem8	40 595	41 447	41 776	42924.3	National Statistical Office, National Accounts	yem
Average gross earnings; public administration and defence (EUR per year)	$f_yem9	42850.0	44290.0	45704.0	46960.3	National Statistical Office, National Accounts	yem
Average gross earnings; education (EUR per year)	$f_yem10	42850.0	44290.0	45704.0	46960.3	National Statistical Office, National Accounts	yem
Average gross earnings; health and social work (EUR per year)	$f_yem11	42850.0	44290.0	45704.0	46960.3	National Statistical Office, National Accounts	yem
Average gross earnings; other (EUR per year)	$f_yem12	26433.0	27486.0	28197.0	28972.1	National Statistical Office, National Accounts	yem
Aggregated gross earnings; overall economy (billion EUR per year)	$f_yivwg0	1460.0	1520.5	1509.4	1550.9	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; agriculture and fishing (billion EUR per year)	$f_yivwg1	6.8	6.9	7.0	7.1	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; mining, manufacturing and utilities (billion EUR per year)	$f_yivwg2	384.6	393.6	373.6	383.9	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; construction (billion EUR per year)	$f_yivwg3	71.2	75.0	77.7	79.8	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; wholesale and retail trade (billion EUR per year)	$f_yivwg4	263.8	276.0	265.1	272.3	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; hotels and restaurants (billion EUR per year)	$f_yivwg5	263.8	276.0	265.1	272.3	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; transport and communication (billion EUR per year)	$f_yivwg6	69.4	75.7	78.4	80.6	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; financial intermediation (billion EUR per year)	$f_yivwg7	57.8	58.4	59.3	60.9	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; real state and business (billion EUR per year)	$f_yivwg8	127.231	134.087	137.657	141.4	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; public administration and defence (billion EUR per year)	$f_yivwg9	354.7	372.9	391.4	402.2	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; education (billion EUR per year)	$f_yivwg10	354.7	372.9	391.4	402.2	National Statistical Office, National Accounts	yivwg

Aggregated gross earnings; health and social work (billion EUR per year)	$f_yivwg11	354.7	372.9	391.4	402.2	National Statistical Office, National Accounts	yivwg
Aggregated gross earnings; other (billion EUR per year)	$f_yivwg12	56.5	59.2	58.6	60.2	National Statistical Office, National Accounts	yivwg
Lagged average gross earnings; overall economy (EUR per year)	$f_yxy0	42351.0	43569.0	44964.0	45131.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; agriculture and fishing (EUR per year)	$f_yxy1	22574.0	22670.0	22989.0	23019.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; mining, manufacturing and utilities (EUR per year)	$f_yxy2	55814.0	56990.0	58253.0	56847.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; construction (EUR per year)	$f_yxy3	40218.0	41480.0	42835.0	43630.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; wholesale and retail trade (EUR per year)	$f_yxy4	32631.0	33653.0	34889.0	34415.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; hotels and restaurants (EUR per year)	$f_yxy5	32631.0	33653.0	34889.0	34415.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; transport and communication (EUR per year)	$f_yxy6	67531.0	70324.0	73206.0	74475.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; financial intermediation (EUR per year)	$f_yxy7	71657.0	72860.0	75313.0	76621.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; real state and business (EUR per year)	$f_yxy8	38 870	40 595	41 447	41 776	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; public administration and defence (EUR per year)	$f_yxy9	41800.0	42850.0	44290.0	45704.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; education (EUR per year)	$f_yxy10	41800.0	42850.0	44290.0	45704.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; health and social work (EUR per year)	$f_yxy11	41800.0	42850.0	44290.0	45704.0	National Statistical Office, National Accounts	yxy
Lagged average gross earnings; other (EUR per year)	$f_yxy12	25543.0	26433.0	27486.0	28197.0	National Statistical Office, National Accounts	yxy
Aggregate self-employment income (billion Euro)*	$f_yse	215.5	220.4	212.3	218.2	National Statistical Office, National Accounts	yse
Aggregate income from capital in private households (billion Eur)	$f_yiy	387.3	375.6	347.9	357.4	National Statistical Office, National Accounts	yiy, yiyot
HIPC Actual Rents for Housing (2005 = 100, annual data)	$f_housingrents	104.6	106.1	107.6	110.6	Eurostat	ypr, bho, xhc, xhcrt, xhcot xhcmomi
Updating factor of 1	$f_one	1.0	1.0	1.0	1.0		yds, ydses_o

Current pension value (Eur, weighted average of West/East German values)	$f_publicpension	31.8	32.8	34.0	34.0	Statutory Parameter, Public Pension Insurance	pdi00, poass, psu, psuor, psuwd
Average old-age pension for employees (Eur per month)	$f_poass_av	905.7	953.9	956.7	982.9	Public Pension Insurance	
Average wage for civil servants (Eur/month)	$f_poacs	3920.0	4050.0	4061.5	4173.2	National Statistical Office	poacs
Average old-age pension for civil servants (Eur per month)	$f_poacs_av	2 900	2 920	3 080	3164.7	National Statistical Office	
Average survivors' pension (Eur per month); Renten wegen Todes	$f_psu_av	591.9	612.4	614.2	631.1	Public Pension Insurance	
Average Orphans' Pension (Eur per month)	$f_psuor_av	189	196	196.7	202.1	Public Pension Insurance	
Average Widows' Pension (Eur per month)	$f_psuwd_av	614.4	635.4	637.2	654.7	Public Pension Insurance	
Aggregate income tax and ssc (billion Euro)	$f_tis	486.085	501.327	492.027	505.6	National Statistical Office	tis
Aggregate net wealth of private households (billion Euro)*	$f_afc	258.7	274.1	393.3	404.1	German Central Bank	afc
Average disability pension (Eur per month) from pension insurance	$f_pdi00_av	795	835	836.9	859.9	Public Pension Insurance	

* Consumer Price Index for 2020 has been uprated according to indicator ZCPIH from DG ECFIN. Earnings for 2020 have been uprated according to DG ECFIN projections on earnings (nominal compensation per employee). The data is available under: **http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm.** The rest of variables has been provisionally uprated for 2020 by using the average harmonized price index for the months January-March 2020.

ANNEX 2. POLICY EFFECTS IN 2020-2021

In this section we analyse the direct tax-benefit policy effect on household disposable income in Germany between 2020 and 2021. We try to understand how changes (or non-changes) to tax-benefit policies have affected household incomes, abstracting from changes in the population characteristics (e.g. increased unemployment) and the distribution of market/original gross incomes (e.g. reduction in wages). It should be noted that tax-benefit policies in a given year are taken as of 30th of June. Covid-related policies are not considered, except of the one-off child benefit of 300 Euro per child.

Table A2.1 and Figure A2.1 show the policy effect measured in real terms by income component and income decile group. The effect is estimated as the difference between simulated household net income under the 2021 tax-benefit policies (deflating the tax-benefit monetary parameters by Eurostat's Harmonized Index of Consumer Prices, HICP) and net incomes simulated under 2020 policies, as a percentage of mean equivalised household disposable income in 2020. Households are ranked based on their equivalised household disposable income. The total policy effect on household incomes is decomposed into the different components: public pensions, means-tested benefits, non-means-tested benefits, employee and self-employed social insurance contributions (SIC), other SIC and direct taxes. We isolate the policy effect from changes in market/original income, i.e. changes to market/original incomes are not considered as part of the policy effect and so, they have no effect on disposable income.

In 2020-2021, the average household disposable income increased by 0.41%. A look at the effects across decile groups reveals that the policy effect was overall regressive. The biggest impact can be found at the 9th decile of the distribution, where the increase reached 1.20%, whereas disposable income of the 2nd decile decreased by 0.94%. Two policies were mostly responsible for the developments in household disposable income: public pensions, which contributed on average to a 0.35% decrease in household disposable income and direct taxes, which contributed on average to a 0.91% increase.

In the case of direct taxes the increase is mainly due to the abolishment of the solidarity surcharge for most income tax payers. The income effect of the missing solidarity surcharge increases steadily from the first to the 9th decile due to the progressive nature of the German income tax schedule. Richer household pay higher amounts of income tax and thus benefit relatively more of tax cuts. The increasing trend breaks with the 10th decile as the solidarity surcharge is abolished for only about 95% of the relevant taxpayers. Households with the highest taxable incomes are still required by law to pay this 'extra' tax.

In the case of public pensions, the decrease in household disposable income which we observe in Table A2.1. is mainly because the German legislated pension value grew less than the CPI projection. In fact, for West Germany the statutory pension insurance did not increase the pension value for 2021 at all. While the regressive effect of direct taxes is concentrated in the upper half of the income distribution, negative income effects of public pensions can be found for lower incomes. This is probably the case because recipients of public pensions are typically concentrated in the lower deciles of the disposable income distribution as income from (public) pensions is in general substantially less than labour income. In addition to this, public pensions usually make up a proportionally bigger part of disposable income in poorer pensioners' households than in richer ones, that in some cases receive additional income, for example from capital or rental income.

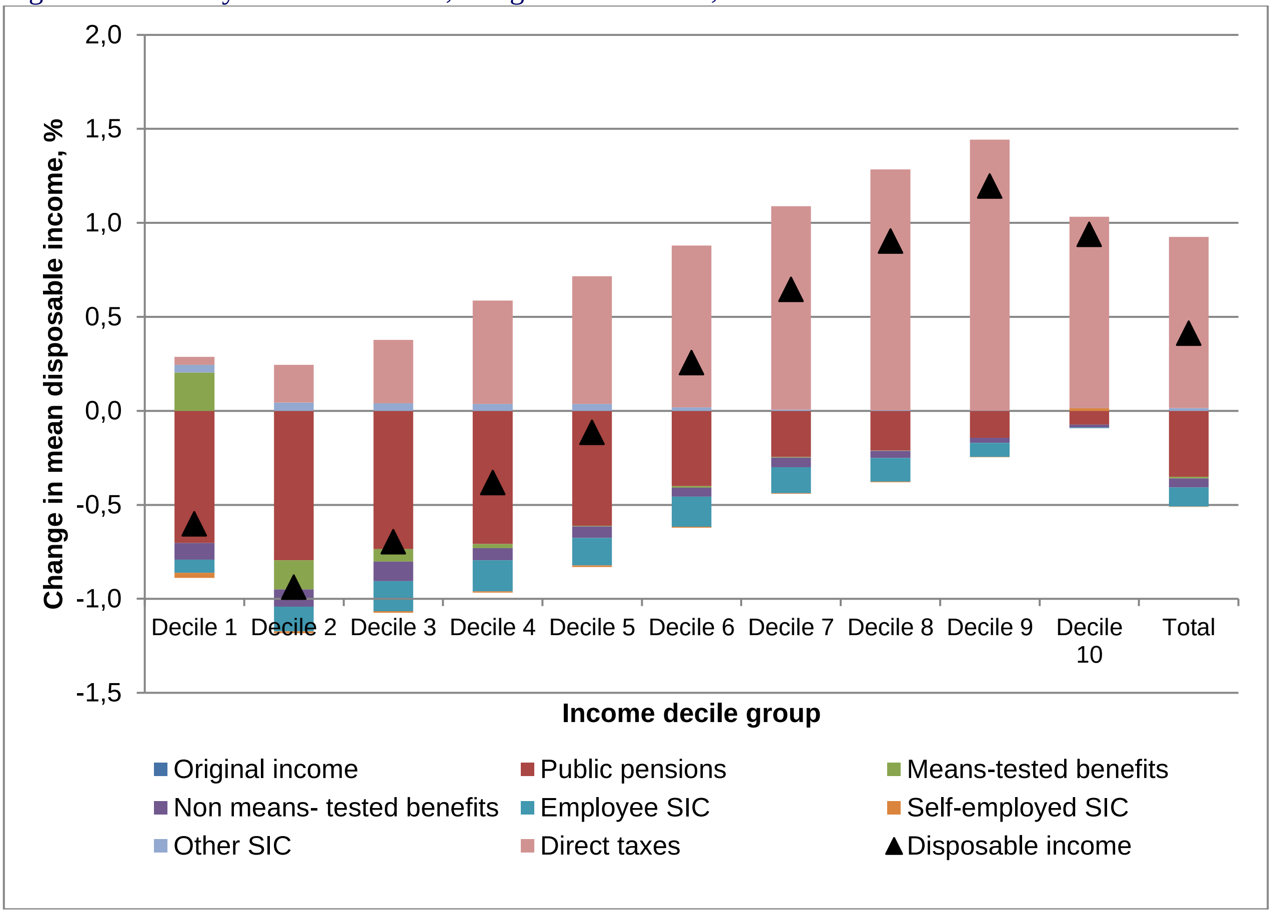
Rising contributions to employee schemes of social insurance, especially statutory health insurance, decrease mean disposable income by 0.1%. The changes in the other policies are nearly negligible, but even social benefits, regardless of means-tested or not, have a mostly regressive effect. An exception is means-tested benefits that increase disposable income of the 1st decile.

Table A2.1: Policy effect in 2020-21, using CPI-indexation, %

Decile	*Original income*	*Public pensions*	*Means-tested benefits*	*Non means-tested benefits*	*Employee SIC*	*Self-employed SIC*	*Other SIC*	*Direct taxes*	*Disposable income*
1	0.00	-0.70	0.20	-0.09	-0.07	-0.03	0.04	0.04	-0.60
2	0.00	-0.79	-0.16	-0.09	-0.13	-0.01	0.04	0.20	-0.94
3	0.00	-0.74	-0.07	-0.10	-0.16	-0.01	0.04	0.34	-0.70
4	0.00	-0.71	-0.02	-0.06	-0.17	-0.01	0.04	0.55	-0.38
5	0.00	-0.61	0.00	-0.06	-0.15	-0.01	0.04	0.68	-0.11
6	0.00	-0.40	-0.01	-0.05	-0.16	-0.01	0.02	0.86	0.26
7	0.00	-0.25	0.00	-0.05	-0.14	0.00	0.01	1.08	0.65
8	0.00	-0.21	0.00	-0.04	-0.13	0.00	0.00	1.28	0.90
9	0.00	-0.14	0.00	-0.03	-0.08	0.00	0.00	1.44	1.20
10	0.00	-0.07	0.00	-0.02	0.00	0.01	0.00	1.02	0.94
Total	0.00	-0.35	-0.01	-0.05	-0.10	0.00	0.02	0.91	0.41

Notes: Other SIC include SIC paid by pensioners and non-working individuals.

Figure A2.1: Policy effect in 2020-21, using CPI-indexation, %



ANNEX 3. VALIDATION TABLES

Table 4.2-Number of employed and unemployed (in thousands)

	EUROMOD	External				Ratio			
	2018	2018	2019	2020	2021	2018	2019	2020	2021
Number of employed	38,599	44,858	45,268	44,898	#NV	86%	85%	86%	#NV
Number of unemployed	2,015	2,340	2,267	2,695	#NV	86%	89%	75%	#NV

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. Number of employed includes both employees and self-employed individuals, also averages over all months.

Sources: EU-SILC 2019 and Federal Employment Agency (2021) – Monatsbericht zum Arbeits- und Ausbildungmarkt Dezember 2020/2019/2018 (http://statistik.arbeitsagentur.de).

Table 4.3-Market income in EUROMOD - Number of recipients (in thousands)

	EUROMOD name	EUROMOD	External				Ratio			
		2018	2018	2019	2020	2021	2018	2019	2020	2021
Original Income	ils_origy	60,466	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Employment Income	yem	41,334	40,495	40,974	40,765	#NV	102%	101%	101%	#NV
Self-employment Income	yse	3,623	4,219	4,151	4,038	#NV	86%	87%	90%	#NV
Private Pension Income	il_ppen	1,622	634	N/A	N/A	#NV	256%	N/A	N/A	#NV
Capital Income	yiy	49,058	61,400	N/A	N/A	#NV	80%	N/A	N/A	#NV
Property Income	ypr	5,954	10,300	N/A	N/A	#NV	58%	N/A	N/A	#NV
Private Transfers Received	ypt	2,826	1,378	N/A	N/A	#NV	205%	N/A	N/A	#NV
Other Income	yot	189	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Fringe Benefits	kfb	5,158	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV

Notes: Number of households for private transfers received. For all other variables, number of individuals.

Sources: EU-SILC 2019 and own simulations based on EUROMOD. For external figures: micro data from GSOEP (yiy, ypr, ypt, kivho) and aggregate statistics from the Federal Employment Agency (yem and yse).

Table 4.4-Market income in EUROMOD - Annual amounts (in mil.)

	EUROMOD name	EUROMOD				External				Ratio			
		2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
Original Income	ils_origy	1,642,299	1,689,922	1,694,031	1,740,667	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Employment Income	yem	1,444,269	1,488,813	1,499,400	1,540,615	1,462,646	1,524,063	1,514,057	#NV	99%	98%	99%	#NV
Self-employment Income	yse	136,452	139,554	134,426	138,161	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Private Pension Income	il_ppen	7,921	8,035	8,058	8,256	4,070	N/A	N/A	#NV	195%	N/A	N/A	#NV
Capital Income	yiy	25,560	24,788	22,960	23,586	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Property Income	ypr	28,830	29,244	29,657	30,484	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Private Transfers Received	ypt	14,731	15,173	15,259	15,679	30,300	N/A	N/A	#NV	49%	N/A	N/A	#NV
Other Income	yot	208	215	216	222	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Fringe Benefits	kfb	14,992	15,208	15,251	15,626	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV

Sources: EU-SILC 2019 and own benefit disaggregation. For external figures: micro data from GSOEP (yiy, ypr, ypt) and aggregate statistics from national accounts (yem).

Table 4.5-Tax benefit instruments included but not simulated in EUROMOD - Number of recipients/ payers (in thousands)

	EUROMOD name	EUROMOD figure	External statistics				Ratio			
		2018	2018	2019	2020	2021	2018	2019	2020	2021
Benefits										
All Pensions	ils_pen	20,662	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Old-age Benefits	poa	18,087	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Employer Scheme	poa00	1,079	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Civil Servants	poacs	2,298	1,191	1,220	1,250	#NV	193%	188%	184%	#NV
Public Service	poapu	651	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Self-Employed	poaps	60	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Stat. Pens. Insur.	poass	15,657	18,134	18,253	N/A	#NV	86%	86%	N/A	#NV
Foreign Country	poaab	311	1,247	1,248	N/A	#NV	25%	25%	N/A	#NV
Early Retirement	byr	125	241	244	N/A	#NV	52%	51%	N/A	#NV
Disability Benefit	pdi	2,234	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Stat. & Employer	pdi00	1,780	1,784	1,769	N/A	#NV	100%	101%	N/A	#NV
Civil Servants	pdiot	152	97	93	90	#NV	157%	163%	169%	#NV
Care Allowance	pdica	327	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
War Victims	pdiwr	5	17	N/A	15	#NV	29%	N/A	34%	#NV
Survivor Pension	psu	3,201	5,143	5,123	N/A	#NV	62%	62%	N/A	#NV
Unempl. Benefits	bun	3,889	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Business Start-Ups	bunot	38	25	24	20	#NV	151%	157%	191%	#NV
Re-Training	buntr	194	166	181	180	#NV	117%	107%	107%	#NV
Severance Pay	ysv	354	118	145	2,939	#NV	300%	244%	12%	#NV
Alimony Pay	bcham	867	806	823	838	#NV	108%	105%	103%	#NV
Non-Prof. Charity	bsapu	69	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Taxes and Social Insurance contributions										
Property Taxes	tpr	18,099	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV

Notes: Number of individuals for all benefits except for bcham and bsapu, where figures refer to number of households. External figures for all bun* benefits are sums over the year (not an average over all months).
Sources: EU-SILC 2019 and own benefit disaggregation. For external figures: Federal Employment Agency 2020 (ysv, bunot, buntr, byr); Sozialbericht 2019 (poa00, poass, poacs, poapu, poaps, psu); ASID 2018 for poaab.

Table 4.6-Tax benefit instruments included but not simulated in EUROMOD - Annual amounts (in mil.)

	EUROMOD name	EUROMOD				External				Ratio			
		2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
Benefits													
Pensions	ils_pen	394,643	406,540	417,452	420,972	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Old-age Benefits	poa	346,212	356,663	365,770	368,892	309,600	325,600	339,600	#NV	112%	110%	108%	#NV
Employer Schemes	poa00	13,019	13,207	13,245	13,570	23,485	23,748	23,713	#NV	55%	56%	56%	#NV
Civil Servants	poacs	79,992	82,645	82,880	85,159	60,000	62,800	65,500	#NV	133%	132%	127%	#NV
Public Service	poapu	5,791	5,874	5,891	6,036	11,700	12,300	12,500	#NV	49%	48%	47%	#NV
Self-Employed	poaps	567	575	577	591	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Stat. Pens. Insur.	poass	232,543	239,856	248,631	248,631	196,940	208,498	N/A	#NV	118%	115%	N/A	#NV
Foreign Country	poaab	1,361	1,381	1,385	1,419	5,163	5,434	N/A	#NV	26%	25%	N/A	#NV
Early Retirement	byr	1,269	1,287	1,291	1,322	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Disability Benefit	pdi	21,895	22,504	23,166	23,283	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Stat. & Employer	pdi00	17,186	17,726	18,375	18,375	17,068	17,608	N/A	#NV	101%	101%	N/A	#NV
Civil Servants	pdiot	2,737	2,777	2,785	2,853	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Care Allowance	pdica	1,170	1,187	1,190	1,219	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
War Victims	pdiwr	18	18	18	19	312	N/A	288	#NV	6%	N/A	6%	#NV
Survivor Pension	psu	27,285	28,143	29,173	29,173	38,447	39,649	N/A	#NV	71%	71%	N/A	#NV
Unempl. Benefits	bun	22,974	23,306	23,372	23,946	31,800	30,600	57,900	#NV	72%	76%	40%	#NV
Business Start-Ups	bunot	125	127	127	130	268	261	240	#NV	47%	49%	53%	#NV
Re-Training	buntr	423	429	430	441	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Severance Pay	ysv	1,299	1,318	1,322	1,354	913	928	22,881	#NV	142%	142%	6%	#NV
Alimony Pay	bcham	841	853	856	877	1,800	1,800	1,900	#NV	47%	47%	45%	#NV
Non-Prof. Charity	bsapu	54	55	55	56	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Taxes and Social Insurance contributions													
Property Taxes	tpr	6989	7090	7110	7284	5700	5800	N/A	#NV	123%	122%	N/A	#NV

Sources: EU-SILC 2019 and own benefit disaggregation. For external figures: Sozialbericht 2019 for poa, poa00, poacs, poapu, poaps, poaab, bcham, psu, byr and ysv; Rentenversicherung in Zeitreihen 2019 for poass and pdi00; ASID 2018 for poaab; OECD Revenue Statistic for tpr

Table 4.7-Tax benefit instruments simulated in EUROMOD - Number of recipients/ payers (in thousands)

	EUROMOD name	EUROMOD				SILC	Ratio	External				Ratio			
		2018	2019	2020	2021	2018	2018	2018	2019	2020	2021	2018	2019	2020	2021
Benefits															
Sickness B.	bhl_s	1,419	1,419	1,419	1,419	1,368	104%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Pen. (St. Ac.)	pdiss_s	275	275	275	275	82	334%	775	761	747	#NV	35%	36%	37%	#NV
U. Insurance	bunct_s	938	938	938	938	1,027	91%	772	810	1,076	#NV	121%	116%	87%	#NV
U. Assistance	bunnc_s	2,789	2,793	2,630	2,617	2,517	111%	2,923	2,747	N/A	#NV	95%	102%	N/A	#NV
Child Ben.	bch00_s	9,185	9,185	9,185	9,185	11,079	83%	9,136	9,422	9,596	#NV	101%	97%	96%	#NV
Add. Child A.	bchot_s	192	156	553	525	745	26%	87	91	276	#NV	219%	171%	201%	#NV
Educ. Allowance	bched_s	699	685	856	845	808	87%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Maternity L.	bmact_s	496	496	496	496	799	62%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Parental L.	bplct_s	621	621	621	621	907	68%	1,829	1,865	1,861	#NV	34%	33%	33%	#NV
General S.A.	bsa00_s	191	191	175	175	258	74%	121	113	120	#NV	158%	169%	146%	#NV
Old-Age S.A.	bsaoa_s	742	736	617	647	414	179%	889	N/A	N/A	#NV	83%	N/A	N/A	#NV
Social Benefits	bsaot_s	148	152	148	164	169	87%	504	465	460	#NV	29%	33%	32%	#NV
Education B.	bed_s	875	827	910	894	1,104	79%	726	680	639	#NV	121%	122%	142%	#NV
Housing Benefits	bho00_s	565	521	744	688	1,245	45%	548	504	N/A	#NV	103%	103%	N/A	#NV
Wage Comp.	bwkmcee_s	-	-	-	-	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Child bonus	bchls_s	-	-	9,185	9,185	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Taxes and Social Insurance contributions															
Taxes / SSC	tis	39,039	39,106	39,100	39,077	39,033	100%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC Total	tsc	55,755	55,765	55,755	55,762	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC: Employer Total	ils_sicer	37,545	37,545	37,545	37,545	#NV	#NV	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC: Employee Total	ils_sicee	35,289	35,871	35,884	35,983	#NV	#NV	32,873	33,410	N/A	#NV	107%	107%	N/A	#NV
SSC: Self-Empl. Total	ils_sicse	2,452	2,464	2,452	2,459	#NV	#NV	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC: Pens Total	il_sicpe	18,071	18,071	18,071	18,071	#NV	#NV	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC: Other	tscot_s	714	657	666	654	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Income Tax	tin_s	48,488	49,377	49,769	49,769	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Taxable Inc.	tinty_s	62,471	62,466	62,447	62,457	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Tax Allow.	tinta_s	61,960	61,965	61,476	61,027	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Tax Base	tintb_s	63,253	63,520	63,510	63,554	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Gross I. Tax	tingt_s	48,488	49,377	49,769	49,769	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV

Notes: Number of individuals for pdiss, bhl, bunct, bmact, bplct, tsc, ils_sicer, ils_sicee, ils_sicse, ils_sicpe, tin, tinty, tinta, tintb and tingt. Number of households for bunnc, bch00, bchot, bched, bsa00, bsaoa, bsaot, bed, bho00 and tis. Social insurance contributions by employees (ils_sicee) exclude here other (tscot) and pensioners' contributions (il_sicpe).
Sources: EU-SILC 2019 and own simulations based on EUROMOD. For external figures: Official statistics from the German Statistical Office and the Federal Employment Agency.

Table 4.8-Tax benefit instruments simulated in EUROMOD -Annual amounts (Mil.)

	EUROMOD name	EUROMOD				SILC	Ratio	External				Ratio			
		2018	2019	2020	2021	2018	2018	2018	2019	2020	2021	2018	2019	2020	2021
Benefits															
Sickness B.	bhl_s	13,353	13,740	14,193	14,209	6,400	209%	13,100	14,400	16,000	#NV	102%	95%	89%	#NV
Pen. (St. Ac.)	pdiss_s	2,473	2,499	2,621	2,983	784	315%	5,726	5,815	5,928	#NV	43%	43%	44%	#NV
U. Insurance	bunct_s	5,344	5,421	5,437	5,570	6,017	89%	13,757	15,008	20,617	#NV	39%	36%	26%	#NV
U. Assistance	bunnc_s	17,900	18,071	17,696	18,199	9,572	187%	28,989	27,924	N/A	#NV	62%	65%	N/A	#NV
Child Ben.	bch00_s	34,523	34,523	36,295	38,953	40,305	86%	37,327	39,222	46,668	#NV	92%	88%	78%	#NV
Add. Child A.	bchot_s	606	510	1,176	1,093	1,895	32%	399	445	1,009	#NV	152%	115%	117%	#NV
Edu. Allowance	bched_s	103	101	196	192	4,325	2%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Maternity L.	bmact_s	378	378	378	378	1,214	31%	700	700	700	#NV	54%	54%	54%	#NV
Parental L.	bplct_s	3,360	3,398	3,440	3,450	6,407	52%	6,764	6,982	7,220	#NV	50%	49%	48%	#NV
General S.A.	bsa00_s	753	761	738	763	1,081	70%	1,500	1,500	1,200	#NV	50%	51%	62%	#NV
Old-Age S.A.	bsaoa_s	3,658	3,664	3,421	3,625	1,363	268%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Social Benefits	bsaot_s	418	435	425	455	391	107%	910	863	859	#NV	46%	50%	49%	#NV
Education B.	bed_s	3,613	3,391	4,098	4,086	4,486	81%	2,707	2,623	2,863	#NV	133%	129%	143%	#NV
Housing Benefits	bho00_s	799	717	1,082	1,002	2,134	37%	1,145	954	N/A	#NV	70%	75%	N/A	#NV
Wage Comp.	bwkmcee_s	-	-	-	-	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Child bonus	bchls_s	-	-	4,431	2,215	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Taxes and Social Insurance contributions															
Taxes / SSC	tis	617,457	636,727	637,988	642,743	616,912	100%	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC Total	tsc	515,147	528,312	535,380	551,364	-	N/A	572,589	598,221	607,948	#NV	90%	88%	88%	#NV
SSC: Employer Total	ils_sicer	226,544	232,605	235,609	242,279	#NV	#NV	223,539	238,358	244,692	#NV	101%	98%	96%	#NV
SSC: Employee Total	ils_sicee	236,609	242,569	245,349	253,553	#NV	#NV	247,712	251,868	249,486	#NV	96%	96%	98%	#NV
SSC: Self-Empl. Total	ils_sicse	15,561	15,815	15,666	16,124	#NV	#NV	23,106	24,625	25,562	#NV	67%	64%	61%	#NV
SSC: Pens. Total	il_sicpe	36,435	37,323	38,755	39,408	#NV	#NV	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
SSC: Other	tscot_s	1,436	1,382	1,471	1,500	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Income Tax	tin_s	328,853	341,020	338,218	333,658	-	N/A	326,136	340,086	327,511	#NV	101%	100%	103%	#NV
Taxable Inc.	tinty_s	2,034,426	2,094,842	2,111,385	2,161,517	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Tax Allow.	tinta_s	433,051	439,981	449,040	453,392	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Tax Base	tintb_s	1,601,375	1,654,861	1,662,346	1,708,125	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV
Gross I. Tax	tingt_s	311,974	323,512	320,870	329,503	-	N/A	N/A	N/A	N/A	#NV	N/A	N/A	N/A	#NV

Notes: Sums for bsa00 and bsaoa exclude people in institutions. In the sum of taxes and social contributions (tis), contributions from employers are excluded.
The variable tin contains the solidarity surcharge. Social insurance contributions by employees (ils_sicee) exclude here other (tscot) and pensioners' contributions (il_sicpe).
Sources: EU-SILC 2019 and own simulations based on EUROMOD. For external figures: official statistics.

Table 4.9-Distribution of equivalised disposable income (shares by deciles)

	EUROMOD				External				Ratio			
	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
D1	3.67	3.65	3.67	3.62	2.30	1.80	#NV	#NV	160%	203%	#NV	#NV
D2	5.50	5.48	5.58	5.53	5.40	4.60	#NV	#NV	102%	119%	#NV	#NV
D3	6.62	6.61	6.70	6.60	6.50	5.90	#NV	#NV	102%	112%	#NV	#NV
D4	7.56	7.54	7.59	7.53	7.50	6.90	#NV	#NV	101%	109%	#NV	#NV
D5	8.49	8.49	8.54	8.49	8.50	8.00	#NV	#NV	100%	106%	#NV	#NV
D6	9.55	9.56	9.59	9.58	9.50	9.10	#NV	#NV	100%	105%	#NV	#NV
D7	10.62	10.64	10.66	10.68	10.70	10.40	#NV	#NV	99%	102%	#NV	#NV
D8	12.01	12.06	12.05	12.10	12.10	12.10	#NV	#NV	99%	100%	#NV	#NV
D9	14.13	14.14	14.12	14.23	14.40	14.80	#NV	#NV	98%	96%	#NV	#NV
D10	21.84	21.83	21.51	21.65	23.20	26.30	#NV	#NV	94%	83%	#NV	#NV
Median	23,368	23,983	24,396	25,112	23,515	23,460	#NV	#NV	99%	102%	#NV	#NV
Mean	25,916	26,616	27,008	27,851	26,105	27,520	#NV	#NV	99%	97%	#NV	#NV
Gini	26.74	26.81	26.34	26.72	29.70	34.40	#NV	#NV	90%	78%	#NV	#NV
S80/S20	3.92	3.94	3.85	3.92	4.89	6.00	#NV	#NV	80%	66%	#NV	#NV

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 2019. External source is Eurostat statistics.

Table 4.10-Poverty rates by gender and age

	EUROMOD				External				Ratio			
	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
40% median HDI												
Total	3.81	3.86	3.94	4.11	4.50	0.00	#NV	#NV	0.85	0.44	#NV	#NV
Males	3.74	3.79	3.85	3.99	4.20	0.00	#NV	#NV	0.89	0.44	#NV	#NV
Females	3.88	3.92	4.02	4.23	4.90	0.00	#NV	#NV	0.79	0.44	#NV	#NV
50% median HDI												
Total	8.08	8.21	7.97	8.25	9.00	0.00	#NV	#NV	0.90	0.64	#NV	#NV
Males	7.59	7.67	7.48	7.73	8.50	0.00	#NV	#NV	0.89	0.61	#NV	#NV
Females	8.57	8.74	8.45	8.76	9.40	0.00	#NV	#NV	0.91	0.66	#NV	#NV
60% median HDI												
Total	14.13	14.30	13.53	14.00	14.80	0.00	#NV	#NV	0.95	0.77	#NV	#NV
Males	13.24	13.42	12.67	13.08	13.90	0.00	#NV	#NV	0.95	0.76	#NV	#NV
Females	15.00	15.14	14.36	14.90	15.70	0.00	#NV	#NV	0.96	0.79	#NV	#NV
70% median HDI												
Total	21.76	21.88	21.17	21.91	23.00	0.00	#NV	#NV	0.95	0.85	#NV	#NV
Males	20.49	20.60	20.10	20.84	21.70	0.00	#NV	#NV	0.94	0.84	#NV	#NV
Females	23.00	23.12	22.22	22.94	24.20	0.00	#NV	#NV	0.95	0.87	#NV	#NV
60% median HDI												
0-15 years	11.84	12.59	10.43	10.68	12.00	0.00	#NV	#NV	0.99	0.67	#NV	#NV
16-24 years	18.65	18.72	17.89	18.11	17.40	0.00	#NV	#NV	1.07	0.69	#NV	#NV
25-49 years	11.59	11.83	11.29	11.38	12.30	0.00	#NV	#NV	0.94	0.71	#NV	#NV
50-64 years	14.33	14.34	14.00	14.33	16.10	0.00	#NV	#NV	0.89	0.94	#NV	#NV
65+ years	17.46	17.29	16.70	18.19	18.00	0.00	#NV	#NV	0.97	0.84	#NV	#NV

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 2019. External source is Eurostat statistics.

Table 4.11-Minimum wage validation

	Baseline				Min Wage Incl.				Ratio			
	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
Disposable income	1,507,244	1,548,122	1,570,071	1,616,714	1,517,758	1,559,612	1,581,940	1,628,680	0.99	0.99	0.99	0.99
Employment Income	1,444,269	1,488,813	1,499,400	1,540,615	1,463,847	1,509,419	1,520,946	1,562,059	0.99	0.99	0.99	0.99
Income tax	328,853	341,020	338,218	333,658	331,326	343,453	340,683	335,937	0.99	0.99	0.99	0.99
SSC: Employee Total	236,608	242,568	245,349	253,553	241,566	247,519	250,718	258,927	0.98	0.98	0.98	0.98
SSC: Self-Empl. Total	15,561	15,815	15,666	16,124	15,561	15,815	15,666	16,124	1.00	1.00	1.00	1.00
Gini	26.74	26.81	26.34	26.73	26.44	26.49	26.02	26.42	1.01	1.01	1.01	1.01
Poverty headcount	14.13	14.30	13.53	13.98	13.60	13.83	13.11	13.59	1.04	1.03	1.03	1.03