

EUROMOD

COUNTRY REPORT



CROATIA (HR)

2014-2017

Ivica Urban, Slavko Bezeredi and Martina Pezer

October 2017

EUROMOD version H1.0



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

EUROMOD has been enlarged to cover 28 Member States and is updated to recent policy systems using data from the European Union Statistics on Income and Living Conditions (EU-SILC) as the input database, supported by DG-EMPL of the European Commission.

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

EUROMOD director: Holly Sutherland

EUROMOD executive director: Jack Kneeshaw

EUROMOD coordination assistant: Cara McGenn

EUROMOD developer responsible for Croatia: Chrysa Leventi

National team for Croatia: Ivica Urban, Slavko Bezeredi and Martina Pezer

The results presented in this report are derived using EUROMOD version H1.0. EUROMOD is continually being improved and the results presented here may not match those that would be obtained with later versions of EUROMOD.

For more information, see: <https://www.euromod.ac.uk>

This document is supported by the European Union Programme for Employment and Social Innovation “Easi” (2014-2020). For further information please consult <http://ec.europa.eu/social/easi>. The information contained within this document does not necessarily reflect the position or opinion of the European Commission.

CONTENTS

1.	BASIC INFORMATION	4
1.1	Basic information about the tax-benefit system	4
1.2	Minimum wage	7
1.3	Social benefits	7
1.3.1	Retirement benefits	7
1.3.2	Survivors benefits	7
1.3.3	Disability benefits	8
1.3.4	Unemployment benefits	9
1.3.5	Sickness benefits	10
1.3.6	Family benefits	11
1.3.7	Social assistance benefits	12
1.3.8	Benefits provided by local and regional self-government units	13
1.4	Social insurance contributions	14
1.4.1	Types of social insurance contributions and payers	14
1.4.2	Wage related social insurance contributions	14
1.4.3	Social insurance contributions for self-employed persons	15
1.4.4	Social insurance contributions on income from contractual work	15
1.4.5	Pensioner health contribution	15
1.5	Taxes	15
1.5.1	Consumption taxes	15
1.5.2	Income taxes	16
1.5.3	Property taxes	16
2.	SIMULATION OF TAXES AND BENEFITS IN EUROMOD	17
2.1	Scope of simulation	17
2.2	Order of simulation and interdependencies	19
2.3	Policy switches	20
2.4	Important indicators	21
2.5	Minimum wage	21
2.6	Social benefits	22
2.6.1	Subsistence benefit (<i>bsa_s</i>)	22
2.6.2	Unemployment benefit (<i>bunct_s</i>)	24
2.6.3	Maternity leave benefit (<i>bfama_s</i>)	26
2.6.4	Parental leave benefit (<i>bfapl_s</i>)	27
2.6.5	Maternity and parental allowance (<i>bmanc_s</i>)	28
2.6.6	Grant for a newborn child (<i>bfaba_s</i>)	29
2.6.7	Child benefit (<i>bch_s</i>)	30

2.6.8	Compensation for electricity costs (<i>bhout_s</i>)	31
2.7	Social insurance contributions	31
2.7.1	Employer social insurance contributions (<i>tscer_s</i>)	31
2.7.2	Employee social insurance contributions (<i>tscee_s</i>)	32
2.7.3	Self-employed social insurance contributions (<i>tscse00_s</i>)	32
2.7.4	Contributions on income from contractual work (<i>tscse01_s</i>)	34
2.7.5	Pensioner health contribution (<i>tscbesi_s</i>)	35
2.7.6	Credited social insurance contributions (<i>tscct_s</i>)	35
2.8	Personal income tax (<i>tin_s</i>)	36
2.8.1	Tax unit	36
2.8.2	Exemptions	36
2.8.3	Types of taxpayers, taxable incomes and tax schedules	36
2.8.4	Tax allowances	38
2.8.5	Tax deductions	40
2.8.6	Tax bases	40
2.8.7	Tax schedules	41
2.8.8	Final yearly tax	42
2.9	Other taxes	44
2.9.1	Surtax (<i>tmu_s</i>)	44
3.	DATA	44
3.1	General description	44
3.2	Data adjustment	45
3.3	Imputations and assumptions	45
3.3.1	Time period	45
3.3.2	Dropped observations	45
3.3.3	Gross incomes	45
3.3.4	Disaggregation of harmonized variables	46
3.4	Uprating	48
4.	VALIDATION	52
4.1	Aggregate Validation	52
4.1.1	Components of disposable income	52
4.1.2	Validation of incomes inputted into the simulation	52
4.1.3	Validation of outputted (simulated) incomes	54
4.2	Income distribution	55
4.2.1	Income inequality	55
4.2.2	Poverty rates	56
4.3	Validation of minimum wage	56

4.4	Summary of “health warnings”	56
5.	REFERENCES	57
5.1	Sources for tax-benefit descriptions/rules	57
5.2	Sources for external data	59
5.3	Other	59
6.	ANNEX 1: POLICY EFFECTS IN 2016-2017	60
7.	ANNEX 2: VALIDATION TABLES	62

1. BASIC INFORMATION

1.1 Basic information about the tax-benefit system

- Public sector in Croatia consists of the general government and public enterprises. The general government has three levels: (a) the central government (CG) includes state ministries, budgetary and extrabudgetary funds, (b) the regional self-government (RSG) entails 20 counties and the City of Zagreb, and (c) the local self-government (LSG) involves 127 cities and 428 municipalities.
- Social security funds are part of CG. These funds are administered by three national social insurance funds – the Croatian Pension Insurance Institute (*Hrvatski zavod za mirovinsko osiguranje*; HZMO), the Croatian Employment Service (*Hrvatski zavod za zapošljavanje*; HZZ) and the Croatian Institute for Health Insurance (*Hrvatski zavod za zdravstveno osiguranje*; HZZO).
- The whole revenue from social insurance contributions (SIC; *doprinosi za obvezna osiguranja*) belongs to HZMO, HZZ and HZZO. The revenue from major tax sources – value added tax, excise taxes and corporate income tax – also belongs to the CG. The revenue from Personal income tax (PIT) is shared among RSG units, LSG units and the CG. There are several taxes that belong exclusively to RSG and LSG units.
- The cash social insurance benefits are paid by national social insurance funds. Major social assistance benefits are paid by the CG. LSG units provide their own social benefits, which top-up the existing CG benefits. The primary examples are the housing benefits and the lump-sum grants for newborn children. Some benefits are also provided by RSG units.
- The tax and benefit year is equivalent to the calendar year (runs from January 1 to December 31). January 1 is usually the date when changes in tax and benefit laws come into force. January 1 and July 1 are the dates when the “actual value of pension” is adjusted.
- In 2017 the statutory retirement age is 65 for men and 61.75 for women. For women, the statutory retirement age gradually increases from 60 in 2010 to 65 in 2030. For both men and women, the statutory retirement age will start to gradually increase in the period 2031-2037, to reach 67 in 2038.
- In 2002 the Croatian pension system underwent a major reform, which introduced three pillars: (1) pillar 1 – intergenerational solidarity (*međugeneracijska solidarnost*), (2) pillar 2 – mandatory individual savings (*individualna kapitalizirana štednja*), and (3) pillar 3 – voluntary individual savings (*dobrovoljno mirovinsko osiguranje*). The savings in pillars 2 and 3 are collected by private pension funds. Two parallel contributory schemes are created: scheme A, whereby persons participate in pillar 1 only, and scheme B, whereby persons participate both in pillar 1 and pillar 2. Persons who were aged above 50 (below 40) in January 2002 are automatically involved into scheme A (B), while people aged between 40 and 50 could choose whether to become members of scheme A or B. People in scheme A pay contribution to pillar 1 only; this contribution is called Pension contribution A. Correspondingly, people in scheme B receive pension from pillar 1 only. Below we describe the pension benefits for these pensioners only, because in the period 2014-2017 they still make the overwhelming majority of new retirees. People in scheme B pay contributions both to pillar 1 (Pension contribution B1) and to pillar 2 (Pension contribution B2).

- For certain groups of pension beneficiaries, special and more favourable rules apply concerning the statutory requirements for retirement and pension formulas. These groups include Croatian Defenders from the Homeland War, war veterans from the World War II, some groups of government officials, full members of Croatian academy of sciences and arts, etc.
- Children must remain in the primary education till the end of the school year during which they turn 15. School years last from September to June. Secondary school is not obligatory.
- Definitions of dependent children vary for purposes of different taxes and benefits. For the purposes of PIT and subsistence benefit, dependent children are those who are involved in regular primary, secondary or tertiary education. For Subsistence benefit the age limit is 29, while Child benefit sets the age limit at 19. PIT sets no specific maximum age.
- Large families are not recognised by current tax and benefit regulations. For the purposes of Subsistence benefit a single parent is a parent who lives without a spouse; “lone parent” is a single parent whose spouse is dead or unknown. PIT does not recognise single parents.
- PIT system is an individual system, with the spouses being assessed independently.
- In principle, PIT taxes market incomes and pensions, while non-pension social benefits are not taxable. Major taxable income sources are employment earnings, pensions, income from self-employment, income from contractual work, property income and capital incomes. Income from contractual work has both the properties of employment and self-employment income.
- The tax-benefit system recognises various groups of people according to their employment and income-earning status. The most relevant groups are: (a) *employed persons* – includes workers hired by employers as well as officials hired by CG/RSG/LSG institutions, (b) *self-employed persons* – those who regularly perform market activities as sole-merchants, craftsmen, entrepreneurs (firm owners), producers in agriculture (farmers), professionals (lawyers, dentists), artists, sportsmen, etc., (c) *temporary workers* – persons who are not employed through the standard labour contracts nor are self-employed persons; they earn income from contractual and occasional jobs, (d) *family workers in agriculture* – persons who work on family farms, but are not self-employed persons, (e) *pensioners* – persons whose primary income source is pension, (f) *unemployed persons* – see definition below, (g) *inactive persons* – those who are out of work, but not unemployed, pensioners or students.
- Besides the social benefits available to general public, there exist subsystems of special benefits, stemming from the Croatian Homeland War, World War II and peace-time military activities. Croatian Defenders from the Homeland War (*hrvatski branitelji iz Domovinskog rata*, HBDRs) are persons who have participated in the organized armed defence in the period from August 1990 to June 1996. Croatian military war invalids of the Homeland War (*hrvatski ratni vojni invalidi iz Domovinskog rata*, HRVI) are HBDRs who have suffered bodily damages of at least 20%, during the organised armed defence or imprisonment in hostile jail or camp. Passed away HBDRs (*smrtno stradali HBDR*) are HBDRs who were killed in organised armed defence or during the imprisonment in hostile jail or camp, or their death is closely related to defence activities. Further groups include civil invalids of the Homeland War or World War II (*civilni invalidi rata*; CIRs), invalids from the 2nd World War (*ratni vojni invalidi*, RVIs) and peace-time military invalids (*hrvatski mirnodopski vojni invalidi*, HMVIs). Various retirement, disability,

survivors and social assistance benefits are available to the above mentioned groups or their family members.

- Employed persons receive gross wage (the so-called “gross-I wage”; *bruto-I plaća*). Employers’ SIC are paid upon the gross wage. The “gross-II wage” (*bruto-II plaća*) is equal to gross wage *plus* employers’ SIC. Employees’ SIC are paid out of the gross wage. Net wage is then equal to gross wage minus employees’ SIC minus PIT and LSG surtax.
- PIT has a general schedule, which is progressive, with two rates and several income-source-specific schedules. The general schedule applies to income reported in yearly tax returns. The Monthly-adjusted general tax schedule is derived from the general schedule and applies to employment earnings and pensions paid out on a monthly basis. Income-source-specific schedules are one-rate and apply to rental income, income from sale of assets, income from insurance, capital income, and “other income”. All income sources, except income from self-employment, are taxed by withholding.
- Generally, taxpayers are not obliged to fill in a tax return, except in several prescribed situations, for example, if employed person works simultaneously for two employers. Self-employed persons must fill in a tax return. Taxpayers *may* fill in a tax return if they want to use some allowances and deductions, or if they assume that their final obligation would be lower than the amount withheld.
- The “current value of pension” (*aktualna vrijednost mirovine*, CVP) is used for calculation of new retirees’ pensions and for the adjustment of pensions of existing pensioners. CVP is revised twice a year (on January 1 and July 1), using an indexation rule which takes into account both the change in average gross wage and the consumer price index, in the preceding calendar year. The amounts of many social benefits are obtained as products of relevant coefficients and the so-called “budgetary base” (*proračunska osnovica*, BB), which is determined every year in the CG budget law. The amount of BB has remained constant through the period from 2002 to 2017, at 3,326 HRK. PIT brackets are not indexed, but are adjusted irregularly as part of PIT reforms.
- In calculations of some benefits and social insurance contributions the following indicators are used: (a) average gross wage from January to August of the previous year (AGWPY), (b) average net wage from January to August of the previous year (ANWPY), (c) average net wage from January to December of the previous year (ANWPY2), (d) gross minimum wage in the current year (GMWCY), (e) net minimum wage in the current year (NMWCY). The amounts of these indicators are presented in section 2.4.
- For PIT purposes incomes are assessed: (a) monthly, for income from regular employment and pensions, (b) yearly, for income from regular self-employment, and (c) at the moment of the occurrence, for all the remaining income sources. Income from the preceding calendar year is assessed for purpose of Child benefit. For purpose of Subsistence benefit, income from three months preceding the appraisal process.
- In principle, all residents are covered by the mandatory health insurance. Working groups of the population must pay health SIC, while CG pays the contributions for various non-working groups. Employed and self-employed persons are entitled to receive sickness benefits, maternity and parental leave benefits. Minimum insurance period conditions apply. Besides them, unemployed and inactive people are also entitled to receive parental benefits through schemes that are separate from maternity and parental leave benefits.
- A person is defined as unemployed if he/she is aged between 15 and 65, is able (or partially able) to work, is actively searching for a job and is available for work. To be considered as unemployed, a person should not: (a) perform work as self-employed or be the owner of an enterprise; (b) obtain monthly taxable income that is higher than the

average unemployment benefit paid out in the preceding year; (c) be a regular student, or pensioner, or a person who satisfies the conditions for retirement. Other conditions apply.

All the tax and benefit rates provided below are those valid in June 30 of each respective year.

1.2 Minimum wage

Minimum wage law was first introduced in July 2008. The amount of gross minimum wage (GMW) was set to 39% of 2007 average gross wage, and equalled HRK 2,747. After that, GMW was adjusted each June 1, using the real GDP growth rate. Before June 2013, when the new law came to effect, GMW equalled HRK 2,814. According to the new law, the starting value of GMW is obtained by a formula using several factors, among them the poverty threshold. The amount for 2017 is HRK 3,276. New GMW is set every January 1 by the ministry of labour, whereby its nominal amount cannot decline.

1.3 Social benefits

1.3.1 Retirement benefits

Full-age retirement pension (*Starosna mirovina*) is obtained by a person who retires at the statutory retirement age and has at least 15 years of service (*mirovinski staž*). The level of pension depends on wages (or contributions) during the whole working period. A hypothetical man from scheme A, who has worked for 40 years, earning average gross wage in each year (henceforth, average worker), and retires in January 2017, receives a pension of HRK 3,129.

Early-age retirement pension (*Prijevremena starosna mirovina*) by a person who retires at most five years before the statutory retirement age and has at least 35 years of service (for men, and 31.75 for women in 2017). For women, the minimum years of service gradually increase from 30 in 2010 to 35 in 2030. The level of pension is also based on previous wages (or contributions), but a penalizing factor is applied, which depends on age and years of service; the maximum is 20.4% for men who retire with 35 years of service at the age of 60. A hypothetical male average worker from scheme A, who has worked for 35 years and retires in January 2017 at the age of 60, receives a pension of HRK 2,179.

For retirement and early retirement pensions, as well as for survivors and disability pensions described below, minimum and maximum pension rules apply. The *minimum pension* (*najniža mirovina*) is proportional to the years of service, and also depends on the type of pension. For a man from scheme A, who retires at the statutory age with 40 years of service, the minimum pension amounts to HRK 2,404 in January 2017. The *maximum pension* (*najviša mirovina*) equals about 3 times the pension of the average worker.

As mentioned in section 1.1, for certain groups of pension beneficiaries, special and more favourable rules apply concerning the statutory requirements for retirement and pension formulas. For more details, see Bađun (2009).

1.3.2 Survivors benefits

Survivors pensions

Family pension (*Obiteljska mirovina*) is received by a widower of the passed-away insured person (PAIP), if the widower is above 50 or below 50, if unable to work or if taking care of children. A child of a PAIP is a beneficiary if involved in secondary or tertiary education; the age limit is 26, unless a person is unable to work. The pension amount is obtained as the *base*

multiplied by a factor which depends on the number of survivors, and ranges from 0.7 for one survivor to 1.0 for four or more survivors. The base is equal to the PAIP's last pension (if the PAIP was a pensioner) or to the eventual PAIP's invalidity pension (if the PAIP was working). Certain minimum years of service are required.

As mentioned in section 1.1, for certain groups of pension beneficiaries, special and more favourable rules apply concerning the statutory requirements for retirement and pension formulas.

Special survivors benefits

There exists a range of survivors benefits related to family members of HBRDs, HRVIs, HMVIs, RVIs and CIRs, here referred to as **Special survivors allowances**.

1.3.3 Disability benefits

Disability pensions

Disability pension (*Invalidska mirovina*) is obtained by persons with partial or full loss of working ability. Certain minimum years of service are required, depending on age. The pension amount is obtained as in the case of retirement pensions, however, the years of service are augmented by a certain factor. The amount also depends on whether a partial or full loss of working ability has occurred.

As mentioned in section 1.1, for certain groups of pension beneficiaries, special and more favourable rules apply concerning the statutory requirements for retirement and pension formulas.

General disability benefits

Supplement for assistance and care (*Doplatak za pomoć i njegu*) is received by a person who needs assistance and care of another person in satisfying the basic living functions, such as preparing meals and feeding, house cleaning, dressing, personal hygiene, etc. Income and wealth means tests are applied. The amount of benefit equals HRK 350 or 500, depending on the level of disability.

Personal disability allowance (*Osobna invalidnina*) is intended for persons with severe disability or other severe permanent changes in their health condition. Income and wealth means tests are applied. The beneficiary cannot obtain Supplement for assistance and care at the same time. The amount of benefit is HRK 1,250 minus income from other sources, excluding Subsistence benefit, Compensation for housing costs, Minimum pension, Child benefit, etc.

Pre-employment supplement (*Naknada do zaposlenja*) is received by younger persons with severe disability or other severe permanent changes in their health condition, who have finished their education, are able to work and unemployed. The amount of benefit is HRK 350, and cannot be obtained simultaneously with the Supplement for constant care.

Benefits for caregivers

Allowance for caregiver (*Naknada za roditelja njegovatelja ili za njegovatelja*) is received by parents or other family members who take care of persons who are completely dependent on the help of others, due to severe physical, mental or health disabilities. The amount of benefit is HRK 2,500.

Supplement for half-time employed caregiver of a child in need of additional care (*Naknada tijekom rada s polovicom punog radnog vremena radi pojačane njege djeteta*) is

received by employed or self-employed person until the age of a child is 3 years. The amount of benefit is HRK 1,663 (50% of BB).

Allowance for caregiver of a child with severe disability (*Naknada tijekom dopusta radi njege djeteta s težim smetnjama u razvoju*) is obtained by employed or self-employed person until the age of a child is 8 years. The amount of benefit is HRK 2,162 (65% of BB).

Supplement for half-time employed caregiver of a child with severe disability (*Naknada tijekom rada s polovicom punog radnog vremena radi njege djeteta s težim smetnjama u razvoju*) is similar to the previous benefit. The benefit amount for employed person equals the net wage obtained by caregiver at half-time work; for self-employed person it equals 50% of SIC base.

Work-related disability benefits

Salary compensation during a professional rehabilitation (*Naknada plaće za vrijeme profesionalne rehabilitacije invalida rada*) is obtained by a disabled worker involved in the program of professional education and prequalification. When the cause of disability is general (related to work injuries and occupational illness), the maximum duration of benefit receipt is 12 (24) months. The amount of the benefit is related to the disability pension that could be realised at the time of rehabilitation.

Supplement for physical impairment due to work injuries and occupational disease (*Naknada zbog tjelesnog oštećenja uslijed ozljede na radu ili profesionalne bolesti*) is obtained by a person whom work injuries and occupational illness have caused physical damages. The amount of benefit depends on the degree of physical impairment, which is expressed as a percentage; e.g. for a 100% impairment, the benefit amounts to HRK 480.

Other benefits in this sub-group include the **Cash compensation for workers exposed to asbestos** (*Novčana naknada radnicima izloženima azbestu*) and **Supplement for professional rehabilitation of HRVI** (*Posebni doplatak za profesionalnu rehabilitaciju HRVI-a*).

Special disability allowances

There exists a range of disability benefits related to HBRDs, HRVIs, HMVIs, RVIs and CIRs, here referred to as **Special disability allowances**. They can be grouped into supplements for assistance and care, supplement for assistance at home and orthopaedic allowances.

1.3.4 Unemployment benefits

Unemployment benefit (*Novčana naknada za vrijeme nezaposlenosti*) is received by unemployed persons who have worked for at least 9 months during the last 24 months; the termination of previous job post should not be voluntary or caused by worker's violations of working obligations; other conditions apply. The duration of benefit receipt increases with the insurance record: from a minimum of 90 days for less than 2 years spent in work to 450 days for people who have spent 25 to 32 years in work. For those having worked for more than 32 years and will satisfy the statutory age condition in less than five years, the duration of benefit is unlimited. For a person who has been using the benefit and then re-employed, the time spent in work is counted from the beginning of new employment. The amount of benefit is proportional to the benefit base, i.e. the average income earned in the 3-month period prior to unemployment. During the first 90 days the benefit is equal to 70% of the base, falling to 35% of the base for the rest of the period; maximum (minimum) levels apply. *Extended unemployment benefit* (*Produžena novčana naknada*) is a measure within Unemployment benefit, which was introduced in 11/2010 and abolished in 01/2014. For persons who were uninterruptedly unemployed for more than 12 months, the duration of benefit was extended by 30 to 120 days.

Allowance and reimbursement of travel expenses for education and training of unemployed (*Novčana pomoć i naknada troškova tijekom obrazovanja i osposobljavanja*) is received by unemployed persons who are involved in education and training programs organised or initiated by the HZZ. The benefit amount is related to the minimum amount of Unemployment benefit and the duration of the program. Additionally, related travel expenses are reimbursed.

Allowance and reimbursement of travel expenses during vocational training of unexperienced workers (*Naknada za vrijeme stručnog osposobljavanja za rad bez zasnivanja radnog odnosa*) is introduced in 2012 and is intended for young unemployed persons to earn initial working experience. These persons work for employers without settling an employment contract. Beneficiaries receive monthly allowance of HRK 1,600, which was raised to HRK 2,400 since 01/2015. Additionally, related travel expenses are reimbursed.

Several benefits are intended for unemployed persons who get employed in a place that is more than 80 kilometres away from their current place of residence. The benefits are obtained if the HZZ cannot find employment for these persons in their current place of residence, and if employment lasts for at least 6 months (except in some cases). **One-time allowance for resettling unemployed** (*Jednokratna novčana pomoć za nezaposlenu osobu*) amounts to HRK 1,200. **Reimbursement of travel and resettling expenses for resettling unemployed** (*Naknada putnih i selidbenih troškova za nezaposlenu osobu*) is available for one-time travel of an unemployed person and her family members, at a maximum amount of HRK 300 per person (if employment last for less than 6 months, the benefit covers only the unemployed person). **Reimbursement of travel and resettling expenses for resettling unemployed** (*Naknada putnih i selidbenih troškova za nezaposlenu osobu*) equals 50% of the cost of resettlement, with a maximum amount of HRK 1,000.

1.3.5 Sick-leave benefits

Sick-leave benefits are paid to insured employed and self-employed persons and temporary workers during the temporary work-break due to sickness and corresponding medical treatment.

Sickness benefit for employed and self-employed persons (*Naknada plaće zbog privremene nesposobnosti ili spriječenosti za rad radi korištenja zdravstvene zaštite*). The cases of sick leave can be divided into three groups: (a) regular – related to illness and medical treatment, other than in cases mention below, (b) special – related to isolation due to infection, organ transplantations, escorting and nurturing of other sick persons, illnesses and complications related to pregnancy and childbirth, (c) work – related to injuries at work or occupational illness, (d) HBDR – related to wounds, injuries or illnesses that are the direct consequence of participation in the Homeland War. In case (a), the employer is obliged to pay the *salary replacement* for a time of 42 days after sick-leave has begun. After that period, HZZO pays the sickness benefit. In cases (b), (c) and (d), HZZO pays the benefit since the beginning of sick leave. The benefit base is obtained as the average “netted” gross wage or SIC base in the 6-month period prior to sick-leave. The minimum salary replacement is 70% of the benefit base. In case (a), the sickness benefit equals 70% of the benefit base, during the first 6 months of sick-leave; maximum (128% of BB) and minimum (25% of BB) limits apply. In cases (b), (c) and (d) the benefit equals 100% of the benefit base. Eligibility depends on the health insurance coverage. Preceding the event of sickness, the beneficiary must have been insured, either: (a) at least 9 months continuously, or (b) at least 12 months with interruptions during a 24 month period. If neither of these conditions is satisfied the benefit equals 25% of BB.

Sickness benefit for temporary workers (*Novčana naknada zbog nemogućnosti obavljanja poslova na osnovi kojih se ostvaruju primitci od kojih se utvrđuje drugi dohodak prema propisima o porezu na dohodak*). Eligibility depends on the health insurance coverage. The

benefit base is the average “netted” gross income from contractual work in the 6-month period prior to sick-leave; for eligibility, the benefit base must be greater than the floor employer SIC base. The benefit equals 70% of the benefit base and terminates after sick leave has begun.

Other sickness benefits are various reimbursements of costs, which incurred in relation to the use of health care or death of the medically treated person (travel costs, accommodation costs for child-caring parents during hospitalization, funeral expenses, etc.).

1.3.6 Family benefits

Benefits for parents, adoptive parents and foster parents

Maternity and parental benefits are intended for parents of newborn children. Effectively, all parents, whether working or not, can receive these benefits, but the duration and amounts are different. Three groups of parents are defined: (a) employed persons and self-employed persons, (b) temporary workers, workers in agriculture and unemployed persons, (c) inactive persons. Group (a) receives Maternity leave benefit and Parental leave benefit. The base for these two benefits is equal to the average gross wage earned in the 6-month period prior to the work-break. Groups (b) and (c) receive Maternity and parental allowance, which does not depend on previous earnings. Analogous benefits are available to adoptive parents.

In 2017, the law on maternity and parental benefits has been amended, whereby the minimum and maximum benefit amounts that depend on BB (see below), have been significantly raised, by up to 50%. However, these changes are put into effect only in 07/2017. Following the EUROMOD methodology, we state the figures valid in 30 June 2017.

Maternity leave benefit (*Naknada za rodiljni dopust*) is received by a mother who is employed or self-employed person, after the birth of a child (children). The leave is divided into mandatory and voluntary work-break period. The mandatory work-break period spans between the 28th day before the expected delivery date (or from the 45th day, upon medical approval) and the 70th day after the birth. The voluntary work-break period spans between the 70th day and the end of the 6th month after the birth. During both these periods the benefit is equal to the benefit base, which is income related. Minimum amount of benefit is HRK 1,663 (50% of BB). Maximum amount is not limited if the beneficiary satisfies the insurance period condition. Otherwise, the benefit equals the minimum amount.

Parental leave benefit (*Naknada za roditeljski dopust*) is obtained by a mother or a father who are employed or self-employed persons, in the period after the end of the 6th month following the birth of a child. The benefit is received up to 6 months if only the mother uses the parental leave, or up to 8 months, if the father uses four months of parental leave. In cases when twins are born or if the 3rd or each subsequent child is born, the duration of benefit receipt can reach 30 months. The benefit base is the same as for the Maternity leave benefit. The amount of benefit in the first 6 (8) months is equal to the benefit base, with maximum set to HRK 2,661 (80% of BB). In the remaining period, i.e. after the 6th (8th) month, the benefit amounts to HRK 1,663 (50% of BB).

Maternity and parental allowance (*Naknade za rodiljnu i roditeljsku brigu i poštedu od rada*) is available to parents of a newborn child who are temporary workers, workers in agriculture, unemployed persons or inactive persons. The benefit receipt starts with the child's birth and lasts for 12 months, or 36 months, if twins or the 3rd or each subsequent child are born. The amount of benefit is HRK 1,663 during the whole period of receipt.

Adoptive parent adoption leave benefit (*Naknada za posvojiteljski dopust*) is obtained by adoptive employed or self-employed parents. The adoption leave begins with the moment of a

child adoption and lasts for up to 6 months. The benefit amount is obtained analogously as in the case of Maternity leave benefit.

Adoptive parent parental leave benefit (*Naknada za roditeljski dopust posvojitelja*) is obtained by adoptive employed or self-employed parents. The duration of the parental leave of adoptive parent and the amount of benefit are assessed analogously as for the Parental leave benefit, in the case of the 1st or the 2nd child's birth.

Support during the adopted child care (*Naknade za posvojiteljsku brigu i poštudu od rada*) is the benefit intended to adoptive parents who are temporary workers, workers in agriculture, unemployed persons or inactive persons. The duration and the amount of the benefit are determined as for the Maternity and parental allowance, in the case of the 1st or the 2nd child's birth.

Compensation for accommodation of a child in a foster family (*Naknada za smještaj djeteta u udomiteljsku obitelj*). The amounts of benefit for a pre-school and school child are HRK 1,800 (54.14% of BB) and HRK 2,000 (60.16% of BB). These amounts are supplemented for children with health impairment and disability.

Foster parent benefit (*Osobna naknada udomitelju djeteta*) is a compensation for a foster caregiver. The benefit amount depends on the number and age of fostered children, and on whether a foster caregiver is the legal supporter of children; the minimum amount for one child is HRK 400 (12% of BB).

Child benefits

Grant for a newborn child (*Jednokratna novčana potpora za novorođeno dijete*) is received by all parents of newborn children and amounts to HRK 2,328 (70% of BB).

Child benefit (*Doplatak za djecu*) is a means-tested benefit received by a parent or other person taking care of one or more children. The amount of benefit per child equals HRK 300 (9% of BB), HRK 250 (7.5% of BB), and HRK 200 (6% of BB), respectively, depending on household income per member. Supplements are given for children without one or both parents and for children with impaired health. Substantial top-up amounts are given to households with three and four or more children, HRK 500 and 1,000, respectively; this is called the pronatalist supplement (“*pronatalitetni dodatak*”). Means-testing is not applied for two groups of children: (a) children with severe disability, for whom the benefit amount is HRK 832 (25% of BB), and (b) children of a killed, captured or missing HBDR, where the benefit amount is HRK 374 (11.25% of BB).

1.3.7 Social assistance benefits

Subsistence benefit (*Pomoć za uzdržavanje, Stalna pomoć, Zajamčena minimalna naknada*) is a means-tested benefit intended for households whose income is below the “means of subsistence”. The latter represent the amount of money necessary to satisfy the basic needs of the particular household. They are obtained as a sum of individual contributions depending on household members' characteristics. When calculating means of subsistence, children, the elderly and people unable to work are automatically accounted; working-able individuals between 18 and 65 are not taken into account unless they satisfy the conditions for being characterised as unemployed (see section 1.1).

This benefit was introduced in 1998 under the name Subsistence support (*Pomoć za uzdržavanje*). In the period from 08/2007 to 05/2011 it was called Permanent support (*Stalna pomoć*). However, in the whole period from 01/1998 to 12/2013 there were no important changes in the benefit design. In 01/2014 Subsistence support was replaced by the Guaranteed

minimum benefit (*Zajamčena minimalna naknada*), which introduces the following changes: (a) the contribution of children in the calculation of the “means of subsistence” is significantly lowered; (b) additional conditions for working-able individuals, (c) the wealth test is tightened, etc. Moreover, with the introduction of Guaranteed minimum benefit, two HBDR / HRVI / RVI / CIR related benefits were abolished (see below), and also the Extended unemployment benefit. Despite these changes the Guaranteed minimum benefit is treated here as a continuation of Subsistence support.

One-time assistance for household in need (*Jednokratna naknada osobama u trenutačnim materijalnim poteškoćama*). Beneficiaries are households that cannot meet basic needs in certain occasions. The benefit serves to cover the expenses typically related to education, clothing, child birth, funeral expenses or transportation. The maximum yearly amount is equal to HRK 3,500 for a household. Exceptionally, upon approval of the ministry of social care, the benefit amount can reach up to HRK 10,000.

Compensation for housing costs (*Naknada za troškove stanovanja*) is received for covering the costs of rent, electricity, gas, heating, water, and other housing bills. The benefit is financed and disbursed by LSG units, which also determine income tests and amounts of benefit. The maximum amount is equal to 50% of the amount of “means of subsistence”. Since 01/2014 it is explicitly defined that the beneficiaries must be receivers of Subsistence benefit. The recipients of Subsistence benefit also have the right to claim the **Firewood grant** (*Naknada za ogrjev*), at typical amount of HRK 950, which is financed by RSG units.

Compensation for electricity costs (*Naknada za ugroženog kupca energenata*) was introduced in 10/2015. Beneficiaries are households which receive Subsistence benefit, or households whose members receive Personal disability allowance. The amount of the benefit for a household is equal to the monthly cost of electricity, with maximum set at HRK 200.

Allowance for settlement of an adult person in a foster family (*Naknada za smještaj odrasle osobe u udomiteljsku obitelj*). The amount of benefit for one fostered adult person is HRK 1,800 (54.14% of BB); the amount is increased for semi-mobile and immobile persons.

Personal allowance for a person performing adult foster care (*Osobna naknada udomitelju odrasle osobe*) is a compensation for a foster caregiver. The benefit amount depends on the number and mobility of fostered persons.

Subsistence supplement for HBDR, HRVI and their family members (*Opskrbnina za HBDR, HRVI i članove njihovih obitelji*) and **Subsistence supplement for RVI, CIR and their family members** (*Opskrbnina za RVI i CIR*) were means-tested subsistence income schemes, intended for special groups of beneficiaries. They were abolished in 01/2014, with the introduction of the Guaranteed minimum benefit.

1.3.8 Benefits provided by local and regional self-government units

As mentioned in section 1.3.7, LSG units provide Compensation for housing costs, while RSG units deliver Firewood grant. Most LSG units, as well as some RSG units, provide their own lump-sum grants for newborn children. In some cases, they are more generous than the grant paid from the central government; e.g. in the City of Zagreb, the amount is HRK 1,800 for the 1st child, HRK 3,600 for the 2nd child and HRK 54,000 for each subsequent child. However, the mode value is HRK 1,000. LSG units also provide: (a) cash supplements to low income pensioners, people with disability, unemployed, etc., (b) subsidies for transportation costs for various groups of citizens (pensioners, unemployed, people with disability, school children, etc.), (c) subsidized pre-school day care programs (kindergartens), (d) lump-sum benefits and

food packages for the poor, (e) various benefits for school children and students (grants, subsidies for school books, school meals, etc.).

1.4 Social insurance contributions

1.4.1 Types of social insurance contributions and payers

The social insurance contributions system defines (a) several types of contributions, and (b) a range of income sources, income earning activities and occupations, that are subject to payment of SIC.

The main types of contributions are:

General health contribution (*Doprinos za zdravstveno osiguranje*): the rate was 15% until 04/2012. From 05/2012 to 03/2014 the rate was equal to 13%. From 04/2014 and on the rate is 15%.

Occupational health contribution (*Doprinos za zdravstveno osiguranje zaštite zdravlja na radu*): the rate is 0.5%.

Pensioner health contribution (*Dodatni doprinos umirovljenika za zdravstveno osiguranje*): the rates are 1% and 3%.

Employment contribution (*Doprinos za obvezno osiguranje u slučaju nezaposlenosti*): the rate is 1.7%.

Pension contribution A (*Doprinos za prvi stup mirovinskog osiguranja*) are the contributions to pillar 1, paid by persons in contributory scheme A. The rate is 20%.

Pension contribution B1 (*Doprinos za prvi stup mirovinskog osiguranja*) are the contributions to pillar 1, paid by persons in contributory scheme B. The rate is 15%.

Pension contribution B2 (*Doprinos za drugi stup mirovinskog osiguranja*) are the contributions to pillar 2, paid by persons in contributory scheme B. The rate is 5% (persons in contributory scheme A do not pay contributions to pillar 2).

Thus, a person pays either Pension contribution A, or the sum of Pension contribution B1 and Pension contribution B2. The overall rate of Pension contributions is 20% in both cases.

In the next few sections we define four main groups of persons who must pay SIC because they are earning certain source of income or performing certain occupational activities.

1.4.2 Wage related social insurance contributions

Employment earnings are subject to employer and employee SIC. The contribution base is equal to the gross employment earnings.

Employer SIC include General health contribution, Occupational health contribution and Employment contribution.

Employee SIC involve Pension contributions (A, B1, B2).

1.4.3 Social insurance contributions for self-employed persons

These contributions are paid by self-employed persons. The contribution base is not income related, but is a lump-sum obtained as some percentage of the average gross wage of the previous year (from January to August). This percentage ranges from 35% to 110% for various types (occupations). Self-employed persons pay General health contribution, Occupational health contribution and Pension contributions (A, B1, B2). Since 04/2014 they also pay Employment contributions.

1.4.4 Social insurance contributions on income from contractual work

SIC are also paid on income from contractual work. These contributions are mimicking the system of employer and employee contributions. In that respect, there is a part of contributions paid by the purchaser of services (“employer”) and a part paid by the provider of services (“employee”). The contribution base is equal to the “gross receipt”, which is an equivalent of “gross wage”. General health contribution is paid by the “employer”, while the earner of contractual income pays Pension contributions (A, B1, B2). Some types of income from contractual work are exempt from SIC, and among these the most important ones are those that relate to honoraria for original works of scientists, journalists, artists, etc. Furthermore, income from contractual work of pensioners is also exempt from SIC. In 01/2017 important changes have been introduced, in order to equalise the treatment of different groups of persons who perform contractual work. All earners have to pay SIC, whose rates are set to one half of regular rates from section 1.4.1.

1.4.5 Pensioner health contribution

Pensioners who receive domestic pensions pay Pensioner health contribution. The contribution base is the monthly gross pension.

1.5 Taxes

1.5.1 Consumption taxes

Value added tax (*Porez na dodanu vrijednost*) exists since 1998. Following the accession of Croatia in EU, in July 2013, VAT became fully harmonised with EU VAT. Taxpayer is every person engaged in the provision of goods and services. The tax base is the value of (a) goods and services provided by a taxpayer within the territory of Croatia, (b) goods and services purchased by a taxpayer from providers residing in other EU countries, and (c) goods and services purchased (i.e., imported) from countries outside the EU. The standard VAT rate is 25%. A minimum rate of 5% applies to bread, milk, medical drugs, equipment and appliances for persons with disability, newspapers (certain types), books (with scientific, educative, cultural content), scientific journals. A reduced rate of 13% applies to accommodation services (in hotels, camps, tourist boats), newspapers (certain types) edible oils and fats, child car-seats, baby food, water and electricity supply services, collection of municipal waste services, concerts tickets, culture and art magazines, some agricultural products (seedlings and seeds, fertilizers, pesticides, etc.).

Excise taxes (*posebni porezi na dobra i usluge, trošarine*). Taxpayers are producers and importers of different goods. The subjects of taxation are: (a) motor vehicles for personal uses, (b) coffee products, (c) alcoholic and non-alcoholic beverages, (d) tobacco products, (g) energy products and electricity. Before 2013 there existed also excise taxes on vessels and aircrafts for personal use, on luxury products, beer, etc.

Beverages tax (*Porez na potrošnju pića*). Taxpayers are providers of bar and restaurant services. The tax base is the sale price of served beverages.

1.5.2 Income taxes

Corporate income tax (*Porez na dobit*). Taxpayers are principally legal entities performing economic activities for profit. Individual entrepreneurs (self-employed persons) are also subject to taxation in certain cases, or they can voluntarily choose to pay Corporate income tax instead of Personal income tax. The tax base is profit (the difference between revenues and expenditures) determined pursuant to the accounting regulations, increased and reduced in accordance with certain provisions determined by the law. The tax rate is 20% in the 2014-2016 period. Since 01/2017 the tax is paid at the 18% rate, and 12% by entities whose yearly revenue is below HRK 3 million.

Personal income tax (*Porez na dohodak*). Taxpayers are individuals earning income from taxable sources, the main of which are employment earnings, income from self-employment, pensions, property income, capital income and income from contractual work. General schedule has four rates till 06/2010 (15%, 25%, 35% and 45%) and three rates (12%, 25% and 40%) since 07/2010. Since 01/2017 the number of rates is reduced to two (24% and 36%). In 2012, taxation of dividends was introduced; since 2015 interest income is also taxable; since 2016 capital gains are taxable. All types of income, except self-employment income, are taxed by withholding during the year; employment income and pensions are taxed using the monthly-adjusted general tax schedule, while other sources are taxed by income specific schedules.

Yearly tax is assessed according to the specific rules, which are significantly changed by the 2016 tax reform, enacted since 01/2017. Prior to 01/2017 taxpayers are divided into those who: (a) *must* submit a yearly tax file (YTF); these are primarily self-employed persons and employed persons who worked simultaneously for two employers during the year, (b) *may* submit YTF, in order to achieve even taxation throughout the year and use yearly allowances and deductions. *All* income sources are reported in YTF and the yearly general schedule is applied. Since 01/2017, YTF covers only the selected forms of income, i.e. self-employment income, employment income, pensions and income from contractual work. All persons who earn these types of income must submit YTF. In mid-2010 several deductions were abolished, namely for insurance premiums, housing and health expenses; the current system has relatively few deductions, e.g., for given donations and for self-employed persons. There are several deductions for inhabitants of less developed and war stricken areas.

Surtax (*Prirez*) is paid by PIT taxpayers. The tax base is the amount of PIT. LSG units set the level of the rate. The maximum rates can be set to: (a) 10% in municipalities, (b) 12% in cities with a population below 30,000, (c) 15% in cities with a population over 30,000, except (d) 30% in Zagreb (where the current rate is 18%).

1.5.3 Property taxes

Currently there is no standard property tax in Croatia. Its role is in certain way played by the Communal fee (*Komunalna naknada*), which is paid by the owners and users of immovable property. The amount of the fee depends on the city (municipality) zone, the type of the property and the surface area.

There are several taxes on different types of assets held and used by natural and legal persons. These taxes are Inheritance and gifts tax (*Porez na nasljedstva i darove*), Real estate transfer tax (*Porez na promet nekretnina*), Tax on vacation houses (*Porez na kuće za odmor*), Tax on road motor vehicles (*Porez na cestovna motorna vozila*), Tax on vessels (*Porez na plovila*), Trade

name tax (*Porez na tvrtku ili naziv*), Tax on the use of public land (*Porez na korištenje javnih površina*), etc.

2. SIMULATION OF TAXES AND BENEFITS IN EUROMOD

2.1 Scope of simulation

EUROMOD is a cross-country comparative benefit-tax model. The model simulates a variety of taxes and benefits. However, not all taxes and benefits mentioned in section 1 are simulated. Some are entirely beyond the scope of the model, and are not included either in the EUROMOD input database or as output variables, while others are included as non-simulated output variables. Table 2.1 and Table 2.2 classify the main tax and benefit instruments according to how each is treated in EUROMOD, and provide a brief explanation as to why the instrument is not fully simulated when this is the case.

Table 2.1 Simulation of benefits in EUROMOD

	Variable name	Treatment in EUROMOD				Why not fully simulated
		2014	2015	2016	2017	
Retirement benefits/pensions						
Old age pension	poa	I	I	I	I	1
Survivors pension	psu	I	I	I	I	1
Disability pension	pdi	I	I	I	I	1
Unemployment benefits						
Unemployment benefit	bunct_s	PS	PS	PS	PS	1
Other unemployment benefits	bunot	I	I	I	I	2
Family benefits						
Child benefit	bch_s	S	S	S	S	
Sickness – maternity benefits						
Sickness benefits	bhl	I	I	I	I	2
Maternity leave benefit	bfama_s	S	S	S	S	
Parental leave benefit	bfapl_s	S	S	S	S	
Maternity and parental allowance	bmanc_s	S	S	S	S	
Grant for a newborn child	bfaba_s	S	S	S	S	
Social assistance benefits						
Subsistence benefit	bsa_s	S	S	S	S	
Other social assistance benefits	bsaot	I	I	I	I	2
Housing benefits						
Compensation for electricity costs	bhout	N/A	N/A	S	S	
	bho	I	I	I	I	2
Education allowances	bed	I	I	I	I	2
Disability benefits	bdi	I	I	I	I	2
Old-age benefits	boa	I	I	I	I	2
Survivors benefits	bsu	I	I	I	I	2
Minimum wage	yem	S	S	S	S	

Notes: 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;
 1: no data on contribution history;
 2: data available not sufficient to simulate all eligibility conditions.

Table 2.2 Simulation of taxes and social insurance contributions in EUROMOD

	Variable name	Treatment in EUROMOD				Why not fully simulated
		2014	2015	2016	2017	
Taxes						
Personal income tax	tin_s	S	S	S	S	
Surtax	tmu_s	S	S	S	S	
Property taxes	tpr	I	I	I	I	2
Social insurance contributions						
Employers	tscer*_s	S	S	S	S	
Employees	tscee*_s	S	S	S	S	
Pensioners	tscbesi_s	S	S	S	S	
Income from self-employment and contractual work	tscse*_s	S	S	S	S	
Credited SIC	tsct_s	S	S	S	S	

Notes: I: *included* in the micro-data but not simulated;

- S: *simulated* although some minor or very specific rules may not be simulated;
2: data available not sufficient to simulate all eligibility conditions.

- ***Structural changes between 2014 and 2015***

- (a) The personal deduction of up to HRK 12,000 yearly for income from dividends was abolished;
- (b) Interest income became taxable by PIT.

- ***Structural changes between 2015 and 2016***

- (a) Capital gains became taxable by PIT;
- (b) Subsistence benefit – several changes in the “means of subsistence” formulas were introduced: (1) supplemental amount was reintroduced for adults in one-member households who are unable to work; (2) supplemental amount for a child of a single parent was reintroduced.

- ***Structural changes between 2016 and 2017***

- (a) Significant changes in the PIT system: (1) the number of rates is reduced from three (12%, 25% and 40%) to two (24% and 36%); (2) Basic personal allowance for non-pensioners is increased from HRK 2,600 to HRK 3,800; for pensioners it remains HRK 3,800; (3) Personal allowance for supported family members is also increased; (4) the rules regarding the submission of YTF have been changed: only self-employment income, employment income, pensions and income from contractual work enter YTF; all persons who earn these types of income must submit YTF.
- (b) Changes in social insurance contributions on income from contractual work have been implemented. The rates have been halved, while some exemptions (honoraria for original works of scientists, journalists and artists, and pensioners’ earnings) are abolished.
- (c) The floor base for employer and employee social insurance contributions is increased from 35% to 38% of AGWPY.

2.2 Order of simulation and interdependencies

The following table shows the order of policies’ simulation in the Croatian system in 2014-2017. The spine starts by setting default values for some variables. Then there is a switch to set the approach to uprating pensions (for more information see section 2.3) and a policy to uprate all monetary variables up to 2017 (for uprating factors see section 3.4). Next, constants, income lists and tax units are defined. The policy spine begins with the simulation of the minimum wage, which changes employment income for those observed below the legal limit. This policy is switched off in the baseline scenario. After that, the model recodes all negative self-employment income to zero. Social insurance contributions, levied on employment and self-employment income, come next. They are followed by personal income tax, maternity and paternal benefits and the unemployment insurance benefit. The last elements of the spine include untaxed benefits, credited social insurance contributions and the surtax.

Note that maternity and parental benefits depend on beneficiaries’ net wage. At the same time, they are also needed for the simulation of personal income tax (in the calculation of personal allowance for supported family members). Therefore, the PIT policy is run twice: first with these benefits set to zero and then again with the benefits’ final values.

Table 2.3 EUROMOD Spine: order of simulations

Policy	2014	2015	2016	2017	Description of policies
SetDefault_hr	on	on	on	on	DEF: Default values for variables
uaa_hr	switch	switch	switch	switch	SWITCH: Uprating by Average Adjustment (for pensions)
Uprate_hr	on	on	on	on	DEF: Uprating factors
ConstDef_hr	on	on	on	on	DEF: Constants
ilsdef_hr	on	on	on	on	DEF: Standardised income lists
ildef_hr	on	on	on	on	DEF: Non-standardised income lists
tundef_hr	on	on	on	on	DEF: Assessment units
bta_hr	switch	switch	switch	switch	SWITCH: Benefit Take-up Adjustments
yem_hr	off	off	off	off	DEF: Minimum wage
neg_hr	on	on	on	on	DEF: Recode negative self-employment income to zero
InitVars_hr	on	on	on	on	DEF: Initialise variables
tscer_hr	on	on	on	on	SIC: Employers
tscee_hr	on	on	on	on	SIC: Employees
tscse00_hr	on	on	on	on	SIC: Self-employed
tscse01_hr	on	on	on	on	SIC: Income from contractual work
tscbesi_hr	on	on	on	on	SIC: Pensioners
tin_hr	on	on	on	on	TAX: Personal income tax
bfapl_hr	on	on	on	on	BEN: Parental leave benefit
bfama_hr	on	on	on	on	BEN: Maternity leave benefit
bfaba_hr	on	on	on	on	BEN: Grant for a newborn child
bmanc_hr	on	on	on	on	BEN: Maternity and parental allowance
bunct_hr	on	on	on	on	BEN: Unemployment benefit
tin_hr	on	on	on	on	TAX: Personal income tax (repetition of policy with order 16)
tmu_hr	on	on	on	on	TAX: Surtax
tsctt_hr	on	on	on	on	SIC: Credited
bch_hr	on	on	on	on	BEN: Child benefit
bsa_hr	on	on	on	on	BEN: Subsistence benefit
bhout_hr	n/a	n/a	on	on	BEN: Compensation for electricity costs
output_std_hr	on	on	on	on	DEF: Standard output individual level
output_std_hh_hr	off	off	off	off	DEF: Standard output household level

2.3 Policy switches

Policy switches are clearly marked in the spine. They have the word “switch” for the years when they are defined and n/a otherwise. Switchable policies can be turned ON or OFF through the run dialog box without changing the model itself. In the baseline a switchable policy is set to its default (ON or OFF) as specified in this documentation.

The Croatian model has two switchable policies. UAA_hr allows choosing between two alternative approaches to pension uprating. By default (i.e., in the baseline), old-age, survivors and disability pensions are uprated according to pension indexation rules. As an alternative, pensions can be uprated according to their average yearly growth. BTA_hr enables two approaches regarding the take-up of Subsistence benefit. By default, the amounts below a certain threshold are *not* claimed. Alternatively, the benefit is taken up by *all* beneficiaries with positive benefit amounts.

2.4 Important indicators

In calculations of some benefits, personal income tax and social insurance contributions the following indicators are used: (a) “budgetary base” (BB), (b) official average gross wage in the current year (AGW), (c) average gross wage from January to August of the previous year (AGWPY), (d) average net wage from January to August of the previous year (ANWPY), (e) average net wage from January to December of the previous year (ANWPY2), (f) gross minimum wage in the current year (GMWCY), (g) net minimum wage in the current year (NMWCY), (h) Regular basic personal allowance (RBPA), (i) Maximum pensioner’s basic personal allowance (MPBPA), and (j) Personal allowance base (PAB), (k) adapted average gross wage in the current year (AGW2). Namely, in 2016/01 there was a significant change in the measurement method regarding the average gross wage; this is manifested in the decrease of AGW in 2016 as compared to 2015. However, in reality there was no such fall, which is shown by AGW2 – the time series constructed by the authors, by combining data from the old and new data series, which overlap in 2016; the 2017 figure is imputed (see note N3 in Table 3.3).

Table 2.4 Indicators used in calculations of some benefits, personal income tax and social insurance contributions (2014-2017), HRK per month

	2014	2015	2016	2017
BB	3,326	3,326	3,326	3,326
AGW	7,953	8,055	7,752	N/A
AGWPY	7,941	7,943	8,037	7,739
ANWPY	5,507	5,510	5,693	5,664
ANWPY2	5,515	5,553	5,711	5,685
GMWCY	3,018	3,030	3,120	3,276
NMWCY	2,414	2,424	2,496	2,621
RBPA	2,200	2,600	2,600	3,800
MPBPA	3,400	3,800	3,800	3,800
PAB	n/a	n/a	n/a	2,500
AGW2	7,516	7,611	7,752	7,938

Sources: Croatian Bureau of Statistics; Ministry of Finance; Tax administration.

2.5 Minimum wage

- *Brief description*

The minimum wage determines the minimum legally allowed gross monthly wage for full-time work.

- *Definitions and eligibility conditions*

The unit of analysis is individual. If the actual wage is less than minimum wage then wage is replaced with minimum hourly wage times actual working hours.

- *Benefit amount*

The amounts of gross minimum wage in 2014-2017 are shown in Table 2.4, by item GMWCY. In the period 2014-2015 it is relatively constant, around HRK 3.000, while in 2016 it increases by about 4%, to HRK 3,120 and to HRK 3,276 in 2017.

2.6 Social benefits

2.6.1 Subsistence benefit (*bsa_s*)

- **Brief description**

Subsistence benefit is a means-tested benefit intended for households whose income is below the “means of subsistence”.

- **Definitions**

2014-2016

The considered unit is a “household” (*kućanstvo*), which is “the family or other community of people who live together and settle living expenses together, regardless of kinship”.

- **Eligibility conditions**

Eligible household members are all persons aged below 15 and above 65.

In order to qualify as eligible household members, persons aged between 15 and 65 must satisfy the conditions for being characterised as unemployed, except in cases when a person is:

- (a) unable to work;
- (b) taking care of a child up to age of 1 year;
- (c) taking care of twins up to age of 3;
- (d) taking care of 3 or more children all aged below 10;
- (e) taking care of a person with physical, mental or health impairments;
- (f) those whose age is above the ‘statutory pension age *minus* 5 years’.
- (g) aged between 15 and 29 and involved in regular education;
- (h) pregnant, from the beginning of pregnancy.

- **Income test**

Household income is the sum of incomes of all household members, both of eligible and non-eligible ones. Household income must be lower than its “means of subsistence” (*sredstva uzdržavanja*). The household’s “means of subsistence” are a sum of contributions of eligible household members. These contributions depend on personal characteristics of each member, and are presented by the following table:

Table 2.5 Means of subsistence: amounts (2014-2017), HRK per month

	2014-2015	2016-2017
<i>Adult in a one-member household</i>		
Able to work	800	800
Unable to work	800	920
<i>Adult in a multiple-member household</i>		
Able to work	480	480
Unable to work	480	480
<i>Lone parent</i>		
Able to work	400	800
Unable to work	550	800
<i>Child of a non-single parent</i>		
Aged 0-6 years	320	320
Aged 7-14 years	320	320
Aged 15-17 years	320	320
Aged 18-25, in regular education	480	480
<i>Child of a single parent</i>		
Aged 0-6 years	320	440
Aged 7-14 years	320	440
Aged 15-17 years	320	440
Aged 18-25, in regular education	480	480

“Single parent” is a person with children who lives without a spouse. Two cases are distinguished: (a) the single parent’s spouse is known and alive, and (b) the single parent’s spouse is dead or unknown. For a person from case (b), we use the special term “lone parent” (*samohrani roditelj*). This classification is introduced in 09/2015, whereby lone parent obtains the larger amount of the means of subsistence (HRK 800). All children of single parents, whether lone parents or not, receive larger amount since 09/2015 (HRK 440).

Household income includes all types of taxable income (see section 2.8), which are taken in net terms, i.e. after deduction of SICs and PIT. The following social benefits are included: sickness benefits, Unemployment benefit, Maternity leave benefit, Parental leave benefit and Maternity and parental allowance. Paid alimonies are deducted from total income. Since 01/2014 received alimonies are also included in household income, but only the part above a certain threshold, which equals 8.5%, 10% and 11% of ANWPY2, for each supported child aged 0-6, 7-12 and 13-18 years, respectively.

- **Wealth test**

In order to qualify for the benefit, the members of a household must satisfy several conditions regarding the possession and the use of assets, as follows.

Household members are not allowed to use a personal vehicle, whether their own or borrowed. Exceptions are made for households: (a) which have a large number of members (6 or more), (b) in which the vehicle is used for transportation of disabled members, or (c) whose place of living is distanced from the city, if there are no means of public transportation available.

Household members should not own real estate other than the one used for living. More generally, they should not own assets, either non-financial or financial, that could be disposed of without compromising the basic needs of household members.

- **Benefit amount**

The benefit equals the difference between means of subsistence and household income. Before 01/2014, the amount of benefit was not limited. Since 01/2014, the maximum benefit for any household is set to the level of gross minimum wage in Croatia (GMWCY).

In 01/2014 a “make work pay” measure was introduced. It is intended for the non-employed working-able persons, whose households receive the Subsistence benefit for at least one year. If such a person gets employed, the benefit is not immediately suspended, but gradually decreased. A following benefit calculation procedure applies. Denote with B_i the benefit amount in the i th month, where $i = 0$ for the month preceding the employment. The monthly benefit amounts in months $i = 0, 1, 2, 3$, are: (a) B_0 , (b) $B_1 = B_0$, (c) $B_2 = 0.75 \cdot B_0$, (d) $B_3 = 0.50 \cdot B_0$, respectively. If employment lasts more than 3 months, the benefit amount is recalculated, taking into account the average household income in the preceding 3 months.

- ***EUROMOD notes***

Eligibility

The law requires that working-able Subsistence benefit recipients regularly report to HZZ, participate in education programmes and show preparedness to accept a job. Since the SILC data provide no information on whether these conditions are satisfied, we assume that persons aged between 15 and 65 do satisfy the above mentioned conditions.

Moreover, since we have no information on whether a person is a benefit recipient for more than one year, the “make work pay” element of the policy is not simulated in EUROMOD.

There is no information to establish whether a person is a lone parent. The lone parent is defined as a person with children who does not have a partner and does not receive an alimony.

Wealth test

The wealth test is partially incorporated by checking whether a household has a car or not; exclusions are simulated for large families and households having members with disability, while the exclusion for distanced households is not simulated due to lack of data. Other types of wealth tests are not simulated because no information is available on the possession of secondary houses/apartments, and other assets.

Accounting for non take-up

Benefit non take-up is modelled by assuming that small amounts are not claimed. Based on actual experience, we have set the threshold at 3% of ANWPY.

2.6.2 Unemployment benefit (*bunct_s*)

- ***Brief description***

Unemployment benefit is received by unemployed persons, under various conditions, during a limited period that depends on previous working record.

- ***Definitions***

The benefit is received by employed persons who become unemployed.

- ***Eligibility conditions***

Unemployed persons who have worked for at least 9 months during the last 24 months are eligible for benefit receipt. The time spent on sick-leave and parental leave are counted as

working time. The termination of the previous job position should not have been voluntary or caused by worker's violations of working obligations.

The benefit ceases to be received at the moment of new employment, retirement, fulfilment of the statutory pension age condition, during the period of maternity or parental leave, or in any other condition in which the person loses his/her unemployment status.

The duration of benefit depends on the history of previous employment. For a person who has been using the benefit and then employed again, the time spent in work is counted from the beginning of new employment. The relationship between months spent in work and the duration of benefit is shown in the first two columns of the following table.

A special rule relates to people who have worked more than 32 years and whose age is above the statutory pension age minus 5 years. They can receive the benefit until re-employment or retirement.

Table 2.6 Duration of unemployment benefit

Months spent in work	Basic duration (in months) 2014-2017
9 to 24	3
25 to 36	4
37 to 48	5
49 to 60	6
61 to 72	7
73 to 84	8
85 to 96	9
97 to 108	10
109 to 120	11
121 to 180	12
181 to 240	13
241 to 300	14
301 to 384	15

- ***Income test***

No income test applies.

- ***Benefit amount***

The unemployment benefit base (UBB) is the worker's mean post-contributions wage during the three-month period preceding unemployment. Post-contributions wage is the gross wage minus employee social insurance contributions.

The amount of benefit is proportional to the benefit base, but maximum and minimum values are set, which depend on certain percentages of average gross wage and gross minimum wage (see section 2.4). The amount of benefit decreases with time, in steps. The details are presented in the following table:

Table 2.7 Unemployment benefit rates (2014-2017)

	2014-2017
<i>During the first 90 days</i>	
Amount	70% of UBB
Maximum	70% of ANWPY2
Minimum	50% of NMWCY
<i>In the rest of the period</i>	
Amount	35% of UBB
Maximum	35% of ANWPY2
Minimum	50% of NMWCY

- **EUROMOD notes**

Effectively, this benefit is only partly simulated using the information about actual receipt. But rather than simply using the observed receipt as part of the eligibility criteria, all eligibility rules in full detail are covered. However, as not all required information (e.g. unemployment history) is available several assumptions are made and some rules are considered automatically fulfilled for those in receipt. This approach is chosen so that the benefit can be also modelled for those currently employed if needed (e.g. to simulate their entitlement if they become unemployed, e.g. for replacement rates calculations).¹

Unemployment duration (*lunmy_s*) is set equal to the maximum of observed unemployment duration (*lunmy*) and observed benefit receipt (*bunctmy*). With regards to the minimum qualifying contribution period, those currently unemployed and in receipt are assumed to satisfy it, while those currently unemployed and not in receipt are assumed to have not passed it. At this point, working age people who are unemployed (*lunmy_s* > 0) and have sufficient contribution history, are considered eligible. Benefit duration (*bunmy_s*) is calculated according to the rules described in Table 2.6, using modelled contribution history, while also controlling for the unemployment duration. In order to (indirectly) take into account the extended duration rules, the benefit duration in 2013 is set equal to the maximum of simulated months according to the basic rules and observed period in receipt.

Benefit entitlement is calculated based on previous earnings and benefit duration, subject to the lower and upper thresholds. For those currently unemployed and in receipt, previous earnings (*yempv*) were calculated by reversing unemployment insurance benefit rules. Finally, the benefit amount is adjusted with the number of months in receipt.

2.6.3 Maternity leave benefit (*bfama_s*)

- **Brief description**

The benefit is received by a working mother who is employed or self-employed person, one month before and six months after the birth of a child (children).

- **Definitions**

The unit of analysis is the family, which consists of partners and own dependent children aged 0 or 1.

- **Eligibility conditions**

¹ Employment changes are modelled in combination with a specific add-on tool and are not part of the baseline simulations.

Mothers who are employed or self-employed persons are eligible for receiving the benefit. The period of receipt is divided into two parts. The *mandatory period*, used by pregnant women / mothers, lasts from the 28th day before the expected delivery date (or from the 45th day, upon medical approval) to the 70th day after birth. The *voluntary period* can also be used by the father. It lasts from the end of the mandatory period to the end of the 6th month after birth.

- ***Income test***

This is not a means-tested benefit.

- ***Benefit amount***

The benefit base is the beneficiary's average "netted SIC contribution base", obtained during the six-month period preceding work-leave. For employees, the "netted SIC contribution base" is gross wage minus employee's contributions, PIT and Surtax. For self-employed the "netted SIC contribution base" is the base for SIC counterfactually taxed by employees' SIC, PIT and Surtax. The "insurance period condition" assumes that preceding the maternity leave, the beneficiary has been insured, either: (a) at least 12 months continuously, or (b) at least 18 months with interruptions during a 24 month period. If the insurance period condition is fulfilled, the benefit amount is equal to 100% of the benefit base during the whole period. The minimum benefit amount is HRK 1,663 (50% of BB). If the "insurance period condition" is not met, the benefit is equal to the minimum amount.

- ***EUROMOD notes***

Note that the exact month of birth is not available in the data; only the quarter of the year is known. Hence, it was assumed that children born in the first, second, third and fourth quarter of the year are born in February, May, August and November respectively.

According to administrative data less than 3% of recipients are men. Hence, in EUROMOD the benefit receipt is only granted to mothers for both the mandatory and the voluntary period. Data on average duration of benefit receipt are not available; however, based on common perception, maximum duration is assumed, i.e. 7 months. Mothers of children aged 0 born in February or May receive the benefit for the whole period (i.e. 7 months); mothers of children aged 0 born in August and November receive the benefit for 6 and 3 months respectively. Mothers of children aged 1 born in November and August receive the benefit for 4 and 1 months respectively.

2.6.4 Parental leave benefit (*bfapl_s*)

- ***Brief description***

The benefit is received by working parents taking care of a small child (children).

- ***Definitions***

The unit of analysis consists of partners and own children aged 0 to 3.

- ***Eligibility conditions***

Mothers and fathers who are employed or self-employed persons are eligible for receipt. The benefit can be claimed from the end of the 6th month after the child's birth until the child reaches the age of 8.

There are two cases: (a) the child is the 1st or the 2nd in a family, (b) the child is the 3rd or subsequent child in family or twins (multiples) are born. In case (a), the leave lasts 6 months if it

is only used by the mother, or 8 months if mother and father use 4 months each. In case (b), the leave lasts 30 months and can be also used by mother only, or equally shared by the parents.

- **Income test**

This is not a means-tested benefit.

- **Benefit amount**

The benefit base is the beneficiary's mean net wage received during the six-month period preceding the work-leave.² During the months 1 to 6 (or 1 to 8, if parents share the leave in equal parts), the benefit amount is equal to 100% of the base. The maximum is set to HRK 2,661 (80% of BB), while the minimum equals HRK 1,663 (50% of BB). In cases (b), the benefit is equal to HRK 1,663 (50% of BB), in the remaining period (months 7 to 30, or 9 to 30, if parents share the leave in equal parts during the first 8 months).

- **EUROMOD notes**

According to administrative data less than 3% of recipients are men. Hence, in EUROMOD the benefit receipt is only granted to mothers. Data on average duration of benefit receipt are not available. Based on common perception, maximum duration is assumed for case (a). As a consequence, the maximum simulated duration of benefit receipt in that case is 6 months. In case (b) it is assumed that the benefit is used all at once and that it lasts for its maximum duration (i.e. 30 months). The benefit duration (depending on the case and on children's month of birth) is described in the following table:

Table 2.8 Duration of parental leave benefit (number of months)

<i>for mothers of...</i>	born in February	born in May	born in August	born in November
children aged 0	5	2	0	0
up to 2 children, youngest aged 1	1	4	6	6
> 2 children/twins, youngest aged 1	12	12	11	8
> 2 children/twins, youngest aged 2	12	12	12	12
> 2 children/twins, youngest aged 3	1	4	7	10

Notes: The months of birth refer to the youngest child in the benefit unit. Mothers need to have exhausted maternity leave benefit (provided one month before and six months after the birth of a child) before receiving parental leave benefit.

2.6.5 Maternity and parental allowance (*bmanc_s*)

- **Brief description**

The benefit is received by parents of newborn children who are unable to claim for the maternity and the parental leave benefits.

- **Definitions**

² For employees, the net wage is gross wage minus employee's contributions and PIT. For self-employed the benefit base is the base for SIC counterfactually taxed by employees' SIC and PIT.

The unit of analysis consists of partners and own children aged 0 to 3.

- **Eligibility conditions**

This benefit is designed to provide support to parents taking care of a newborn child (children) who do not qualify as employed or self-employed persons. The following groups are considered as eligible: temporary workers, workers in agriculture, unemployed and inactive persons.

The benefit is received from the child's birth and can last 12 months at most if the child is the 1st or the 2nd in the family, or 36 months at most if it is the 3rd or subsequent child in the family or if twins (multiples) are born.

- **Income test**

This is not a means-tested benefit.

- **Benefit amount**

The benefit amount equals HRK 1,663 per month (50% of BB).

- **EUROMOD notes**

The benefit receipt is only granted to mothers. The benefit duration (depending on the case and on children's month of birth) is described in the following table:

Table 2.9 Duration of Maternity and parental allowance (nr of months)

<i>for mothers of...</i>	born in February	born in May	born in August	born in November
children aged 0	11	8	5	2
up to 2 children, youngest aged 1	1	4	7	10
> 2 children/twins, youngest aged 1	12	12	12	12
> 2 children/twins, youngest aged 2	12	12	12	12
> 2 children/twins, youngest aged 3	1	4	7	10

Notes: The months of birth refer to the youngest child in the benefit unit.

2.6.6 Grant for a newborn child (*bfaba_s*)

- **Brief description**

The grant is received by a parent of a newborn child.

- **Definitions**

The unit of analysis consists of partners and own children aged 0.

- **Eligibility conditions**

All parents of newborn children are eligible, irrespectively of their working status.

- **Income test**

This is not a means-tested benefit.

- **Benefit amount**

The benefit amount is HRK 2,328 (70% of BB).

2.6.7 Child benefit (*bch_s*)

- **Brief description**

Child benefit is a monthly means-tested benefit paid to families with children below a certain age limit.

- **Definitions**

The unit of analysis consists of households with dependent children. The latter are defined as (a) persons aged up to 15; (b) persons aged 15, if involved in primary education – until the end of the school year; (c) persons aged between 15 to 19, if involved in secondary education – until the end of the school program. Special categories of children are further defined: (g1) children with ‘impaired health’, (g2) children with ‘severe disability’, and (g3) children of killed, captured or missing HBDR. Children in groups (g1) and (g3) must satisfy age conditions (a), (b) or (c). For children in group (g2), the age limit is 27; since 9/2015, this age limit is removed, under certain conditions.

- **Eligibility conditions**

Beneficiaries are households with dependent children.

- **Income test**

Monthly household income per member (total household income divided by the number of household members) must be lower than HRK 1,663 (i.e. 50% of BB). Household income is defined the same way as for the Subsistence benefit, except that alimonies are not included; the Subsistence benefit is not part of household income.

- **Benefit amount**

Benefit amounts per child are presented in the following table:

Table 2.10 Child benefit income thresholds and benefit rates (2014-2017), HRK per month

Household income per member	2014-2017
less than HRK 543.14	299.34
HRK 543.14 – 1,119.53	249.45
HRK 1,119.53 – 1,663	199.56

The benefit amounts per child, shown in table above, are increased: (a) by 25%, if both parents are missing or if they are ‘permanently incapable for work and independent living’; (b) by 15%, if one parent is missing or if he/she is ‘permanently incapable for work and independent living’, (c) by 25%, for a child with ‘impaired health’.

Apart from the amounts shown in the table above, the benefit amount designated to a child with ‘severe disability’ is HRK 831.50, irrespectively of household income. Likewise, the amount designated to a child of a killed, captured or missing HBDR is HRK 374.18, irrespectively of household income.

The benefit amount for a household is the sum of amounts designated to each child, according to the rules described above. The benefit amount for a household is augmented by the so-called pronatalist supplement (“*pronatalitetni dodatak*”), which is obtained if the household income per member is below HRK 1,663. The amount of the pronatalist supplement is: (a) HRK 500, if a household has 3 dependent children, and (b) HRK 1,000, if a household has 4 or more dependent children.

- ***EUROMOD notes***

In EUROMOD the state of ‘permanent incapability for work and independent living’ (for parents) and the state of ‘impaired health’ is proxied by disability status, whereas the state of ‘severe disability’ (for children) is not modelled due to lack of relevant information. Child benefit for a child of a killed, captured or missing HBDR is not simulated in EUROMOD due to lack of data.

2.6.8 Compensation for electricity costs (*bhout_s*)

- ***Brief description***

This means-tested benefit was established in October 2015. It is intended to income-poor households to assist them in covering of the costs of electricity.

- ***Definitions***

The unit of analysis is a household.

- ***Eligibility conditions***

Beneficiary is a household that receives Subsistence benefit or a household in which one or more household members receives Personal disability allowance.

- ***Income test***

Income test is indirectly implied through Subsistence benefit and Personal disability allowance.

- ***Benefit amount***

The amount of the benefit for a household is equal to the monthly cost of electricity, with maximum set at HRK 200.

- ***EUROMOD notes***

The amounts of Personal disability allowance are not available in the data. However, persons for whom the average amount of disability benefit (obtained as $12 * bdi / bdimy$) falls in the interval HRK 1,200 to 1,300, are considered beneficiaries of Personal disability allowance. Furthermore, data do not contain a separate variable for the cost of electricity; instead, the variable “other housing costs” (*xhcot*) is present, which also includes other types of costs.

2.7 Social insurance contributions

2.7.1 Employer social insurance contributions (*tscer_s*)

- ***Liability to contributions***

All employers are required to pay social insurance contributions for each person they employ.

- ***Income base used to calculate contributions***

The contribution base is gross employment earnings.

The floor base is 35% of AGWPY (see Table 2.4). Since 01/2017 the floor base is raised to 38% of AGWPY. There is no ceiling base for these contributions.

- ***Contribution rates***

(a) General health contribution (*tscersi00_s*): from 04/2014 onward the rate is 15%.

(b) Occupational health contribution (*tscersi01_s*): the rate is 0.5% of gross employment earnings.

(c) Employment contribution (*tscerui_s*): the rate is 1.7% of gross employment earnings.

2.7.2 Employee social insurance contributions (*tscee_s*)

- ***Liability to contributions***

These contributions are paid by private and public sector employees. Persons belonging in contributory scheme A pay Pension contribution A only. Persons in contributory scheme B pay both Pension contribution B1 and B2.

- ***Income base used to calculate contributions***

The contribution base is gross employment earnings. The floor base is 35% of AGWPY. Since 01/2017 the floor base equals 38% of AGWPY. For Pension contribution A and Pension contribution B1, both monthly and yearly ceilings are determined: monthly ceiling base is equal to 6 times AGWPY and yearly ceiling base is 72 times AGWPY. For Pension contribution B2 only monthly ceiling base is determined, equal to 6 times AGWPY.

- ***Contribution rates***

Persons in contributory scheme A pay Pension contribution A (*tsceepi00_s*): the rate is 20% of the contribution base.

Persons in contributory scheme B pay (1) Pension contribution B1 (*tsceepi01_s*): the rate is 15% of the contribution base, and (2) Pension contribution B2 (*tsceepi02_s*): the rate is 5% of the contribution base.

- ***EUROMOD notes***

In order to distinguish people contributing to pillar 1 from people contributing to both pillars 1 and 2 we calculated their age in 2002. If it was less than 40, they had to contribute to both pillars. If it was above 50, they had to contribute to pillar 1 only. People aged between age 40 and 50 could choose voluntarily to which pillar to contribute. However, as we know from the administrative data that 70% of these people had chosen to be in pillar 1, all people of this age group were assumed to contribute only to this pillar.

2.7.3 Self-employed social insurance contributions (*tscse00_s*)

- ***Liability to contributions***

Self-employed persons are obliged to pay social insurance contributions. For a definition of self-employed person, see section 1.1. There exist various taxation schemes for self-employed

people, which depend on their yearly revenue, type of activity, voluntary choices, etc. The largest group are self-employed persons who run their accounting books on cash basis, and calculate their yearly income as a difference between total receipts and total outlays; they are PIT payers (group A). Self-employed persons can opt to pay Corporate income tax instead of PIT, whereby they use accrual basis for accounting (group B). Entrepreneurs in agriculture may be members of group A or group B, however, if their yearly revenue is below certain thresholds, they can opt for lump-sum PIT (group C) or they can be exempted from PIT taxation (group D). Belonging to certain group (A, B, C or D) determines the SIC bases and rates.

We focus on self-employed persons who run accounting books on cash basis and pay PIT (group A). They are divided into four groups: “professionals I”, “professionals II”, “craftsmen” and “farmers I”.

There are two additional groups of farmers. “Farmers II” are self-employed persons in agriculture whose yearly revenue from the business activity is below HRK 80.500 and who do not receive state agricultural subsidies; they are exempted from PIT (group D). “Farmers III” are self-employed persons in agriculture whose yearly revenue from the business activity does not exceed HRK 149.500 (group C); they pay PIT according to lump-sum schedule. In assessing the yearly revenue from the business activity in agriculture, if there is more than one self-employed household member, then the revenues of all members are summed up and compared to the above mentioned thresholds.

There are two types of rental activities: (a) renting of accommodation space to tourists and travellers, and (b) renting of other immovable and movable property. We define “renters I” as: persons from group (a), who rent more than 20 beds or if they provide space for more than 10 tents. “Renters II” are persons from group (b) if their yearly revenue is above HRK 230.000. “Renters I” and “renters II” are treated as self-employed persons and their PIT and SIC status is analogous to the one of “craftsmen”.

“Renters III” are persons from group (a), who rent up to 20 beds to tourists of travellers or if they provide space for up to 10 tents or a camping space for up to 30 guests. “Renters IV” are persons from group (b) if their yearly revenue is up to HRK 230.000. “Renters III” (“renters IV”) can voluntarily choose to take the status of “renters I” (“renters II”). “Renters III” and “renters IV” do not pay SCs, but do pay PIT.

- ***Income base used to calculate contributions***

Income bases are lump-sum, i.e. they do not depend on income earned. There are several different lump-sum amounts, which depend on the type of self-employment. The base is obtained as a product of AGWPY and type-specific coefficients, which are shown in the following table:

Table 2.11 Coefficients used in the calculation of self-employed social insurance contributions base

Type of self-employment	Coefficient
professionals I	1.10
professionals II and craftsmen	0.65
farmers I	0.55
farmers II	0.35
farmers III	0.40

Notes: *Professionals I*: health care workers, veterinarians, lawyers, notaries, auditors, engineers, architects, tax advisors, bankruptcy trustees, interpreters, translators, tourist workers;
Professionals II: nurses, dental technicians, physiotherapists, film workers, journalists;
Farmers I: farmers who run accounting books on cash basis, and are PIT payers;

Farmers II: farmers who are exempted from PIT;
Farmers III: farmers who pay lump-sum PIT.

- **Contribution rates**

The contribution rates for different groups of self-employed people are summarised in the following table:

Table 2.12 Contribution rates (2014-2017)

	Other than Farmers II	Farmers II
General health contribution (<i>tscsesi0000_s</i>)	15%	7.5%
Occupational health contribution (<i>tscsesi0001_s</i>)	0.5%	0.5%
Employment contribution (<i>tscseui_s</i>)	1.7%	1.7%
Pension contribution A (<i>tscsepi0000_s</i>)	20%	10%
Pension contribution B1 (<i>tscsepi0001_s</i>)	15%	5%
Pension contribution B2 (<i>tscsepi0002_s</i>)	5%	5%

Notes: Persons in contributory scheme A pay Pension contribution A; Persons in contributory scheme B pay Pension contribution B1 and Pension contribution B2.

- **EUROMOD notes**

Information on which group a person belongs concerning his/her taxation status is not available in the data. For non-agricultural self-employed persons, we assume that they all run accounting books on cash basis and pay PIT (as group A). They are divided into “professionals I”, “professionals II” and “craftsmen”. Agricultural self-employed persons are divided into “farmers I”, which pay PIT (as group A), and “farmers II”, which are exempted from PIT (as in group D). The division between “farmers I” and “farmers II” is made using an income threshold, which is a proxy for their annual receipts. Renters who declare themselves as self-employed persons are treated as “craftsmen”. Other renters are treated as “renters IV”.

2.7.4 Contributions on income from contractual work (*tscse01_s*)

- **Liability to contributions**

The contributions are paid by earners of income from contractual work. Some types of contractual work (when earned by pensioners, honoraria for original works of scientists, journalists and artists) are exempt from paying SIC. However, these exemptions were abolished in 01/2017.

- **Income base used to calculate contributions**

The contribution base is equal to “gross receipt” from contractual work, which is the equivalent of “gross wage” (1.4.4). There are no floors or ceilings. In case of honoraria for original works of scientists and journalists (artists), the contribution base equals 70% (45%) of “gross receipt”.

- **Contribution rates**

(a) General health contribution (*tscsesi0100_s*): the rate was 15% until 04/2012. From 05/2012 to 03/2014 the rate was equal to 13%. From 04/2014 and on the rate is 15%. Since 01/2017 the rate is 7.5%.

(b) Pension contributions

Persons in contributory scheme A pay Pension contribution A (*tscsepi0100_s*): the rate is 20% of the contribution base. Since 01/2017 the rate is 10%.

Persons in contributory scheme B pay (1) Pension contribution B1 (*tscsepi0101_s*): the rate is 15% of the contribution base, and (2) Pension contribution B2 (*tscsepi0102_s*): the rate is 5% of the contribution base. Since 01/2017 the rate is 7.5% for Pension contribution B1 and 2.5% for Pension contribution B2.

- **EUROMOD notes**

Because information on the type of contractual work is not available, it is not possible to model taxation of honoraria for original works of scientists, journalists and artists.

2.7.5 Pensioner health contribution (*tscbesi_s*)

- **Liability to contributions**

The contribution is paid by pensioners who receive public pensions.

- **Income base used to calculate contributions**

The contribution base is the “gross pension”.

- **Contribution rates**

Pensioner health contribution: the rate is 3% of contribution base if the contribution base is above ANWPY. If the contribution base is not greater than ANWPY, the contribution is paid from the CG budget, and this is treated as a credited social insurance contribution (section 2.7.6).

2.7.6 Credited social insurance contributions (*tscct_s*)

- **Eligibility**

There are several different contributions paid by the CG budget on behalf of various social groups: (a) CSIC1 – for persons performing maternity and parental care, (b) CSIC2a and CSIC2b – for unemployed persons, (c) CSIC3 – for pensioners with gross pension not greater than ANWPY, (d) CSIC4 – for persons on sick-leave. Contributions CSIC1, CSIC2a and CSIC4 are pension contributions paid to the pillar 2 of the pension system. CSIC2b and CSIC3 are special health contributions, paid to HZZO.

- **Contribution base**

The contribution bases are equal to:

(a) for CSIC1, CSIC2a and CSIC2b: 35% of AGWPY in the 2014-2016 period and 38% of AGWPY in 2017;

(b) for CSIC3: the “gross pension”;

(c) for CSIC4: the amount of Sickness benefit.

- **Contribution rates / amounts**

The rate is 5% of the contribution base for CSIC1, CSIC2a, CSIC2b and CSIC4. For CSIC3 the rate is 1% of the contribution base.

- **EUROMOD notes**

Contribution CSIC4 is not simulated due to the lack of data on the months spent in sick-leave.

2.8 Personal income tax (*tin_s*)

2.8.1 Tax unit

The tax unit is an individual who receives income from a taxable income source.

2.8.2 Exemptions

Non-pension social benefits are generally excluded from personal income tax. Capital gains were exempted from taxation prior to 2016.

2.8.3 Types of taxpayers, taxable incomes and tax schedules

For introduction on Personal income tax, see section 1.5.2, which explains that taxation differs across types of taxpayers and taxable income sources. More details are provided below.

(a) *Pensions and employment income*: taxed by withholding on a monthly basis, using the monthly-adjusted general tax schedule (see below). In the 2014-2016 period, taxpayers who earn these incomes are not obliged to submit YTF (section 1.5.2). Since 01/2017, all persons who earn these types of income must submit YTF.

(b) *Self-employment income*: different tax treatment applies to various groups of self-employed persons (section 2.7.3).

(b1) *“professionals I”, “professionals II”, “craftsmen” and “farmers I”*: during the year self-employed persons make pre-payments of personal income tax (PIT), amounts of which are determined by Tax Administration, based on the previous year’s tax obligation. Self-employed persons are obliged to submit a yearly tax file (YTF).

(b2) *“Farmers II”*: are exempted from PIT.

(b3) *“Farmers III”*: pay PIT according to special lump-sum schedule.

(c) *Income from contractual work*: taxed by withholding as income is earned. In 2014-2016, persons who receive this type of income are not obliged to submit YTF. Since 01/2017, all persons who earn these types of income must submit YTF.

(d) *Capital income*: taxed by withholding as income is earned. In 2014-2016 persons who receive these incomes are not obliged to submit YTF. Since 01/2017, the tax paid by withholding is final in all cases, i.e. capital income does not enter YTF.

(e) *Rental income*: taxpayers who earn income from rental activities have different tax treatment, according to certain conditions (recall section 2.7.3)

(e1) “Renters I” and “renters II”: taxed as “craftsmen” – see point (b1) above.

(e2) “Renters III”: pay PIT according to special lump-sum schedule.

(e3) “Renters IV”: their rental income is taxed analogously as capital incomes – see point (d) above.

Table 2.13 Taxation by type of income and taxpayer

Type of income	Taxation throughout the year	Yearly tax file 2014-2016	Yearly tax file 2017
<i>Employment and pension income</i>	withheld, monthly-adjusted general tax schedule	voluntary	obligatory
<i>Self-employment income</i> “professionals I”, “professionals II”, “craftsmen”, “farmers I” “farmers II” “farmers III”	pre-payments exempted lump-sum	obligatory n/a not allowed	obligatory n/a not allowed
<i>Income from contractual work</i>	withheld, income specific schedule	voluntary	obligatory
<i>Capital income</i>	withheld, income specific schedule	voluntary	not allowed
<i>Rental income</i> “renters I” “renters II” “renters III” “renters IV”	pre-payments pre-payments lump-sum withheld, income specific schedule	obligatory obligatory not allowed voluntary	obligatory obligatory not allowed not allowed

The discussion above has indicated that there are several schedule types, which apply in the following circumstances:

(S1) *Yearly general tax schedule in 2014-2016*. It applies for all persons submitting YTF. All types of income must be reported within YTF. Taxpayer may use all the types of allowances and deductions (sections 2.8.4 and 2.8.5). Tax base equals total income minus allowances minus deductions. The schedule has three rates (section 2.8.7).

(S2) *Yearly general tax schedule in 2017*. It is applied for the following types of income: self-employment income, pensions, employment income and income from contractual work. Other types of income are not included. Taxpayer may use all types of allowances and deductions (sections 2.8.4 and 2.8.5). Tax base equals total income minus allowances minus deductions. The schedule has two rates (section 2.8.7).

(S3) *Monthly-adjusted general tax schedule* is applied to pensions and employment income. Taxpayer may use regular personal tax allowances (sections 2.8.4). Tax base equals total income minus allowances. The schedule is multiple-rate, resembling the yearly general tax schedule, but with bands scaled down to monthly level (section 2.8.7).

(S4) *Income-specific schedules* are one-rate schedules applied to income from contractual work, capital incomes and rental income (“renters IV”). These schedules do not allow for using any personal tax allowances or deductions (section 2.8.7).

(S5) *Lump-sum schedules* do not involve tax rates, but tax amounts are already determined by tax law. They are used in taxation of “farmers III” and “renters III”.

2.8.4 Tax allowances

- *Eligibility conditions*

Social insurance contributions represent tax allowances. For employed persons, this involves Pension contributions (A, B1, B2); for self-employed persons: all social insurance contributions, i.e., General health contribution, Occupational health contribution and Pension contributions (A, B1, B2); for income from contractual work: Pension contributions (A, B1, B2); for pensioners: Pensioner health contribution.

2014-2016:

Each tax unit can claim the *regular basic personal allowance*. Persons who receive pensions based on mandatory contributions claim *pensioner’s basic personal allowance*.

In addition to regular and pensioner’s basic personal allowance, a tax unit can claim *regular personal allowance for supported family members* – children and other immediate family members (spouses, parents, parents in law, grandparents, grandchildren). The PIT law is not specific on the maximum age of supported children: all children in regular education are included; children who finished their regular education and are waiting for the first job are also included.

The above mentioned personal allowances are available in the monthly-adjusted general tax schedule for all taxpayers to which this schedule applies. These allowances are also available in the yearly general tax schedule, whereby some taxpayers can use *enlarged* personal allowances (see below). Personal allowances are not available in income-specific schedules; in order to claim them, taxpayers must fill YTF.

People who live in “special areas” can claim *enlarged* basic personal allowance and the corresponding *enlarged* personal allowance for supported family members. These allowances are available only in the yearly general tax schedule. Thus, in order to claim them, a taxpayer must fill YTF. Before 2014, special areas were war-stricken and mountainous cities and municipalities and the amounts of enlarged personal allowances were up to 114% higher than regular. Since 2014, special areas are cities and municipalities whose economic development index is below average and enlarged allowances are up to 45% higher than general.

2017:

A unique basic personal allowance is introduced for all taxpayers. In other words, pensioners’ and enlarged basic personal allowances are abolished. Furthermore, the amounts of personal allowance for supported family members are equal for all taxpayers.

- *Income test*

Total personal income of supported child or supported adult (excluding social benefits and children’s family pension) may not exceed: (a) HRK 11,000 in 2014, (b) HRK 13,000 in 2015 and 2016, (c) HRK 12,500 in 2017.

- *Amounts of allowances*

2014-2016

Basic personal allowance is equal to $BPA = RBPA$ for non-pensioners, where $RBPA$ is the value of indicator from Table 2.4. For pensioners, basic personal allowance is obtained as $BPA = \min(\max(pens, RBPA), MBPA)$, where $pens$ denotes pensions based on mandatory contributions, whereas $MPBPA$ is the indicator from Table 2.4.

The personal allowance for children is obtained as follows. Suppose that persons A and B are parents of c children. The personal allowance for the i th child is obtained as $CA_i = RBPA \cdot [0.4 + 0.1 \cdot i \cdot (i + 1)/2]$. Total personal allowance for c children is equal to $TAC = \sum_i^c CA_i$. The TAC amount can be divided among two parents in whatever proportion. Thus, persons A and B obtain $TAC_A = p \cdot TAC$ and $TAC_B = (1 - p) \cdot TAC$, respectively. In practice, the parent with larger income uses the whole amount of tax allowance, i.e. $p = 1$ or $p = 0$; only a minor share of parents divide personal allowance for children. For supported spouse and each supported non-child member the personal allowance is equal to $0.5 \cdot RBPA$.

If the taxpayer or her (his) supported members are persons with disability, supplemental personal allowance is given. For taxpayer and each dependant with less than 100% disability, the supplement equals $0.3 \cdot RBPA$, while it equals $1.0 \cdot RBPA$ for persons with 100% disability.

2017

Basic personal allowance equals HRK 3,800 in 2017. This figure is obtained as 150% of PAB (see Table 2.4), rounded up to the first next one hundred HRK. Since 01/2017, basic personal allowance is identical for *all* taxpayers.

The personal allowance for children is obtained in a similar fashion as earlier, but the formula and amounts have changed. Thus, the personal allowance for the i th child is obtained as $CA_i = PAB \cdot [0.5 + 0.05 \cdot i \cdot (i + 3)]$. For supported spouse and each supported non-child member the personal allowance is equal to $0.7 \cdot PAB$.

For taxpayer and each dependant with less than 100% disability, the supplement equals $0.4 \cdot PAB$, while it equals $1.0 \cdot PAB$ for persons with 100% disability.

Monthly personal tax allowances are presented in the following table:

Table 2.14 Regular personal tax allowances (2014-2017), HRK per month

	2014	2015-2016	2017
Basic personal allowance for non-pensioner	2,200	2,600	3,800
Basic personal allowance for pensioner	2,200-3,400	2,600-3,800	3,800
Personal allowance for supported family members			
(a) each supported non-child member	1,100	1,300	1,750
(b1) the first child	1,100	1,300	1,750
(b2) the second child	1,540	1,820	2,500
(b3) the third child	2,200	2,600	3,500
(b4) etc. (see formulas above)			
(c1) supplement for each taxpayer and supported member with disability	660	780	1,000
(c2) supplement for each taxpayer and supported member with 100% disability	2,200	2,600	3,750

2.8.5 Tax deductions

- *Types of deductions*

The following tax deductions are available:

(D1) Donations for cultural, educational, scientific, medical, humanitarian, sports and religious purposes;

(D2) Contributions paid to voluntary pension funds by employers on behalf of their employees or by self-employed persons on behalf of themselves.

(D3) In the period from 2012 to 2014, each tax unit had a deduction for income from dividends at a yearly amount of HRK 12,000.

Other deductions include: (a) deductions for self-employed who employ persons living in “special areas”, (b) deductions for self-employed, for expenditures on research and development, and outlays for education of young employees, (c) Deductions for HRVI and receivers of HBDR related survivors pension, etc.

- *Eligibility conditions*

Each tax unit can claim deductions D1 and D2 if the relevant outlays can be documented. Deductions D1 and D3 are available in the general schedule only.

- *Amounts*

The maximum amount of D1 is 2% of the previous tax year’s income. The total yearly amount of D2 is capped on HRK 6,000.

- *EUROMOD notes*

Due to lack of information, deduction D1 has not been simulated in EUROMOD. Deductions for private insurance contributions for the self-employed and deduction for income from dividends are simulated.

2.8.6 Tax bases

Tax base is obtained differently for various types of income schedules. As a general rule, incomes entering tax base are net of any social insurance contributions (i.e. in post-SIC terms).

(S1) *Yearly general tax schedule in 2014-2016*. Tax base is the sum of all post-SIC incomes minus the sum of all personal tax allowances and deductions.

(S2) *Yearly general tax schedule in 2017*. Tax base is the sum of selected post-SIC incomes (self-employment income, employment income, pensions and income from contractual work) minus the sum of all personal tax allowances and deductions.

(S3) *Monthly-adjusted general tax schedule*. Tax base is the sum of post-SIC pensions and employment income minus personal tax allowances.

(S4) *Income-specific schedules*. Tax bases are post-SIC income from contractual work, rental income and capital incomes (interest income, dividends, capital gains). Standardised deductions (obtained as a percentage of income) are applied in certain cases.

2.8.7 Tax schedules

- *General tax schedules*

Table 2.15 and Table 2.16 present *monthly-adjusted general tax schedules* in the 2014-2016 period. The yearly general tax schedules are obtained simply by multiplying the tax band limits by 12.

Table 2.15 Monthly-adjusted general tax schedule (2014)

Tax band	Income bracket (HRK per month)		Tax rate
	Lower limit	Upper limit	
1	0	2,200	12%
2	2,200	8,800	25%
3	8,800	-	40%

Table 2.16 Monthly-adjusted general tax schedule (2015-2016)

Tax band	Income bracket (HRK per month)		Tax rate
	Lower limit	Upper limit	
1	0	2,200	12%
2	2,200	13,200	25%
3	13,200	-	40%

Table 2.17 presents the monthly-adjusted general tax schedule in 2017.

Table 2.17 Monthly-adjusted general tax schedule (2017)

Tax band	Income bracket (HRK per month)		Tax rate
	Lower limit	Upper limit	
1	0	17,500	24%
2	17,500	-	36%

In comparison to the 2014-2016 period, there are some additional rules, as follows. Taxation of pensions on a monthly basis is performed in two steps:(1) *preliminary* tax amount is obtained using the schedule from Table 2.17; (2) preliminary tax amount is multiplied by 50%. The same method is used for taxation of employment income of persons who live on “group 1 special areas”.

The yearly general tax schedule is obtained by multiplying the tax band limits by 12. However, one change is introduced. Namely, a provision is made for taxpayers whose total yearly amount of income from contractual work (*YCW*) is not greater than $5 \cdot PAB$. In such case, the limit of the tax band is augmented by $EXT = YCW$. Otherwise, if *YCW* is greater than $5 \cdot PAB$, then $EXT = 0$.

Table 2.18 Yearly general tax schedule (2017)

Tax band	Income bracket (HRK per month)		Tax rate
	Lower limit	Upper limit	
1	0	210,000 + <i>EXT</i>	24%
2	210,000 + <i>EXT</i>	-	36%

- *Income-specific schedules*

There are several income-specific schedules, of which we describe the following five:

Table 2.19 Income specific tax schedules

Income source	Tax base	Tax rates			
		2014	2015	2016	2017
Income from contractual work	“gross receipt” minus pension contributions	25%	25%	25%	24%
Rental income (“renters IV”)	70% of gross income	12%	12%	12%	12%
Dividends	gross income above the amount of personal deduction	12%	12%	12%	12%
Interest income	gross income	0%	12%	12%	12%
Capital gains	gross income	0%	0%	12%	12%

Notes: The personal deduction in taxation of dividends equalled HRK 12,000 per year in 2012-2014; in 2015 this personal deduction was abolished.

- *Lump-sum schedules*

As explained in section 2.7.3, farmers III are self-employed persons in agriculture whose yearly revenue from the business activity does not exceed HRK 149,500. They pay PIT according to lump-sum schedule, shown in Table 2.20.

Table 2.20 Lump-sum schedule for “farmers III”, HRK per year

Yearly revenue	Counterfactual income, in HRK	Lump-sum tax
less than HRK 80,500	12,750	1,530
HRK 80,500 – 115,000	17,250	2,070
HRK 115,000 – 149,500	22,425	2,691

2.8.8 Final yearly tax

Taxation of income can be divided in two stages: throughout the year and at the end of the year.

In previous discussion (section 2.8.3), we have seen that taxation throughout the year differs by income groups: (A) Pensions and employment income are taxed each month, using the monthly-adjusted general tax schedule; (B) Income from contractual work is usually taxed at the moment when the income transfer is made between the parties (buyer and seller of the service); income-specific schedule is applied; (C) Analogous procedure applies for capital and rental incomes (“renters IV”); (D) self-employed people make tax pre-payments each month; (E) some groups of farmers and renters (“farmers III” and “renters III”) pay monthly lump-sum amounts.

At the end of the year the final yearly tax is assessed. Taxpayers from group D are obliged to submit YTF. On the other hand, those from group E cannot submit YTF for their incomes. The treatment of groups A, B and C differs in two periods – before 01/2017 and since 01/2017.

Before 01/2017, persons from groups A, B and C could voluntarily submit YTF; the major reason for doing this is to exploit the full yearly amount of personal allowance. In this respect, taxpayers who voluntarily submit YTF can be divided into several groups: (1) those who live in “special areas” and want to claim the *enlarged* personal allowances (section 2.8.4), (2) taxpayers who have not been working throughout all the year, due to parenthood, sickness or unemployment; they have used only the monthly portions of personal allowances in the months when they worked, while by submitting YTF, all-year personal allowance can be used; (3) taxpayers from groups B and C are taxed by income-specific schedules, which do not incorporate personal allowances; by submitting YTF, these allowances can be used.

Using unused personal allowances works *in favour of* YTF submission; however, there is also a reason *against*. The marginal tax rate for income from contractual work (ICW) is 25% in the 2014-2016 period (Table 2.19), which is lower than the 40% rate in the yearly general tax schedule (Table 2.15 and Table 2.16). Because taxpayers who earned ICW are not obliged to submit YTF, they obtain a preferential treatment for marginal ICW. Analogous is true for capital and rental income. However, since 01/2017 such preference is abolished for income from contractual work, which obligatorily enters YTF.

When deciding whether to submit YTF or not, a person must calculate two values: the sum of all tax paid throughout the year (T_1), and the amount of tax that should be paid in YTF (T_2). If $T_1 > T_2$, a person has incentive to submit YTF; if $T_1 \leq T_2$, there is no such incentive.³

- **EUROMOD notes**

(1) In EUROMOD investment income (yiy) includes dividends, interest income and capital gains. As disentangling the three components is not possible due to lack of available information, the taxation rules that are applicable for dividends were implemented for this income source.

(2) Special areas are not simulated due to lack of data on the place of living.

(3) The EUROMOD module “imitates” the two-stage process of income taxation. In the first stage, income is taxed throughout the year, using the monthly-adjusted general tax schedule and the income-specific schedules. The second stage involves the assessment of the yearly income tax. In reality, before January 2017, at the end of the year, each taxpayer has three mutually exclusive options regarding the YTF: (a) must submit YTF, (b) can submit voluntarily, (c) cannot submit YTF. Option (b) is implemented in the model for those eligible in the following way. A person calculates two values: (B1) the sum of PIT amounts paid for different income sources throughout the year, and (B2) PIT that would be paid within YTF. Then, if $B1 \leq B2$, a person “does not submit YTF”, and their amount of tax is B1; otherwise, if $B1 > B2$, a person “submits YTF”, and their amount of tax is B2.

³ Observe the following example. In 2016, unrelated taxpayers *i* and *j* have yearly personal allowances of HRK 31,200; their post-SIC income from contractual work is HRK 50,000; post-SIC employment incomes are HRK 0 and 250,000, respectively. During the year they will both have to pay HRK 12,500 of tax on income from contractual work; taxpayer *j* also pays HRK 58,368 of tax on employment income; the total of HRK 68,868. For taxpayer *i* it is highly beneficial to submit YTF, because the final tax amount would be only HRK 2,256. However, taxpayer *j* would have to pay HRK 76,368 in YTF, which is by HRK 7,500 more than without YTF. Namely, having a relatively high income, taxpayer *j* enters the top tax bracket of 40%; the whole amount of income from contractual work is faced with this rate instead of 25%.

(4) No information is available on the yearly revenue of “farmers III”. We assume that all of them belong to the first bracket from Table 2.20. Correspondingly, their yearly lump-sum tax is HRK 1,530.

2.9 Other taxes

2.9.1 Surtax (*tmu_s*)

- ***Tax unit***

The unit of analysis is the individual.

- ***Tax base and tax schedule***

The tax base is the amount of PIT. LSG units set the level of the rate. The maximum rates can be set to: (a) 10% in municipalities, (b) 12% in cities with a population below 30,000, (c) 15% in cities with a population over 30,000, except (d) 30% in Zagreb (where the current rate is 18%).

- ***EUROMOD notes***

Due to lack of information on LSG units, the simulated tax rates in EUROMOD were (a) 16% for people living in densely populated areas, (b) 12% for those living in intermediate populated areas and (c) 6% for people living in thinly populated areas. These rates are based on the fact that cities have, on average, larger surtax rates than municipalities. Furthermore, the rates are tuned in such a way so that the ratio between total simulated surtax and PIT aligns with the relevant ratio obtained from administrative data.

3. DATA

3.1 General description

The Croatian dataset for EUROMOD 2014-2017 simulations is derived from the EU-SILC standard UDB 2015 (income reference year 2014). It contains the data from wave 2015 of the Croatian SILC survey which is implemented as a 4-year rotating household panel survey.

Commission Regulation 28/2004 defines indicators aimed at measuring unit non-response in EU-SILC final quality reports. At the time of writing the Croatian EU-SILC Quality Report has not yet become available.

Table 3.1 EUROMOD database description

EUROMOD database	HR_2015_a2
Original name	UDB_c15_ver 2015-2 from 01-03-17
Provider	Eurostat
Year of collection	2015
Income reference period	2014
Sample size	Indiv: 17,135; HH: 6,561

3.2 Data adjustment

In order to guarantee consistency between demographic variables and income variables which refer to the year before data was collected (and on which EUROMOD simulation are based), all children born between the end of the income reference period and the date of interview have been dropped from the sample.

3.3 Imputations and assumptions

3.3.1 Time period

The reference period for the various attributes is:

- Demographic variables (age, marital status, education): at the date of the interview;
- Economic activity status: recorded both at the date of interview and for each month during the income reference year;
- Current employment variables: at the date of the interview;
- Income data: calendar year 2014 (based on 12-months period of receipt);
- Housing, durables possessions, financial, social, and health situation of household: at the date of the interview.

All monetary amounts in the SILC are expressed in annual terms. These are converted into monthly terms (dividing by 12) for the EUROMOD database.

3.3.2 Dropped observations

People with year of birth equal to 2015 (39 cases) were excluded from EUROMOD's database, as they were not born in SILC's income reference period. Moreover, 4 non-respondent households, containing 9 individuals, were dropped from the original sample.

3.3.3 Gross incomes

In the SILC data missing values are being imputed, if necessary. Most of the imputations are done by the Croatian Bureau of Statistics (CBS). In cases there were still some missing values imputations were done jointly by the authors and they are described in detail in the Data Requirement Document (DRD), following the templates prepared by the EUROMOD core team.

By default, in EU-SILC all values of income components are in gross terms. The authors have checked the relationship between gross and net incomes from SILC data for all taxable income sources. Certain irregularities have been revealed in the case of self-employment income. For self-employed persons, the CBS staff has used an algorithm that treats all these persons as if they are included into corporate income system (denoted as "group B" in section 2.7.3). However, actually, this relates only to a small percentage of self-employed persons. Therefore, the estimates of imputed SIC, PIT and gross income for majority of these persons are biased. To cure the problem, the '*Net-to-Gross Income Conversion Model*' was created, consisting of six parts, which perform the following functions: (1) Dividing people who earned self-employment income into groups; (2) Preparation of income variables; (3) Grouping household members into 'native families'; (4) Calculation of PIT; (5) Calculation of SIC and gross income; (6) Obtaining the final variables.

SILC variables py050g and py050n contain gross and net incomes of all self-employed income people, including various groups of self-employed persons and earners of income from contractual work (see sections 2.7.3 and 2.7.4). Self-employed persons are those whose

economic status is farmer, employer or self-employed. All other persons with positive self-employment income are *earners of income from contractual work*. Self-employed persons are divided into five mutually exclusive groups: (a) family workers – persons whose self-employed status is “family worker”, (b) farmers – those whose branch of industry is agriculture, (c) “professionals I” – those whose occupation is professionals, (d) “professionals II” – those whose occupation is technicians and associate professionals, (e) all other self-employed persons. Farmers are further divided into “farmers I”, “farmers II” and “farmers III”.

As explained in section 2.7.5, public pensions exceeding ANWPY are subject to 3% Pensioner health contribution. SILC data on pensions do not include this contribution within the gross pension amounts. Therefore, we “inflate” the existing gross pension values by the corresponding factor, in order to obtain the true gross values of pensions.

3.3.4 Disaggregation of harmonized variables

A range of UDB EU-SILC benefit variables have been obtained after aggregation of several country-specific benefits that are recorded by the National SILC survey. The aggregation is done by benefit function, e.g. for old-age, disability, sickness, unemployment, family etc. However, to simulate certain policies in EUROMOD information about the entitlement of single benefits is required. Thus, efforts were made to disaggregate the broader benefit categories by imputing the separate components. The imputations have been done using information in EU-SILC on individual/household characteristics and receipt of the aggregated variables.

SILC 2015 data provide more detailed benefit variables. Namely, each of the function variables is divided into four component variables, which represent contributory means-tested, contributory non-means-tested, non-contributory means-tested and non-contributory non-means-tested benefits. This separation simplifies the identification procedure. Nevertheless, some imputations are necessary, as shown in the rest of this section.

The following table contains the main variables that are derived for the Croatian part of EUROMOD dataset by imputations.

Table 3.2 EUROMOD database description

Variable name in EUROMOD	Variable description	Component of the aggregated variable in EU-SILC
bfamh	maternity and parental benefits	HY052G
bch	Child benefit	HY053G
bfaba	lump-sum grants for newborn children	HY054G
bsa00	Subsistence benefit	HY060G
bsaot	other social assistance benefits	HY060G
bunct	Unemployment benefit	PY092G
bunot	other unemployment benefits	PY092G
ysv00	severance pay - for surplus workers	PY094G
poa	old-age pensions	PY102G
boa	old-age benefits	PY103G
ysv02	severance pay - upon old-age retirement	PY104G
psu	survivors pensions	PY112G
bsu	survivors benefits	PY113G
pdi	disability pensions	PY132G
bdi	disability benefits	PY133G
ysv01	severance pay - upon retirement due to disability	PY134G

In the following description we use the abbreviations such as hy052g, which represents the actual values of SILC variable HY052G, multiplied by the HRK/EUR exchange rate and divided by 12.

As explained in section 1.3.4, there are several unemployment benefits, among which the Unemployment benefit has the major role. The variable PY090G bunches them together, also including severance pay. However, 2015 SILC for Croatia disaggregates PY090G into PY092G and PY094G, where the latter represents severance pay for surplus workers, and the former contains all other unemployment benefits. Severance pay for surplus workers is simply obtained as $ysv00 = py094g$. In the next step, a simple model is created, which disentangles $py092g$ into Unemployment benefit and other unemployment benefits. The model first simulates the duration of unemployment benefit for each person with $py092g > 0$ (see section 2.6.2). The amount of $py092g$ is then allocated between: (a) Unemployment benefit (bunct): if the duration of unemployment benefit is at least 1 month and if $py092g > 0.5 * NMWCY$ (i.e. the minimum Unemployment benefit that can be obtained for 1 month), and (b) other unemployment benefits (bunot), if otherwise.

The variable PY130G, which contains disability benefits, is also disaggregated in the 2014 SILC. The variables PY132G, PY133G and PY134G contain disability pensions, disability benefits and severance pay upon retirement due to disability, respectively, from which the variables pdi, bdi and ysv01 are created.

In a similar way, from the variables PY102G, PY103G and PY104G we have obtained old-age pensions (poa), old-age benefits (boa) and severance pay upon old-age retirement (ysv02). Total severance pay is the sum of individual components ($ysv = ysv00 + ysv01 + ysv02$).

Survivors pensions (psu) and survivors benefits (bsu) are obtained from PY112G and PY113G, respectively.

There are several social assistance benefits (section 1.3.7), among which the primary role is taken by the Subsistence benefit. The variable HY060G contains these benefits and because they are all non-contributory and means-tested, no disaggregation is possible within SILC. Since only Subsistence benefit can be modelled in EUROMOD, imputation of Subsistence benefit is performed. The amount of Subsistence benefit (bsa00) is calculated for all households, for which purpose a model is created, that uses the parameters described in section 2.6.1. For households in which $bsa00 > hy060g$, the value of Subsistence benefit was reduced to $bsa00 = hy060g$. For households in which $bsa00 < hy060g$, the value of Subsistence benefit was kept the same, and furthermore, the value of Other social assistance benefits is obtained as $bsaot = hy060g - bsa00$.

The variable HY060G contains family benefits. It is separated into three components – HY052G, HY053G and HY054G – from which maternity and parental benefits (bfamh), Child benefit (bch) and lump-sum grants for newborn children (bfaba) are identified.

3.4 Uprating

To account for any time inconsistencies between the input dataset and the policy year, uprating factors are used. Each monetary variable (i.e. each income component) is uprated 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. Uprating factors are generally based on changes in the average value of an income component between the year of the data and the policy year.

As a rule, uprating 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. Uprating 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 3.3.

Table 3.3 Raw indices for deriving EUROMOD uprating factors

Index	Constant name	Values of the raw indices				Income components uprated by the index	Source	Notes
		2014	2015	2016	2017			
Harmonized CPI	\$HICP	100.26	100.00	99.37	100.96	afc, xhcmomi, ypp, xpp, xmp, xhcot	S2; S1a	N1
GDP	\$f_gdp	98.28	100.00	103.52	107.69	Ysv	S3; S1	N2
employment income	\$f_yem					kivho, kfbcc, kfb, bhl, yem_a, yivwg, ypt,	S4; S1	N3
		98.75	100.00	101.86	104.30	yot, yem, yempv		
self-employment income	\$f_yse	98.75	100.00	101.86	104.30	ysenr00, ysere01, ysere00, ysenr01, yse	\$f_yem	
property income	\$f_ypr	98.28	100.00	103.52	107.69	xhcrct, ypr	\$f_gdp	
investment income	\$f_yiy	2.98	2.64	1.94	1.94	Yiy	S5	N4
old-age pensions	\$f_poa	60.92	61.01	61.49	61.59	Poa	S6	N5
disability pensions	\$f_pdi	60.92	61.01	61.49	61.59	Pdi	\$f_poa	
survivors pensions	\$f_psu	60.92	61.01	61.49	61.59	Psu	\$f_poa	
unemployment benefit	\$f_bunct	98.75	100.00	101.86	104.30	Bunct	\$f_yem	
other unemployment benefits	\$f_bunot	1600.00	2400.00	2400.00	2620.00	Bunot	S7	N6
family benefits	\$f_bfa	3326.00	3326.00	3326.00	3326.00	Bfa	S8	N7
housing benefits	\$f_bho	100.00	100.00	103.27	103.27	Bho	\$f_bsa00	
education allowances	\$f_bed	98.28	100.00	103.52	107.69	Bed	\$f_gdp	
subsistence benefit	\$f_bsa00	100.00	100.00	103.27	103.27	bsa00	S9	N8
other social assistance benefits	\$f_bsaot	500.00	500.00	500.00	500.00	Bsaot	S10	
one	\$f_one					tis, tscer, tscee, tad, tpr, ydses_o, yds,		
		1.00	1.00	1.00	1.00	tscse, tin, tmu		
disability benefits	\$f_bdi	500.00	500.00	500.00	500.00	Bdi		
child benefit	\$f_bch	3326.00	3326.00	3326.00	3326.00	Bch	\$f_bfa	
grants for newborn children	\$f_bfaba	3326.00	3326.00	3326.00	3326.00	Bfaba	\$f_bfa	
maternity and parental benefits	\$f_bfamh	98.75	100.00	101.86	104.30	Bfamh	\$f_yem	
survivors benefits	\$f_bsu	3326.00	3326.00	3326.00	3326.00	Bsu	\$f_bfa	
old-age benefits	\$f_boa	60.92	61.01	61.49	61.59	Boa	\$f_poa	
old-age pensions	\$f_poa_av	101.45	100.00	100.16	100.99	Poa	S11	
disability pensions	\$f_pdi_av	94.88	100.00	102.19	103.77	Pdi	\$f_poa_av	

survivors pensions	\$f_psu_av	101.05	100.00	99.71	100.07	Psu	\$f_poa_av
--------------------	------------	--------	--------	-------	--------	-----	------------

Sources:

	Institution	Publication	Table / page	Internet link
S1	European Commission	Country Report Croatia 2017	Table 1.1: Key economic, financial and social indicators – Croatia	https://ec.europa.eu/info/sites/info/files/2017-european-semester-country-report-croatia-en.pdf
S1a	European Commission	Economic and Financial Affairs - AMECO	Table 2.4: Consumer price index	http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm
S2	Croatian National Bank	Statistics (web): Selected non-financial statistics	Table J1a: Harmonised indices of consumer prices	http://www.hnb.hr/en/statistics/statistical-data/selected-non-financial-statistics
S3	Croatian National Bank	Statistics (web)	Main macroeconomic indicators	http://www.hnb.hr/en/statistics/main-macroeconomic-indicators
S4	Croatian Bureau of Statistics	Statistics in line: Employment and Wages	Table 9.1.3 and Table 9.1.31.	http://www.dzs.hr/Hrv_Eng/Pokazatelj/MSI%20ZAPOSLENOST%20I%20PLACE.xlsx
S5	Croatian National Bank	Statistical overview	Table G1b: Credit institutions' interest rates on kuna deposits indexed to foreign currency (new business) (1.2 Time deposits)	http://www.hnb.hr/en/statistics/statistical-data/credit-institutions/interest-rates
S6	Croatian Pension Insurance Institute	(a) Statističke informacije Hrvatskog zavoda za mirovinsko osiguranje (Nr. 4/2016) (b) HZMO web pages	(a) Table 24. Aktualna vrijednost mirovine i najniže mirovine te postotak usklađivanja (b) Information on the current “actual value of pension”	(a) http://www.mirovinsko.hr/default.aspx?id=723 (b) http://www.mirovinsko.hr/default.aspx?id=1278
S7	Government of the Republic of Croatia	(a) Narodne novine 12/14; (b) Narodne novine 134/14; (c) Web pages “Mjere.hr”	(a) Odluka o visini novčane pomoći za nezaposlenu osobu koju je hrvatski zavod za zapošljavanje uključio u stručno osposobljavanje za rad bez zasnivanja radnog odnosa (b) Odluka o izmjeni i dopuni odluke o visini novčane pomoći, etc. (c) Stručno osposobljavanje za rad bez zasnivanja radnog odnosa	(a) http://narodne-novine.nn.hr/clanci/sluzbeni/2014_01_12_211.html (b) http://narodne-novine.nn.hr/clanci/sluzbeni/2014_11_134_2544.html (c) http://mjere.hr/mjere/strucno-osposobljavanje-rad-bez-zasnivanja-radnog-odnosa/
S8	Ministry of Finance, Republic of Croatia	(a) Narodne novine 119/16; (b) Narodne novine 140/10;	(a) Zakon o izvršavanju Državnog proračuna Republike Hrvatske za 2017. godinu (b) Zakon o izvršavanju Državnog proračuna Republike Hrvatske za 2011. godinu	(a) http://narodne-novine.nn.hr/clanci/sluzbeni/2016_12_119_2606.html (b) http://narodne-novine.nn.hr/clanci/sluzbeni/2010_12_140_3574.html
S9	Ministry of Demography, Family, Youth and Social Policy	Godišnje statističko izvješće o primijenjenim pravima socijalne skrbi (2013.)	Table 1-2.: section I. B.	http://www.mdomsp.hr/pristup-informacijama/statisticka-izvjesca-1765/statisticka-izvjesca-za-2103-godinu/2325

S10	Government of the Republic of Croatia	(a) NN 114/14 (b) NN 112/13 (c) NN 30/08	(a) Odluka o osnovici za izračun iznosa drugih prava iz sustava socijalne skrbi (b) Odluka o osnovici za ostvarivanje prava po osnovi socijalne skrbi (c) Odluka o osnovici za ostvarivanje prava po osnovi socijalne skrbi	(a) http://narodne-novine.nn.hr/clanci/sluzbeni/2014_09_114_2173.html (b) http://narodne-novine.nn.hr/clanci/sluzbeni/2013_09_112_2445.html (c) http://narodne-novine.nn.hr/clanci/sluzbeni/2008_03_30_976.html
S11	Croatian Pension Insurance Institute	Statističke informacije Hrvatskog zavoda za mirovinsko osiguranje (various issues)	Table 9	http://www.mirovinsko.hr/default.aspx?id=723

Notes:

N1: For 2017: imputation made using data from S1 on projected growth rate of Harmonised index of consumer prices.

N2: For 2017: imputation made using data from S1 on projected growth rates of GDP and GDP deflator.

N3: Based on AGW (Table 2.4). For 2017: imputation made using data from S1 on projected growth rate of Nominal compensation per employee.

N4: For 2017: equal to the 2016 value.

N5: Based on the “actual value of pension”; yearly averages. For 2017, equals the value for the period 01/2017 to 06/2017.

N6: Based on the monthly amount of Allowance and reimbursement of travel expenses during vocational training of unexperienced workers.

N7: Based on the monthly amount of “budgetary base” (BB).

N8: Based on the hypothetical weighted average of “means of subsistence” for different types of persons, where the weights are the respective numbers of persons in each type (in 2013).

4. VALIDATION

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 Annex 2. 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.

The sources of external data are described in section 5.2.

4.1.1 Components of disposable income

In this section, the main differences between the definition of disposable income in EUROMOD and EU-SILC are presented.

Table 4.1 Components of disposable income

	EUROMOD 2014	EU-SILC 2015
	ils_dispy	HY020
Employee cash or near cash income	+	+
Employer's social insurance contribution	0	0
Company car	0	+
Contributions to individual private pension plans	0	0
Cash benefits or losses from self-employment	+	+
Pension from individual private plans	+	0
Unemployment benefits	+	+
Old-age benefits	+	+
Survivors 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	-	-
Regular inter-household cash transfer paid	-	-
Tax on income and social insurance contributions	-	-
Repayments/receipts for tax adjustment	0	+

4.1.2 Validation of incomes inputted into the simulation

Table 7.1 in Annex presents the differences between the number of employed and unemployed in the input dataset and external statistics.

There is a huge discrepancy concerning the number of unemployed, where the SILC-based figure for 2014 is almost twice as high as the figure based on external statistics, which is based on the Labour Force Survey (LFS). This can be explained by the differences in methodology, where the LFS definition of unemployed person is much stricter than the one of SILC. Evidently, large numbers of LFS-inactive have reported themselves as unemployed in SILC. For example, the calculations on the SILC 2015 data have shown that among the 423 thousand persons who have been “unemployed” during all 12 months in 2014 (according to variable *lummy*), only 244 thousand have been “actively looking for a job in previous 4 weeks”, at the time of the interview (according to variable *lowas*). On the other hand, the number of employed is relatively similar in SILC and LFS data.

Table 7.2 in Annex 2 shows the differences between the number of recipients of various types of market income in the input dataset and external statistics. Table 7.3 presents the differences in aggregate annual amounts. The input dataset is based on SILC 2015, while external statistics come from Tax Administration.

SILC-based figures for the number of employed are 9% to 12% lower than the administrative ones, while the difference for total employment income is 6% to 8%. As employment income is one of the main income sources, we have performed a comparison of wage distributions from the two data sources. Employment incomes are divided into eight brackets, which were formed as percentages of AGW2 (see Table 2.4). Let us concentrate on 2014. Administrative data show significantly larger number of employees (by 48%) in the interval of 25% to 50% AGW2. This is probably due to common feature of Croatian labour market, where many employers report their employees at the minimum wage, which lies in this interval, and pay the other part of salary in cash. SILC data show a larger number of employees in the next interval, of 50% to 75% AGW2, by 16%. In all subsequent brackets, SILC data show smaller numbers of employees than administrative data, and the coverage ratio falls with gross income. The ratio between the number of wage earners in SILC and administrative data is 63% for the income interval beyond 300% AGW2, which is relatively small, but presents a great improvement as compared to previous round of research, based on SILC 2014, when the corresponding ratio was only 29% (Urban and Bezeredi, 2017).

Table 7.4 in Annex 2 presents the differences between the number of recipients of various types of non-simulated benefits and numbers of payers of non-simulated taxes in the input dataset and external statistics. Table 7.5 shows the differences in aggregate yearly amounts of non-simulated taxes and benefits.

Pensions. SILC data underestimate the total number of pensioners by about 4%. The number of disability pensioners is overestimated by 29% in 2014 and 53% in 2016, while the number of old-age and survivors pension beneficiaries is underestimated by one fifth. The reason for this discrepancy is the difference in methodology; in ESSPROS data, disability pensioners above the statutory retirement age are reclassified as old-age pensioners, but the same has not yet been done in the Croatian SILC data. Tax administration data on pensions are used to impute the structure by income brackets (rows *pen*, *pen01*, etc.). Except for the bottom and top brackets, there is a solid correspondence between EUROMOD and administrative data.

Housing benefits. Total amounts of housing benefits in SILC represent about two thirds of those according to administrative sources, while the number of beneficiaries stands at only about 40% of the actual number.

Survivors benefits. As shown in section 1.3.2, these benefits cover a range of survivors benefits related to family members of HBRDs, HRVIs, HMVIs, RVIs and CIRs, and their total amount according to administrative sources is somewhat above HRK 400 million. However, SILC data capture less than 3% of that amount. The reason may be that survey respondents report these

benefits under survivor pensions (which are, however, also underreported, as we have seen above).

Sickness benefits. One of the largest discrepancies among non-simulated benefits is in the case of sickness benefits, where SILC data represent only about one fourth of total amount according to administrative sources. One reason for this might be that surveyed persons treat sickness benefits as employment income.

Disability benefits. Another underestimated category are disability benefits; the ratio between SILC/EUROMOD and official figures is about 40%. As in the case of *survivors benefits*, a part of disability benefits may be reported as disability pensions.

4.1.3 Validation of outputted (simulated) incomes

Table 7.6 in Annex 2 presents the numbers of recipients of various types of simulated benefits and numbers of payers of simulated taxes, in EUROMOD and external statistics. Table 7.7 shows the same for aggregate yearly amounts.

Child benefit. EUROMOD results for Child benefit fit relatively well with the administrative data (HZMO). There is a 5% over-appreciation for the number of households which receive the benefit in 2016, which can be reasoned as follows. The number of children in Croatia is constantly falling as a consequence of unfavourable demographic trends, but this development is not simulated in EUROMOD. The total amount in 2016 is also overestimated by 5%.

Grant for a newborn child. EUROMOD underestimates the total number of beneficiaries and the amount of Grant for a newborn child by about 20%. The official statistics (CBS) says that 40 thousand children have been born and received the benefit in 2014. However, input data contain only 30 thousand children of age 0.

Maternity leave benefit. EUROMOD captures about three quarters of the administrative amount of Maternity leave benefit. One of the reasons is the same as for the Grant for a newborn child, as explained above. The second reason can be found in underestimation of higher employment incomes in input data, and the benefit is related to wage (see section 2.6.3). The ratio between EUROMOD and administrative figures for the number of recipients is at about 85%.

Parental leave benefit. The number of beneficiaries is significantly underestimated in EUROMOD, by almost 30%. Comparison with the results from the previous round of research (Urban and Bezeredi, 2017) show that the underestimation was only 5%. Because the model itself (*bfapl_s*) was changed only marginally, the difference can be ascribed to differences between SILC 2015 and SILC 2014 samples. On the other hand, the total amount in EUROMOD is only modestly underappreciated.

Maternity and parental allowance. EUROMOD underestimates the number of beneficiaries by about one quarter. Conversely, the amount of benefit is overestimated by 7% to 12%. The model assumes that each beneficiary receives the benefit in the maximum duration, but in reality this may not be the case.

Subsistence benefit. EUROMOD obtains 16% (in 2015) to 26% (in 2016) more beneficiaries than according to administrative figures. On the other hand, the discrepancy in the aggregate amount is significantly smaller, ranging from -4% in 2014 to 8% in 2016. In the previous rounds of research (Urban and Bezeredi, 2017), the number of beneficiaries in EUROMOD was overestimated in much greater extent, up to 50%. According to the basic calculation, many households have the right to obtain only a small amount of benefit, which is not taken-up in reality. The current version of the model introduces the threshold below which the benefit is not taken-up.

Unemployment benefit. SILC data seriously underestimate the number of recipients and the total amount of Unemployment benefit. According to SILC, 53 thousand people received unemployment benefits, whereas the administrative figure for Unemployment benefit is 118 thousand people in 2014. EUROMOD uses SILC data to determine which persons are receiving Unemployment benefit, and also uses the amount of benefit recorded in SILC to calculate the benefit base (*yempv*). Given all these conditions, it is not unexpected that the ratio between EUROMOD and administrative total amount of Unemployment benefit is only 43% in 2014 and 59% in 2016.

We have seen in the previous section that input data capture only 92% to 94% of total employment income, as registered in official sources. Consequently, similar discrepancy can be noticed for employer SIC, employee SIC, self-employed persons SIC and personal income tax.

Employer and employee social insurance contributions. Regarding the total amount, the ratio between EUROMOD and administrative figures is about 93% to 96% in different years. The exception is 2014, where the ratio for employer SIC is 101%; this is due to the change in the rate of General health contribution, which occurred in 04/2014. Thus, from 01/2014 to 03/2014 the rate was 13%, and 15% in the rest of the year; however, EUROMOD assumes the 15% rate in the whole year.

Self-employed social insurance contributions. EUROMOD overstates the total amount of SIC for self-employed persons in comparison to administrative figures by 54% in 2014.

Personal income tax and Surtax. The ratio between EUROMOD output and administrative data for Personal income tax and Surtax is relatively low: 75% in 2014, and falling to 66% in 2016. The progressive structure of PIT causes that the major share of total tax is paid by higher income individuals; but they and their income are underrepresented in SILC, as indicated in section 4.1.2 (Table 7.2 and Table 7.3). Furthermore, in the last several years the PIT system sees an increased reliance on capital income, which tends to be seriously underreported. In order to reveal where the ‘leakages’ exactly come from, Table 7.8 disentangles PIT revenue according to income sources. According to Tax administration 2016 data, HRK 912 million was collected on account of capital income, but EUROMOD registers only HRK 9 million, or 1%. In absolute terms, the largest discrepancy comes from PIT on employment income, which is further disaggregated by gross income. People whose gross wage is above 300% of AGW paid HRK 2.6 billion of PIT, but only about one half of this amount is noted in EUROMOD. However, this represents a significant improvement in comparison to the previous round of research, based on SILC 2014, when the corresponding ratio was only 22% (Urban and Bezeredi, 2017).

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 insurance contributions. The weights in the OECD equivalence are: first adult=1; additional people aged 14+ = 0.5; additional people aged under 14 = 0.3.

4.2.1 Income inequality

Table 7.9 in Annex 2 presents income distribution indicators in EUROMOD and external statistics. External statistics on income distribution come from EUROSTAT, and are based on SILC for income years 2014 and 2015.

Median and mean income. The mean and median income in EUROMOD and external statistics are virtually identical.

Gini coefficient. The 2014 Gini coefficients in EUROMOD and external statistics are 29.1 and 30.4, respectively. Thus, the difference is 1.3 percentage points. However, in 2015 the difference falls to only 0.1 percentage points.

Income distribution by decile groups. The comparison by decile group income shares just confirms what has been said for the Gini coefficients. In 2014, lower income decile shares are overstated in EUROMOD, especially the first decile group (by 13%), while the tenth income decile is understated (by 3%), in comparison to external data. In 2015 only significant discrepancy is for the first decile group (8%). Namely, EUROMOD provides “better targeting” of Subsistence benefit and Child benefit than it is in reality, which contributes to larger income shares for the bottom decile group.

4.2.2 Poverty rates

Table 7.10 in Annex 2 presents poverty rates in EUROMOD and external statistics, which come from EUROSTAT and are based on SILC surveys.

Poverty rates by age groups. In 2014, EUROMOD shows roughly equal poverty rate for some age subgroups (‘16-24 years’, ‘50-64 years’, ‘65+ years’), as the external source. However, a remarkable difference is noticed for the group ‘0-15 years’, where EUROMOD indicates 13% lower poverty rate than the external source.

Poverty rates for different poverty lines. EUROMOD shows lower poverty rates than external source for all selected poverty lines, for both men and women. The underestimation is stronger, the lower is the poverty line. Thus, for ‘40% median HDI’, EUROMOD poverty rate in 2014 is by 12% lower than in external data, while for ‘70% median HDI’ the difference is 4%.

4.3 Validation of minimum wage

Table 7.11 in Annex 2 shows the results without and with implementation of the minimum wage. The implementation of the minimum wage brings almost insignificant changes in the amounts of various income, benefit and tax items.

4.4 Summary of “health warnings”

The analysis in section 4.1 has shown that SILC data, which serve as input for EUROMOD, have certain deficiencies in terms of representativeness and coverage. Higher income earners are underrepresented in the SILC sample, which may particularly influence the analysis of PIT and employee/employer SICs. Some of the benefits, which cannot be simulated in EUROMOD, like sickness and disability benefits, are also underrepresented, which may give biased results on poverty rates.

Personal income tax. Due to the lack of data on the place of living, we could not simulate “enlarged personal allowance”, obtained by people who live on specific areas. For the same reason, we had to come up with an “educated guess” in order to specify the rates for Surtax.

Self-employed social insurance contributions. Due to the lack of data on the type of self-employed persons, it was necessary to introduce certain assumptions, based on occupation and industry. As explained in section 3.3.3, due to the problems with gross incomes of self-employed persons, we had to develop our own net-to-gross computation procedure.

Unemployment benefit. As noted above, EUROMOD uses SILC data to determine which persons are receiving Unemployment benefit, and also uses the amount of benefit recorded in

SILC to calculate the benefit base (yempv). However, the number of beneficiaries and the aggregate amount is significantly underestimated in SILC as compared to administrative data, and this problem extends to EUROMOD.

5. REFERENCES

5.1 Sources for tax-benefit descriptions/rules

Note: NN denotes the official gazette (Narodne Novine). Legal acts published in NN are available online in Croatian, at <http://narodne-novine.nn.hr/default.aspx>.

- **Taxation**

Institutions:

Porezna uprava (Tax Administration), <http://www.porezna-uprava.hr/>

Legal framework:

Zakon o porezu na dohodak (act on personal income tax) (old act: NN 177/04, 73/08, 80/10, 114/11, 22/12, 144/12, 43/13, 120/13, 125/13, 148/13, 83/14, 143/14, 136/15; new act: NN 115/16)

Zakon o doprinosima (act on social insurance contributions) (NN 84/08, 152/08, 94/09, 18/11, 22/12, 144/12, 148/13, 41/14, 143/14, 115/16)

- **Pensions**

Institutions:

Ministarstvo rada i mirovinskog osiguranja (Ministry of Labour and Pension System), <http://www.mrms.hr/>

Hrvatski zavod za mirovinsko osiguranje (Croatian Pension Insurance Institute), <http://www.mirovinsko.hr/>

Legal framework:

Zakon o mirovinskom osiguranju (act on public pension insurance) (NN 157/13, 151/14, 33/15, 93/15, 120/16)

Badun, M. (2009) 'Pension beneficiaries who have been granted pensions under more favourable conditions', Newsletter Nr. 44, Institute of Public Finance Zagreb.

- **Labour**

Institutions:

Ministarstvo rada i mirovinskog osiguranja (Ministry of Labour and Pension System), <http://www.mrms.hr/>

Zavod za zapošljavanje (Croatian Employment Service), <http://www.hzz.hr/>

Legal framework:

Zakon o posredovanju pri zapošljavanju i pravima za vrijeme nezaposlenosti (act on employment services and unemployment benefits) (Old act: NN 80/08, 94/09, 121/10, 25/12, 118/12, 12/13, 153/13; New act: NN 16/17)

- **Health**

Institutions:

Ministarstvo zdravlja (Ministry of health), <http://www.zdravlje.hr/>

Hrvatski zavod za zdravstveno osiguranje (Croatian Institute for Health Insurance), <http://www.hzzo.hr/>

Legal framework:

Zakon o zdravstvenoj zaštiti (act on health protection) (NN 150/08, 71/10, 139/10, 22/11, 84/11, 154/11, 12/12, 35/12, 70/12, 144/12, 82/13, 159/13, 22/14, 154/14, 70/16)

Zakon o obveznom zdravstvenom osiguranju (act on mandatory health insurance) (NN 80/13, 137/13)

- **Family**

Institutions:

Ministarstvo za demografiju, obitelj, mlade i socijalnu politiku (Ministry of Demography, Family, Youth and Social Policy), <http://www.mdomsp.hr/>

Legal framework:

Zakon o doplatku za djecu (Child benefit) (NN 94/01, 138/06, 107/07, 37/08, 61/11, 112/12, 82/15)

Zakon o roditeljskim i roditeljskim potporama (act on maternity and parental benefits) (NN 85/08, 110/08, 34/11, 54/13, 152/14, 59/17)

- **Social assistance**

Institutions:

Ministarstvo za demografiju, obitelj, mlade i socijalnu politiku (Ministry of Demography, Family, Youth and Social Policy), <http://www.mdomsp.hr/>

Legal framework:

Zakon o socijalnoj skrbi (act on social assistance) (NN 73/97, 27/01, 59/01, 82/01, 103/03, 44/06, 79/07, 57/11, 33/12, 157/13, 152/14, 99/15, 52/16, 16/17)

- **Disability**

Institutions:

Ministarstvo za demografiju, obitelj, mlade i socijalnu politiku (Ministry of Demography, Family, Youth and Social Policy), <http://www.mdomsp.hr/>

Legal framework:

Zakon o zdravstvenoj zaštiti (act on health protection) (see above)

Zakon o profesionalnoj rehabilitaciji i zapošljavanju osoba s invaliditetom (act on rehabilitation and employment of persons with disability) (NN 157/13, 152/14)

- **War veterans**

Institutions:

Ministry of Veterans' Affairs

Legal framework:

Zakon o pravima hrvatskih branitelja iz Domovinskog rata i članova njihovih obitelji (act on the benefits of Croatian Defenders of the Homeland War) (NN 174/04, 92/05, 02/07, 107/07, 65/09, 137/09, 146/10, 55/11, 140/12, 19/13, 33/13, 148/13, 92/14)

Zakon o zaštiti vojnih i civilnih invalida rata (act on the benefits of military invalids and civil invalids of the Homeland War) (NN 33/92, 77/92, 58/93, 2/94, 76/94, 108/95, 82/01, 103/03, 148/13)

5.2 Sources for external data

In their publications or by request, CBS provides statistical data in all areas. These data represent the main source for external validation, and are supplemented by administrative data provided by various government institutions, as follows:

- ***Taxation***

Data are obtained from Tax Administration by request.

- ***Pensions***

Croatian Pension Insurance Institute: the publication “Statističke informacije Hrvatskog zavoda za mirovinsko osiguranje” (statistical information on pensions; various issues).

- ***Labour***

Croatian Employment Service: the publication “Godišnjak” (yearly report on unemployment benefits; various issues).

- ***Health***

Croatian Institute for Health Insurance: the publication “Godišnje izvješće” (yearly report; various issues).

- ***Family, Social assistance and Disability***

Ministry of Demography, Family, Youth and Social Policy: various yearly statistical reports.

- ***War veterans***

Government of the Republic of Croatia: Izvješće o provedbi zakona o pravima hrvatskih branitelja iz Domovinskog rata i članova njihovih obitelji (yearly report on HBDR benefits; various issues).

5.3 Other

EIZ (2017). *Croatian Economic Outlook No. 71*, The Institute of Economics. Available at: <http://www.eizg.hr/en-US/Croatian-Economic-Outlook-25.aspx>

Urban, I., and Bezeredi, S. (2016). *EUROMOD Country Report: Croatia, 2011-2015*, Institute for Social and Economic Research. Available at: <https://www.euromod.ac.uk/using-euromod/country-reports/f3-g2>

Urban, I., and Bezeredi, S. (2017). *EUROMOD Country Report: Croatia, 2013-2016*, Institute for Social and Economic Research. Available at: <https://www.euromod.ac.uk/using-euromod/country-reports/>

6. ANNEX 1: POLICY EFFECTS IN 2016-2017

In this section we analyse the direct tax-benefit policy effect on household disposable income in Croatia between 2016 and 2017. We try to understand how changes (or non-changes) to tax-benefit policies have affected household incomes in the two periods, 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.

Table A1 and Figure A1 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 2017 tax-benefit policies (deflating the tax-benefit monetary parameters by Eurostat's Harmonized Index of Consumer Prices, HICP) and net incomes simulated under 2016 policies, as a percentage of mean equivalised household disposable income in 2016 (MEHDI). 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, employees and pensioners' social insurance contributions (SIC), self-employed 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.

The HICP is projected to rise by 1.6% between 2016 and 2017. Means-tested benefits are not inflation-adjusted in Croatia, and their real value falls due to the increase in the price level. The largest fall, 0.42% of its MEHDI, is felt by the decile group 1, which is most dependent on means-tested benefits; decile groups 2 to 5 lose 0.2% of their MEHDI on average. Public pensions are adjusted using the "current value of pension", but the formula for its calculation takes into account the price inflation in the preceding period (section 1.1), in which prices were stable. Therefore, pension income also falls in real terms, about 0.5% of MEHDI in the first 5 decile groups, and somewhat less in the remaining groups.⁴

As explained in section 2.7.4, the SIC rate on income from contractual work is halved in 2017. The subsequent gain is relatively even for different decile groups and on average it amounts to 0.26% of MEHDI (see column "Self-employed SIC" in Table A1). On the other hand, the relative gains from PIT reform increase with income: from 0.2% of MEHDI for decile group 4 to 1.96% of MEHDI for the top decile group (see column "Direct taxes" in Table A1).

Overall, real disposable income increases by 0.92%, but the pattern pronouncedly favours those with higher income; e.g., the decile group 1 loses about 1%, while decile group 10 gains more than 2% in terms of MEHDI.

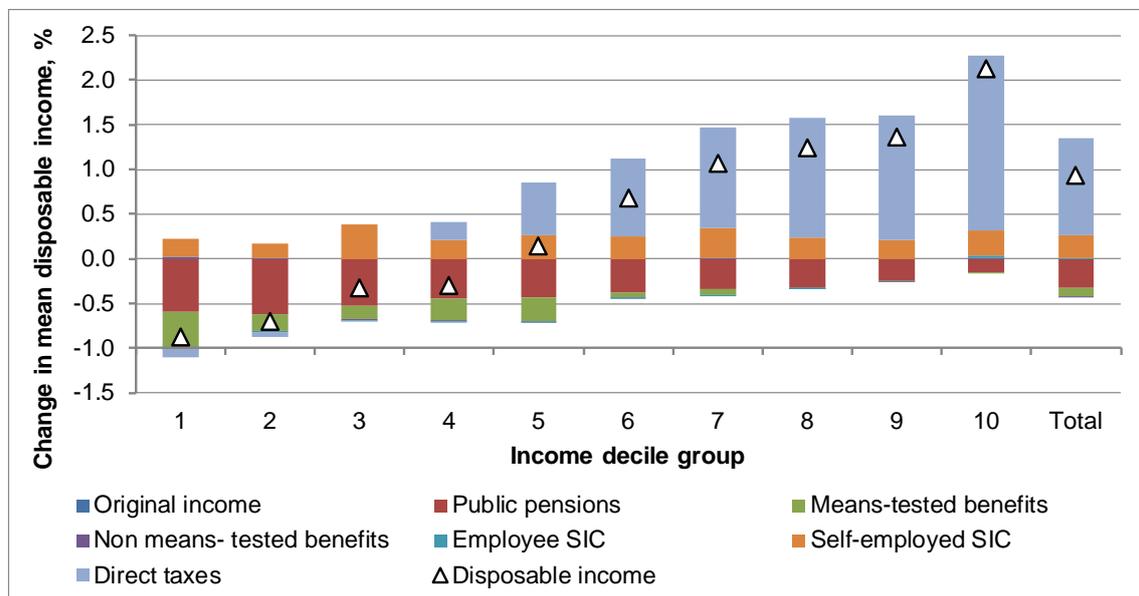
⁴ At the time of writing this report (October 2017) new forecasts are available, which say that the price level will increase by less than 1.6% in 2017, namely about 1% (EIZ, 2017). Such development would lead to smaller decrease of MEHDI for receivers of social benefits and public pensions than indicated by this analysis.

Table A1: Policy effects in 2016-2017, using the CPI-indexation, %

Decile	Original income	Public pensions	Means-tested benefits	Non means-tested benefits	Employee & pensioners SIC	Self-employed SIC	Direct taxes	Disposable income
1	0.00	-0.59	-0.42	0.02	-0.01	0.20	-0.09	-0.87
2	0.00	-0.62	-0.19	0.01	-0.01	0.16	-0.06	-0.70
3	0.00	-0.53	-0.15	-0.01	-0.01	0.38	-0.01	-0.33
4	0.00	-0.45	-0.24	-0.01	-0.01	0.21	0.20	-0.30
5	0.00	-0.44	-0.27	-0.01	0.00	0.26	0.57	0.13
6	0.00	-0.38	-0.05	-0.01	0.00	0.25	0.88	0.68
7	0.00	-0.34	-0.07	0.00	0.00	0.35	1.12	1.06
8	0.00	-0.32	0.00	0.00	0.00	0.23	1.34	1.24
9	0.00	-0.24	0.00	-0.01	0.00	0.20	1.40	1.36
10	0.00	-0.15	0.00	0.01	0.03	0.29	1.96	2.13
Total	0.00	-0.33	-0.08	0.00	0.00	0.26	1.08	0.92

Notes: Shown as a percentage change in mean equivalised household disposable income by income component and income decile group. Income decile groups are based on equivalised household disposable income in 2016, using the modified OECD equivalence scale. Each policy system has been applied to the same input data, deflating monetary parameters of 2017 policies by Eurostat’s Harmonized Index of Consumer Prices (HICP).

Figure A1: Policy effects in 2016-2017, using the CPI-indexation, %



7. ANNEX 2: VALIDATION TABLES

Note: In Table 7.1 through Table 7.8 no external information is available for 2017; in Table 7.9 no external information is available for 2016-17; in Table 7.10 no external information is available for 2016-17.

Table 7.1: Number of employed and unemployed

	EUROMOD	External				Ratio			
	2014	2014	2015	2016	2017	2014	2015	2016	2017
Number of employed	1,420,817	1,566,000	1,585,000	1,590,000	1,545,000	0.91	0.90	0.89	0.92
Number of unemployed	528,638	327,000	306,000	240,000	253,000	1.62	1.73	2.20	2.09

Table 7.2: Market income in EUROMOD, number of recipients

		EUROMOD	External			Ratio		
		2014	2014	2015	2016	2014	2015	2016
yem	employment income	1,372,966	1,513,838	1,539,874	1,561,582	0.91	0.89	0.88
yem01	empl. income: below 25% of AGW	112,305	123,453	130,327	121,364	0.91	0.86	0.93
yem02	empl. income: 25% to 50% of AGW2	242,428	357,953	367,620	373,954	0.68	0.66	0.65
yem03	empl. income: 50% to 75% of AGW2	426,867	367,058	372,584	385,353	1.16	1.15	1.11
yem04	empl. income: 75% to 100% of AGW2	218,689	234,590	236,760	244,863	0.93	0.92	0.89
yem05	empl. income: 100% to 150% of AGW2	263,926	283,666	284,330	284,931	0.93	0.93	0.93
yem06	empl. income: 150% to 200% of AGW2	59,819	74,814	75,064	77,358	0.80	0.80	0.77
yem07	empl. income: 200% to 300% of AGW2	31,829	44,963	45,626	46,394	0.71	0.70	0.69
yem08	empl. income: above 300% of AGW2	17,102	27,341	27,563	27,365	0.63	0.62	0.62
ysenr00	tax exempted income of self-employed persons	17,601	N/A	N/A	N/A	N/A	N/A	N/A
ysenr01	non-reported/tax exempted "other income"	160,721	N/A	N/A	N/A	N/A	N/A	N/A
ysere00	reported income of self-employed persons	125,781	102,787	111,502	111,502	1.22	1.13	1.13
ysere01	reported "other income"	106,195	334,305	361,968	333,237	0.32	0.29	0.32
ysv	severance payments	16,819	36,778	36,465	28,334	0.46	0.46	0.59
yot	income of children under 16	183,042	N/A	N/A	N/A	N/A	N/A	N/A
ypp	private pensions	1,111	N/A	N/A	N/A	N/A	N/A	N/A
ypr	property income	128,389	N/A	N/A	N/A	N/A	N/A	N/A
yyi	investment income	165,913	N/A	N/A	N/A	N/A	N/A	N/A
ypt	private transfers received	91,675	N/A	N/A	N/A	N/A	N/A	N/A
xmp	maintenance payments	81,555	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.3: Market income in EUROMOD, annual amounts (in HRK million)

		EUROMOD				External			Ratio		
		2014	2015	2016	2017	2014	2015	2016	2014	2015	2016
yem	employment income	102,218	103,511	105,437	107,962	108,277	110,739	115,006	0.94	0.93	0.92
yem01	empl. income: below 25% of AGW2	1,495	1,514	1,542	1,579	664	693	706	2.25	2.18	2.18
yem02	empl. income: 25% to 50% of AGW2	8,738	8,849	9,014	9,229	10,204	10,471	11,067	0.86	0.85	0.81
yem03	empl. income: 50% to 75% of AGW2	23,975	24,279	24,730	25,323	18,245	18,847	19,848	1.31	1.29	1.25
yem04	empl. income: 75% to 100% of AGW2	17,199	17,417	17,741	18,166	17,236	17,757	18,822	1.00	0.98	0.94
yem05	empl. income: 100% to 150% of AGW2	28,841	29,206	29,750	30,462	29,918	30,326	30,934	0.96	0.96	0.96
yem06	empl. income: 150% to 200% of AGW2	9,336	9,454	9,630	9,860	11,297	11,496	12,034	0.83	0.82	0.80
yem07	empl. income: 200% to 300% of AGW2	6,650	6,734	6,859	7,024	9,567	9,723	10,058	0.70	0.69	0.68
yem08	empl. income: above 300% of AGW2	5,983	6,059	6,171	6,319	11,146	11,426	11,537	0.54	0.53	0.53
ysenr00	tax exempted income of self-employed	507	514	523	536	N/A	N/A	N/A	N/A	N/A	N/A
ysenr01	non-reported/tax exempted "other income"	1,512	1,531	1,560	1,597	N/A	N/A	N/A	N/A	N/A	N/A
ysere00	reported income of self-employed persons	9,945	10,071	10,258	10,504	5,828	6,123	6,123	1.71	1.64	1.68
ysere01	reported "other income"	1,769	1,791	1,824	1,868	3,429	3,759	3,943	0.52	0.48	0.46
ysv	severance payments	990	1,007	1,042	1,084	1,442	1,165	990	0.69	0.86	1.05
yot	income of children under 16	211	214	218	223	N/A	N/A	N/A	N/A	N/A	N/A
ypp	private pensions	6	6	6	6	N/A	N/A	N/A	N/A	N/A	N/A
ypr	property income	1,723	1,754	1,815	1,888	N/A	N/A	N/A	N/A	N/A	N/A
yyi	investment income	216	191	141	141	3,627	5,930	7,850	0.06	0.03	0.02
ypt	private transfers received	1,133	1,148	1,169	1,197	N/A	N/A	N/A	N/A	N/A	N/A
xmp	maintenance payments	783	781	776	788	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.4: Tax benefit instruments included but not simulated in EUROMOD, number of recipients/payers

		EUROMOD	External			Ratio		
		2014	2014	2015	2016	2014	2015	2016
Benefits								
poa	Old-age pensions	646,776	795,257	813,361	845,073	0.81	0.80	0.77
pdi	Disability pensions	234,433	181,663	169,513	153,588	1.29	1.38	1.53
psu	Survivors pensions	199,452	246,802	245,057	244,046	0.81	0.81	0.82
pen	Total public pensions	1,080,660	1,125,179	1,128,993	1,126,473	0.96	0.96	0.96
pen01	publ. pensions: below 25% of AGW2	333,380	410,313	418,640	425,499	0.81	0.80	0.78
pen02	publ. pensions: 25% to 50% of AGW2	591,407	523,765	522,888	522,779	1.13	1.13	1.13
pen03	publ. pensions: 50% to 75% of AGW2	108,913	143,662	142,713	135,739	0.76	0.76	0.80
pen04	publ. pensions: 75% to 100% of AGW2	33,432	33,532	30,940	30,239	1.00	1.08	1.11
pen05	publ. pensions: 100% to 150% of AGW2	12,425	12,478	12,175	11,138	1.00	1.02	1.12
pen06	publ. pensions: 150% to 200% of AGW2	1,026	1,072	1,121	782	0.96	0.91	1.31
pen07	publ. pensions: 200% to 300% of AGW2	78	212	326	167	0.37	0.24	0.47
pen08	publ. pensions: above 300% of AGW2	0	145	189	131	0.00	0.00	0.00
bho	Housing benefits	17,669	42,624	44,005	42,026	0.41	0.40	0.42
bsaot	Other social assistance benefits	55,624	N/A	N/A	N/A	N/A	N/A	N/A
bunot	Other unemployment benefits	3,827	N/A	N/A	N/A	N/A	N/A	N/A
boa	Old-age benefits	22,123	N/A	N/A	N/A	N/A	N/A	N/A
bsu	Survivors benefits	3,466	N/A	N/A	N/A	N/A	N/A	N/A
bed	Education allowances	25,305	N/A	N/A	N/A	N/A	N/A	N/A
bhl	Sickness benefits	27,107	N/A	N/A	N/A	N/A	N/A	N/A
bdi	Disability benefits	101,655	N/A	N/A	N/A	N/A	N/A	N/A
Taxes and Social Insurance contributions								
tpr	Property tax	388,677	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.5: Tax benefit instruments included but not simulated in EUROMOD, annual amounts (in HRK million)

		EUROMOD				External			Ratio		
		2014	2015	2016	2017	2014	2015	2016	2014	2015	2016
Benefits											
poa	Old-age pensions	21,334	21,366	21,534	21,569	23,310	23,555	24,512	0.92	0.91	0.88
pdi	Disability pensions	7,616	7,627	7,687	7,699	6,364	6,368	5,896	1.20	1.20	1.30
psu	Survivors pensions	5,107	5,115	5,155	5,163	6,486	6,387	6,342	0.79	0.80	0.81
pen	Total public pensions	34,057	34,107	34,376	34,432	32,718	32,907	33,224	1.04	1.04	1.03
pen01	publ. pensions: below 25% of AGW2	5,383	5,455	6,322	6,669	5,743	5,928	6,146	0.94	0.92	1.03
pen02	publ. pensions: 25% to 50% of AGW2	18,706	18,679	18,084	18,295	15,972	16,100	16,428	1.17	1.16	1.10
pen03	publ. pensions: 50% to 75% of AGW2	5,889	5,888	5,895	5,526	7,292	7,344	7,168	0.81	0.80	0.82
pen04	publ. pensions: 75% to 100% of AGW2	2,658	2,802	2,827	2,888	2,437	2,293	2,302	1.09	1.22	1.23
pen05	publ. pensions: 100% to 150% of AGW2	1,258	1,133	1,096	949	1,155	1,125	1,081	1.09	1.01	1.01
pen06	publ. pensions: 150% to 200% of AGW2	149	135	136	104	100	94	80	1.49	1.43	1.71
pen07	publ. pensions: 200% to 300% of AGW2	15	15	15	0	10	14	10	1.50	1.05	1.51
pen08	publ. pensions: above 300% of AGW2	0	0	0	0	9	9	9	0.00	0.00	0.00
bho	Housing benefits	79	79	81	81	120	117	120	0.66	0.67	0.68
bsaot	Other social assistance benefits	392	392	392	392	174	160	155	2.25	2.44	2.53
bunot	Other unemployment benefits	12	19	19	20	306	556	556	0.04	0.03	0.03
boa	Old-age benefits	49	49	49	50	138	180	168	0.36	0.27	0.29
bsu	Survivors benefits	11	11	11	11	437	412	405	0.02	0.03	0.03
bed	Education allowances	170	173	179	187	N/A	N/A	N/A	N/A	N/A	N/A
bhl	Sickness benefits	364	368	375	384	1,284	1,335	1,463	0.28	0.28	0.26
bdi	Disability benefits	596	596	596	596	1,499	1,485	1,509	0.40	0.40	0.39
Taxes & Social Insurance contributions											
tpr	Property tax	192	192	192	192	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.6: Tax benefit instruments simulated in EUROMOD, number of recipients/payers

		EUROMOD				SILC	Ratio	External			Ratio		
		2014	2015	2016	2017	2014	2014	2014	2015	2016	2014	2015	2016
Benefits													
bsa	Subsistence benefit	59,149	59,079	61,370	60,560	31,266	1.89	49,053	50,974	48,701	1.21	1.16	1.26
bunct	Unemployment benefit	53,279	53,279	53,279	53,279	53,279	1.00	118,182	108,387	102,164	0.45	0.49	0.52
bch	Child benefit	192,090	186,426	182,728	175,012	199,086	0.96	191,658	188,236	174,576	1.00	0.99	1.05
bfaba	Grant for a newborn child	29,872	29,872	29,872	29,872	26,893	1.11	39,660	37,784	37,616	0.75	0.79	0.79
bfama	Maternity leave benefit	28,620	28,620	28,620	28,620	N/A	N/A	33,684	32,525	32,887	0.85	0.88	0.87
bfapl	Parental leave benefit	32,190	32,190	32,190	32,190	N/A	N/A	44,994	43,927	42,672	0.72	0.73	0.75
bmanc	Maternity and parental allowance	32,054	32,054	32,054	32,054	N/A	N/A	46,267	46,179	43,563	0.69	0.69	0.74
bfamh	All parental benefits (bfama, bfapl & bmanc)	92,864	92,864	92,864	92,864	58,072	1.60	124,945	122,631	N/A	0.74	0.76	N/A
bhout	Compensation for electricity costs	0	0	63,872	63,061	0	N/A	N/A	N/A	61,043	N/A	N/A	1.05
Taxes and Social Insurance contributions													
tin	Personal income tax	1,342,749	1,161,764	1,189,542	985,676	1,345,574	1.00	2,725,915	2,752,303	2,771,491	0.49	0.42	0.43
tmu	Surtax	1,342,749	1,161,764	1,189,542	985,592	1,345,574	1.00	2,725,915	2,752,303	2,771,491	0.49	0.42	0.43
tscsicer	Employers: all SIC	1,407,939	1,407,939	1,407,939	1,429,617	0	N/A	1,513,838	1,539,874	1,561,582	0.93	0.91	0.90
tscepp	Employees: pension SIC	1,372,966	1,372,966	1,372,966	1,372,966	0	N/A	1,513,838	1,539,874	1,561,582	0.91	0.89	0.88
tscsicse00	Self-employed: all SIC	122,369	122,369	122,369	122,369	0	N/A	102,787	111,502	111,502	1.19	1.10	1.10
tscsicse01	"Other income" earners: all SIC	106,195	106,195	106,195	106,195	0	N/A	334,305	361,968	333,237	0.32	0.29	0.32
tscbesi	Pensioners: health SIC	46,961	47,097	46,961	46,961	0	N/A	1,125,179	1,128,993	1,126,473	0.04	0.04	0.04
tscsicct	Credited SIC	1,392,753	1,392,616	1,392,753	1,392,753	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.7: Tax benefit instruments simulated in EUROMOD, annual amounts (in HRK million)

		EUROMOD				SILC	Ratio	External			Ratio		
		2014	2015	2016	2017	2014	2014	2014	2015	2016	2014	2015	2016
Benefits													
bsa	Subsistence benefit	619	618	658	654	296	2.09	645	608	611	0.96	1.02	1.08
bunct	Unemployment benefit	535	539	553	574	419	1.28	1,245	1,077	932	0.43	0.50	0.59
bch	Child benefit	1,613	1,585	1,559	1,510	1,657	0.97	1,639	1,588	1,480	0.98	1.00	1.05
bfaba	Grant for a newborn child	71	71	71	71	64	1.11	89	88	88	0.79	0.81	0.81
bfama	Maternity leave benefit	566	582	591	610	N/A	N/A	805	790	803	0.70	0.74	0.74
bfapl	Parental leave benefit	427	427	427	427	N/A	N/A	462	447	434	0.92	0.95	0.98
bmanc	Maternity and parental allowance	411	411	411	411	N/A	N/A	383	384	368	1.07	1.07	1.12
bfamh	All parental benefits (bfama, bfapl & bmanc)	1,404	1,420	1,429	1,449	1,019	1.38	1,650	1,621	1,605	0.85	0.88	0.89
bhout	Compensation for electricity costs	0	0	150	148	0	N/A	N/A	N/A	127	N/A	N/A	1.19
Taxes and Social Insurance contributions													
tin	Personal income tax	8,536	7,163	7,472	6,485	9,631	0.89	11,449	10,548	11,373	0.75	0.68	0.66
tmu	Surtax	1,011	854	890	779	1,118	0.90	1,339	1,234	1,331	0.75	0.69	0.67
tscsicer	Employers: all SIC	17,795	18,019	18,353	18,727	0	N/A	17,541	19,047	19,781	1.01	0.95	0.93
tscepp	Employees: pension SIC	20,397	20,653	21,035	21,534	0	N/A	21,342	21,818	22,654	0.96	0.95	0.93
tscsicse00	Self-employed: all SIC	2,725	2,737	2,770	2,672	0	N/A	1,766	1,758	1,758	1.54	1.56	1.58
tscsicse01	"Other income" earners: all SIC	551	558	569	327	0	N/A	457	493	485	1.21	1.13	1.17
tscbesi	Pensioners: health SIC	122	123	124	124	0	N/A	408	410	415	0.30	0.30	0.30
tscsicct	Credited SIC	1,216	1,224	1,246	1,299	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 7.8: Personal income tax in detail - Annual amounts (in HRK million)

		EUROMOD				External			Ratio		
		2014	2015	2016	2017	2014	2015	2016	2014	2015	2016
tin	Personal income tax	8,536	7,163	7,472	6,485	11,449	10,548	11,373	0.75	0.68	0.66
tinpens	PIT - pensions	499	375	386	343	392	343	360	1.27	1.09	1.07
tinse00	PIT - income of self-employed persons	584	492	514	446	278	282	354	2.10	1.75	1.45
tinprop	PIT - rental of property income	102	92	97	142	293	333	361	0.35	0.27	0.27
tincapt	PIT - capital income	15	12	9	10	424	652	912	0.04	0.02	0.01
tinse01	PIT - "other income"	101	87	91	105	647	703	736	0.16	0.12	0.12
tinempl	PIT - employment income	7,223	6,094	6,363	5,428	9,414	8,235	8,650	0.77	0.74	0.74
tinempl01	PIT - empl. income: below 25% of AGW	3	2	2	3	8	5	5	0.35	0.40	0.44
tinempl02	PIT - empl. income: 25% to 50% of AGW	74	26	31	7	151	68	80	0.49	0.39	0.39
tinempl03	PIT - empl. income: 50% to 75% of AGW	663	479	510	213	577	442	487	1.15	1.08	1.05
tinempl04	PIT - empl. income: 75% to 100% of AGW	827	646	687	598	945	807	906	0.88	0.80	0.76
tinempl05	PIT - empl. income: 100% to 150% of AGW	2,293	1,974	2,068	1,857	2,366	2,086	2,190	0.97	0.95	0.94
tinempl06	PIT - empl. income: 150% to 200% of AGW	1,018	924	959	877	1,253	1,127	1,197	0.81	0.82	0.80
tinempl07	PIT - empl. income: 200% to 300% of AGW	996	851	877	818	1,480	1,243	1,298	0.67	0.68	0.68
tinempl08	PIT - empl. income: above 300% of AGW	1,349	1,192	1,229	1,055	2,635	2,458	2,486	0.51	0.48	0.49

Table 7.9: Distribution of equivalised disposable income

	EUROMOD				External			Ratio		
	2014	2015	2016	2017	2014	2015	2016	2014	2015	2016
D1	2.95	2.91	2.96	2.90	2.60	2.70	N/A	1.13	1.08	N/A
D2	4.88	4.77	4.79	4.77	4.70	4.70	N/A	1.04	1.02	N/A
D3	6.20	6.14	6.13	5.99	6.00	6.10	N/A	1.03	1.01	N/A
D4	7.37	7.28	7.27	7.15	6.90	7.30	N/A	1.07	1.00	N/A
D5	8.44	8.41	8.39	8.30	8.70	8.50	N/A	0.97	0.99	N/A
D6	9.66	9.62	9.62	9.63	9.60	9.70	N/A	1.01	0.99	N/A
D7	11.08	11.08	11.01	10.99	11.00	11.10	N/A	1.01	1.00	N/A
D8	12.63	12.63	12.65	12.73	12.60	12.70	N/A	1.00	0.99	N/A
D9	14.98	15.04	15.06	15.14	15.30	15.10	N/A	0.98	1.00	N/A
D10	21.82	22.13	22.13	22.41	22.60	22.00	N/A	0.97	1.01	N/A
Median	41,839	42,362	43,040	44,307	41,632	42,450	N/A	1.00	1.00	N/A
Mean	46,203	47,255	47,967	49,450	46,339	47,188	N/A	1.00	1.00	N/A
Gini	29.1	29.6	29.5	30.1	30.4	29.7	N/A	0.96	1.00	N/A
S80/S20	4.7	4.8	4.8	4.9	5.2	5.0	N/A	0.90	0.97	N/A

Table 7.10: Poverty rates by gender and age

	EUROMOD				External			Ratio		
	2014	2015	2016	2017	2014	2015	2016	2014	2015	2016
40% median HDI										
Total	6.97	7.22	7.12	7.44	7.90	8.30	N/A	0.88	0.87	N/A
Males	7.00	7.22	7.12	7.42	7.90	8.30	N/A	0.89	0.87	N/A
Females	6.93	7.22	7.12	7.46	8.00	8.30	N/A	0.87	0.87	N/A
50% median HDI										
Total	12.73	12.91	12.81	13.45	13.50	13.20	N/A	0.94	0.98	N/A
Males	12.38	12.57	12.46	12.93	13.10	12.90	N/A	0.94	0.97	N/A
Females	13.06	13.22	13.13	13.93	13.90	13.50	N/A	0.94	0.98	N/A
60% median HDI										
Total	19.23	19.51	19.32	19.95	20.00	19.50	N/A	0.96	1.00	N/A
Males	18.37	18.54	18.25	18.99	19.30	18.50	N/A	0.95	1.00	N/A
Females	20.03	20.42	20.32	20.85	20.60	20.50	N/A	0.97	1.00	N/A
70% median HDI										
Total	25.94	25.97	26.03	26.73	26.90	26.50	N/A	0.96	0.98	N/A
Males	24.88	24.85	24.93	25.52	25.80	25.20	N/A	0.96	0.99	N/A
Females	26.93	27.02	27.05	27.87	27.90	27.60	N/A	0.97	0.98	N/A
60% median HDI										
0-15 years	17.66	17.79	16.91	18.22	20.30	19.40	N/A	0.87	0.92	N/A
16-24 years	19.87	20.11	19.99	20.21	19.90	20.90	N/A	1.00	0.96	N/A
25-49 years	15.30	15.52	15.27	15.76	16.40	15.40	N/A	0.93	1.01	N/A
50-64 years	20.05	20.26	20.19	20.70	20.00	19.00	N/A	1.00	1.07	N/A
65+ years	26.41	27.04	27.33	28.04	26.30	27.00	N/A	1.00	1.00	N/A

Table 7.11: Minimum wage validation

	Baseline				Min Wage Incl.				Ratio			
	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017
equivalised disposable income	125,090	127,895	129,825	133,719	125,232	128,030	129,974	133,909	0.999	0.999	0.999	0.999
employment income	102,218	103,511	105,437	107,962	102,389	103,675	105,617	108,190	0.998	0.998	0.998	0.998
Personal income tax	8,536	7,163	7,472	6,485	8,546	7,172	7,481	6,494	0.999	0.999	0.999	0.999
Surtax	1,011	854	890	779	1,012	855	891	779	0.999	0.999	0.999	0.999
Employers: all SIC	17,795	18,019	18,353	18,727	17,809	18,032	18,370	18,749	0.999	0.999	0.999	0.999
Employees: pension SIC	20,397	20,653	21,035	21,534	20,413	20,668	21,054	21,560	0.999	0.999	0.999	0.999
Subsistence benefit	619	618	658	654	617	616	656	652	1.003	1.003	1.003	1.003
Child benefit	1,613	1,585	1,559	1,510	1,610	1,583	1,558	1,508	1.002	1.002	1.001	1.001
Median	41,839	42,362	43,040	44,307	41,879	42,428	43,057	44,445	0.999	0.998	1.000	0.997
Poverty rate (60% median HDI)	19.2	19.5	19.3	20.0	19.0	19.3	19.1	19.7	1.010	1.010	1.009	1.015
Gini coefficient	29.1	29.6	29.5	30.1	29.0	29.5	29.5	30.0	1.001	1.001	1.001	1.002