The Hypothetical Household Tool (HHoT) in EUROMOD

EUROMOD Technical Session

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European Commission

Hypothetical Household Tool (HHoT):

- Hypothetical household simulation
- Value added of HHoT
- How does it work?
- HHoT statistical wizard
- HHoT and the EUROMOD-JRC interface

Hypothetical Household Simulations

- HHoT: recent EUROMOD application.
- User-generated hypothetical households.
- Advantages of simulations based on hypothetical data:
  - No need of survey data.
  - Easier analysis based on simple cases.

HHoT: state-of-the-art model for hypothetical household simulations

- HHoT unique features:
- **1- Flexibility and user-friendliness:**
  - Flexibility in family characteristics: e.g. household composition, employment status, education level, wage level.
  - Examples: multi-generational households, households with members on sickness…

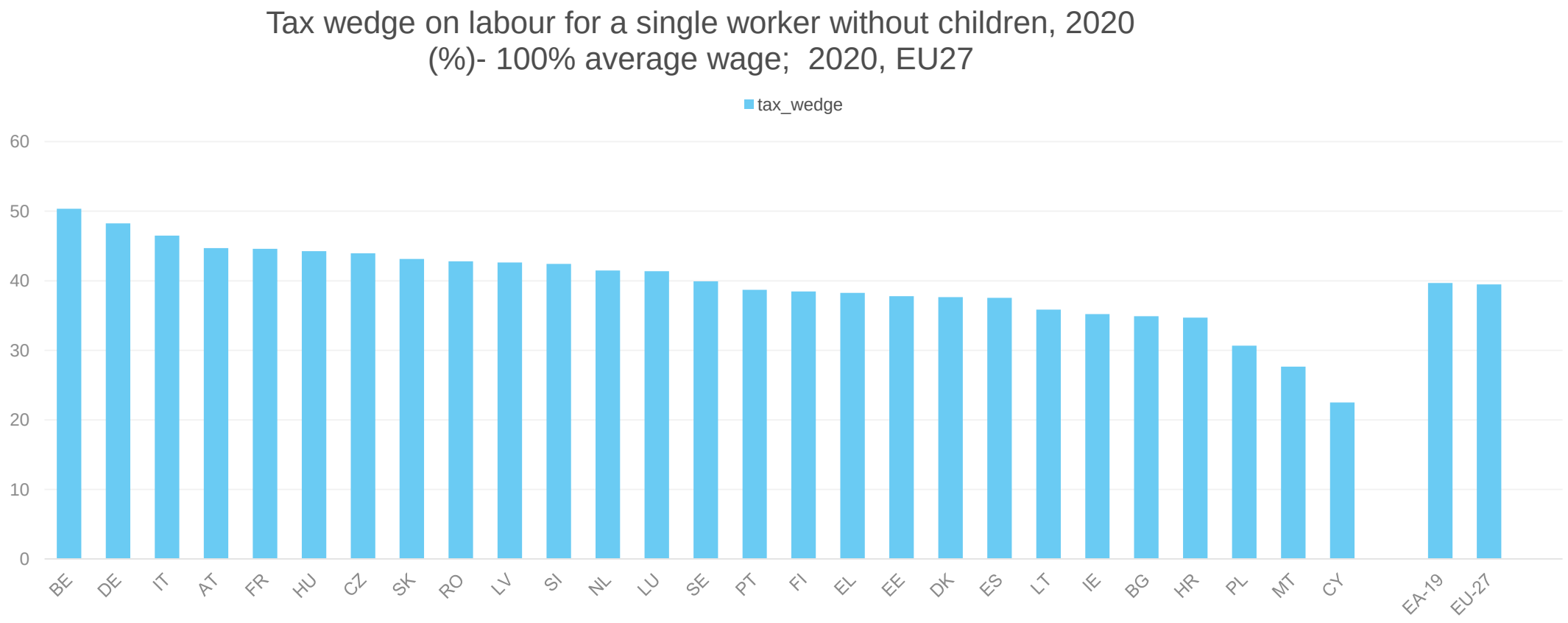
HHoT: state-of-the-art model for hypothetical household simulations

- **2- Full integration into EUROMOD framework, i.e.:**
  - regular and timely updates of policy rules
  - fully transparent policies and assumptions
  - validated systems
  - comparative framework that allows policy switches across countries
  - living model that benefits from extensions

HHoT: state-of-the-art model for hypothetical household simulations

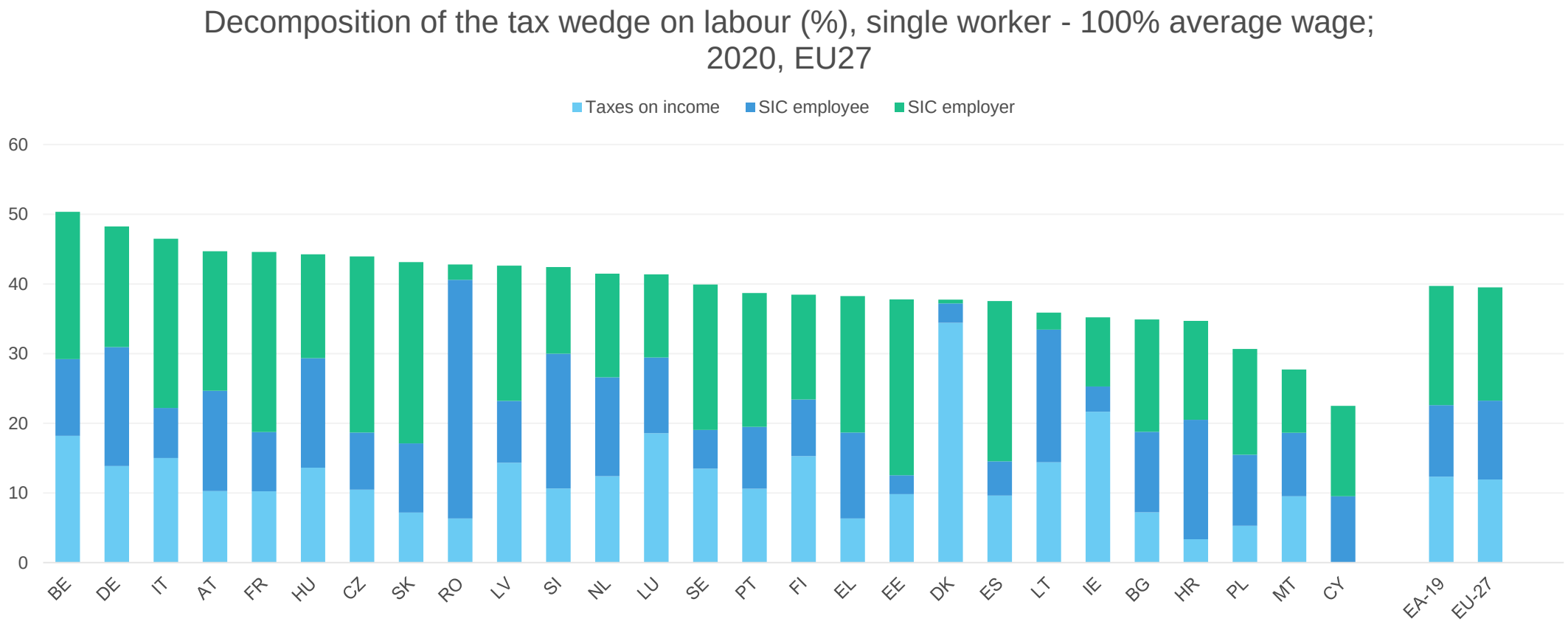
- **3- Consistency and complementarity between microsimulations and HH simulations**
  - Hypothetical household (HH) simulations abstract from population composition: illustrative, simpler, but not for distributional analysis
  - Microsimulations: more complex, richer analysis of tax-policy reforms; analysis of budgetary impact and distributional effects
  - EUROMOD-HHoT allows combination of both types of analysis in a consistent way

EU countries coverage



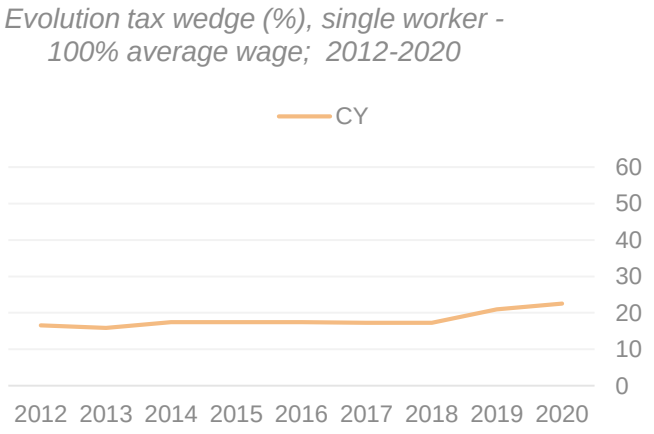
European Commission

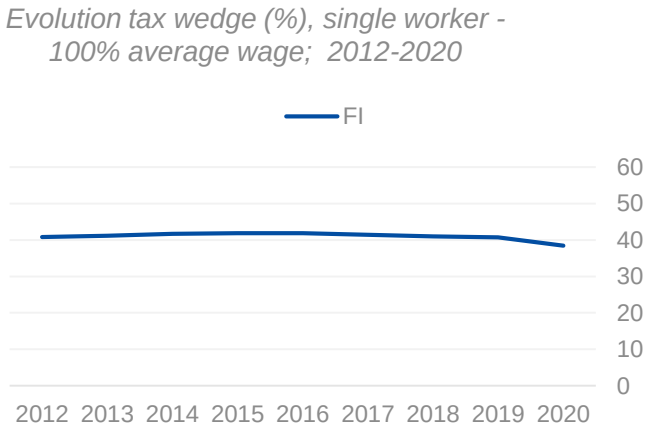
Decomposition across PIT/SIC/cash benefits

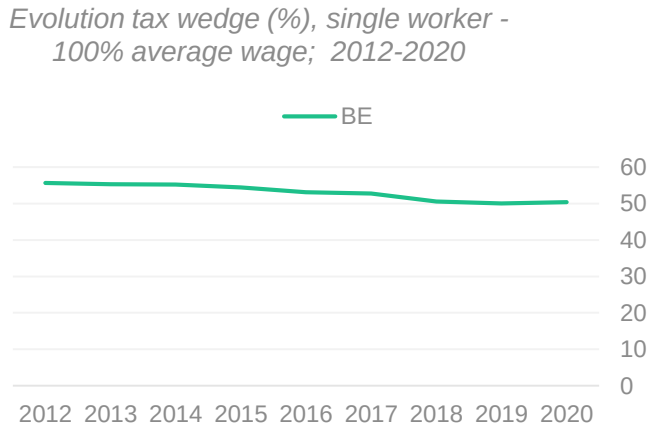


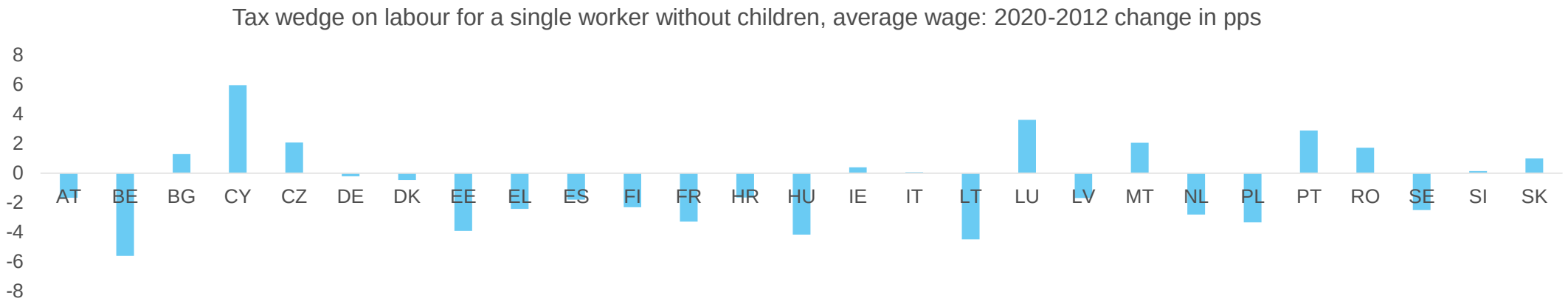
European Commission

Analysis of trends



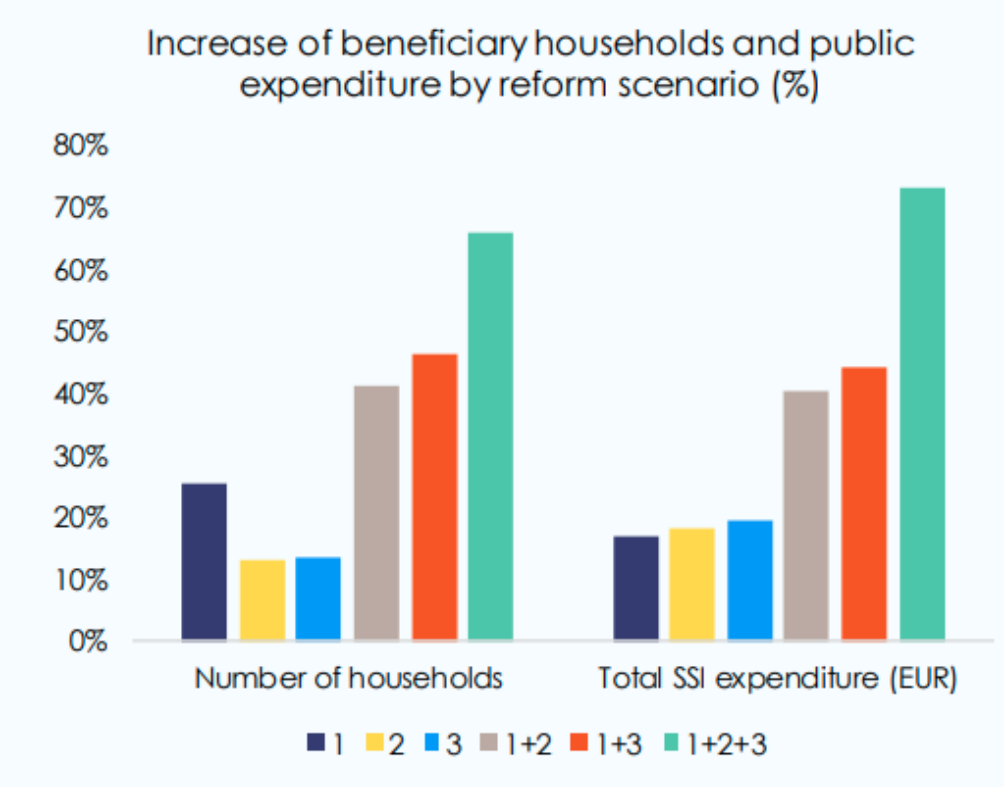


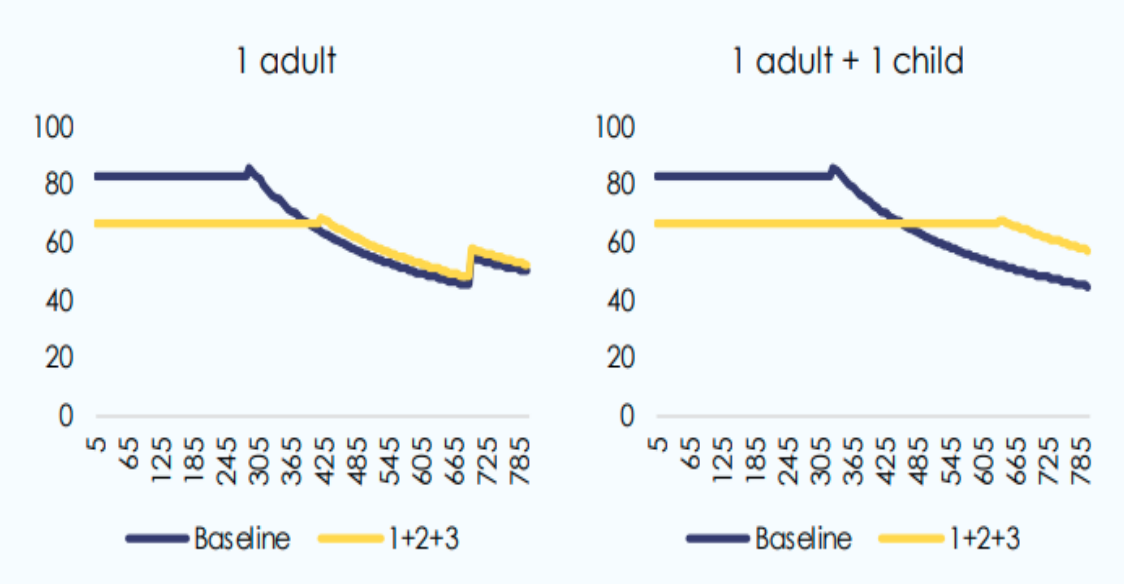




European Commission

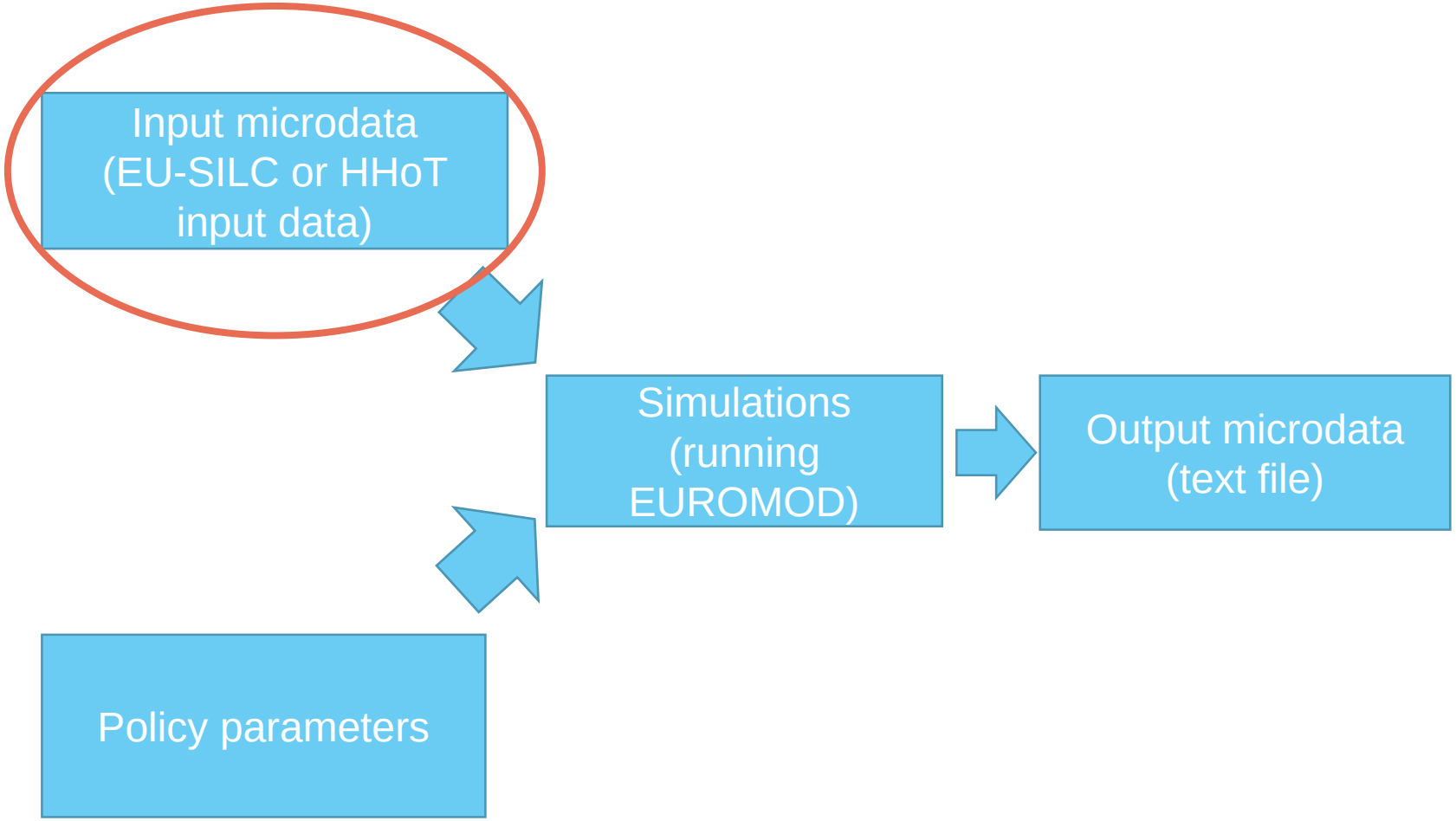
Complementarity with microsimulation on real data



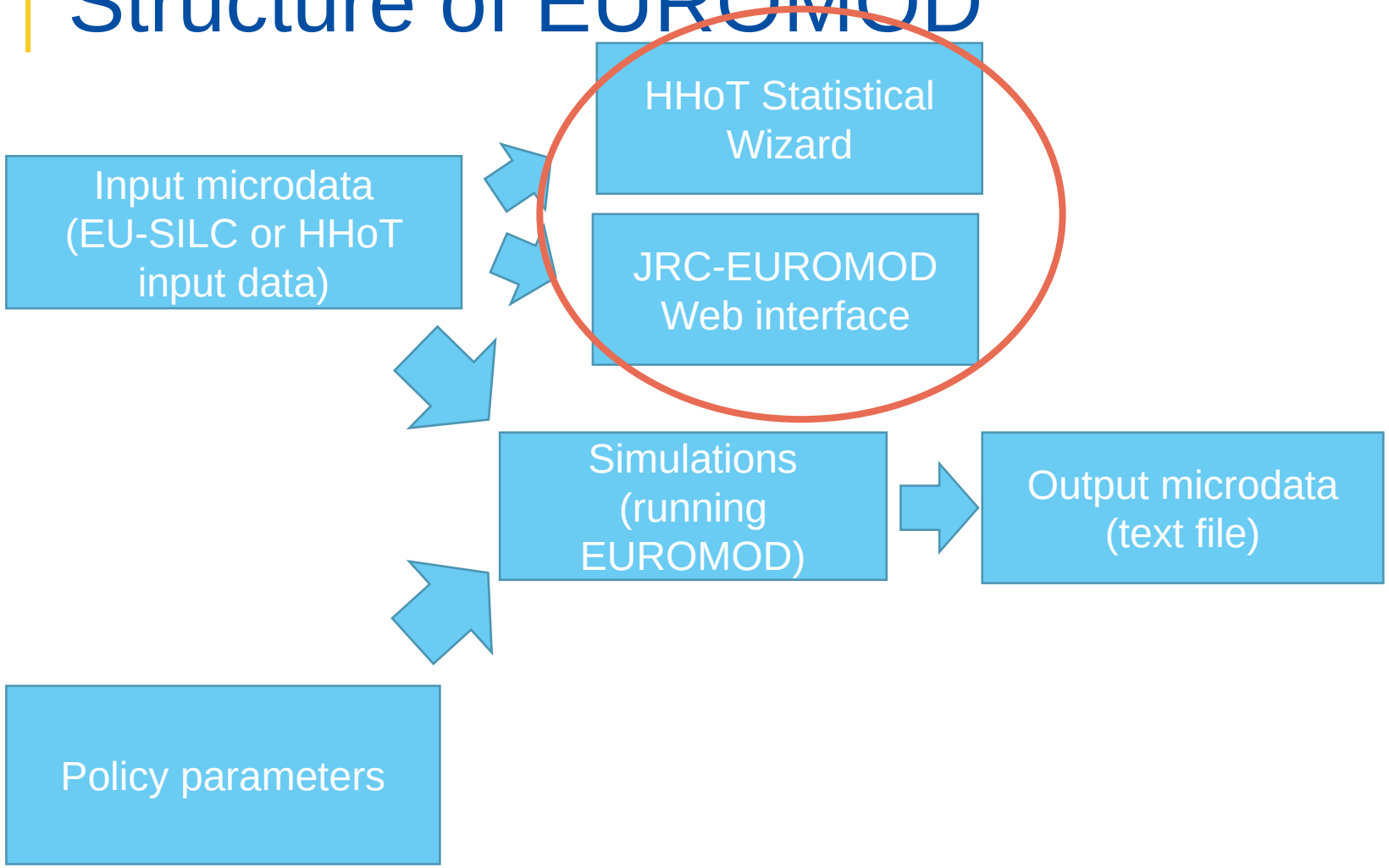


Source: European Commission, Joint Research Centre, based on the EUROMOD model. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020SC0507&from=EN

Structure of EUROMOD

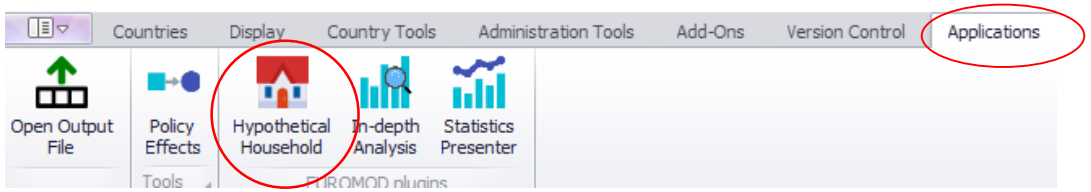


Structure of EUROMOD

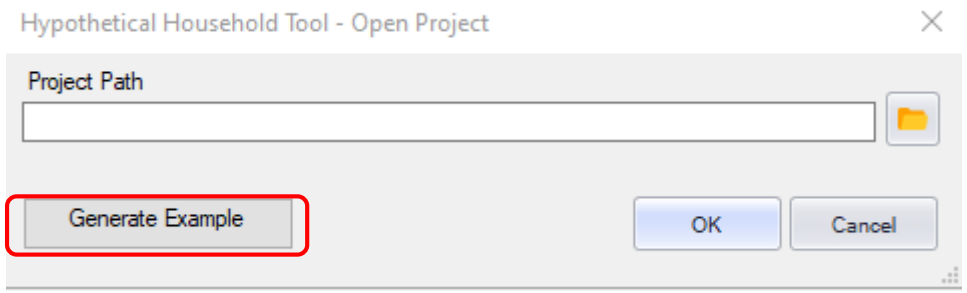


HHoT User interface

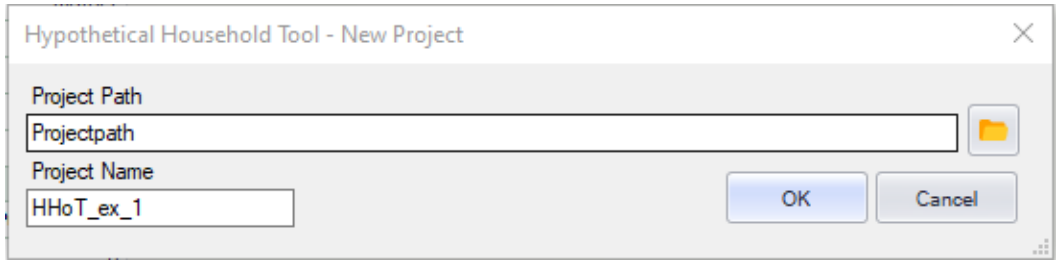
- HHoT accesible from the standard EUROMOD user interface



Getting started for the first time

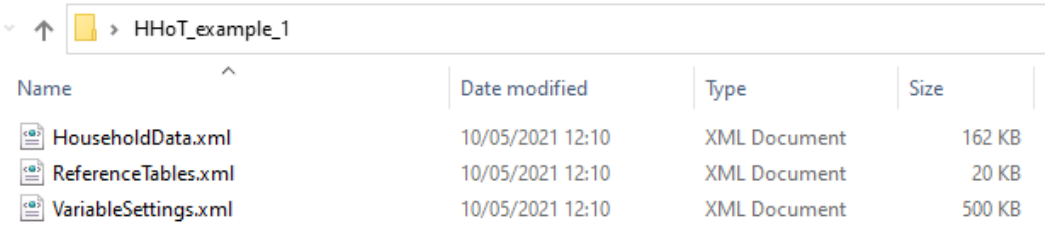


Getting started for the first time



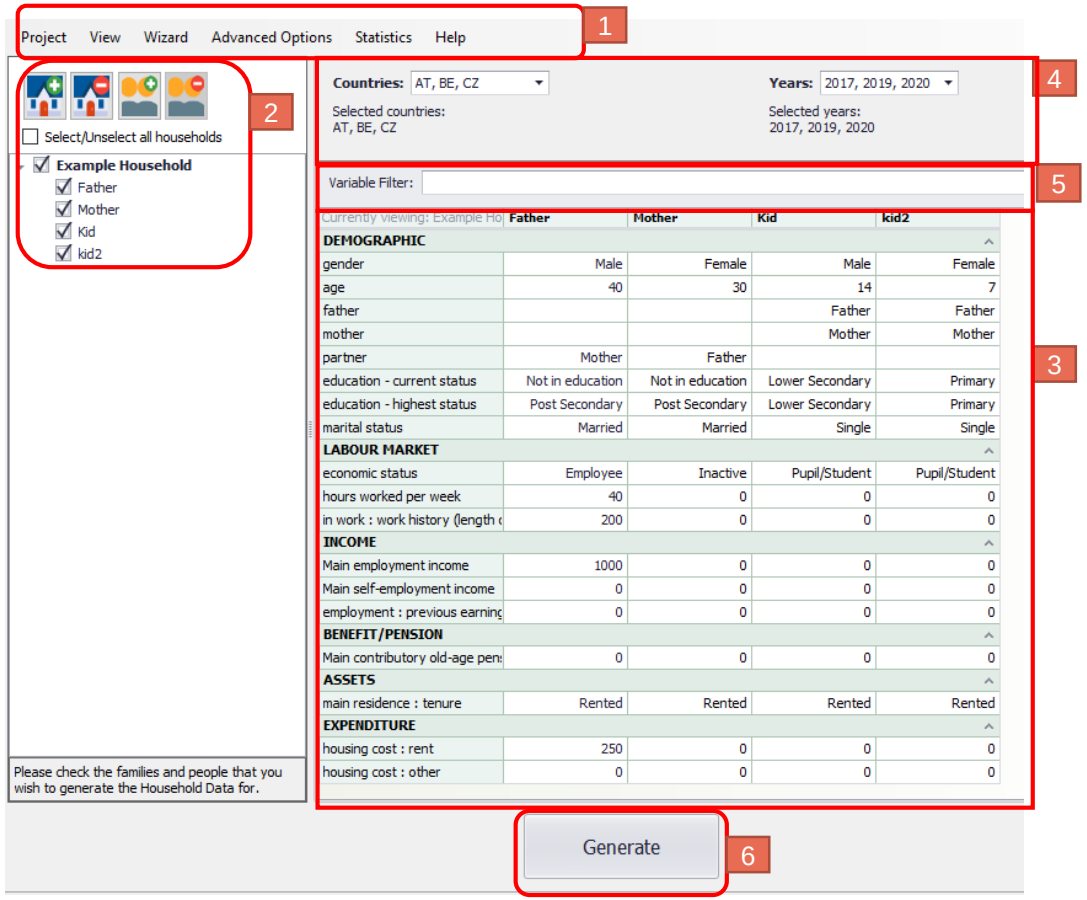
- Project path
- Project name
- HHoT will remember this folder

Getting started for the first time



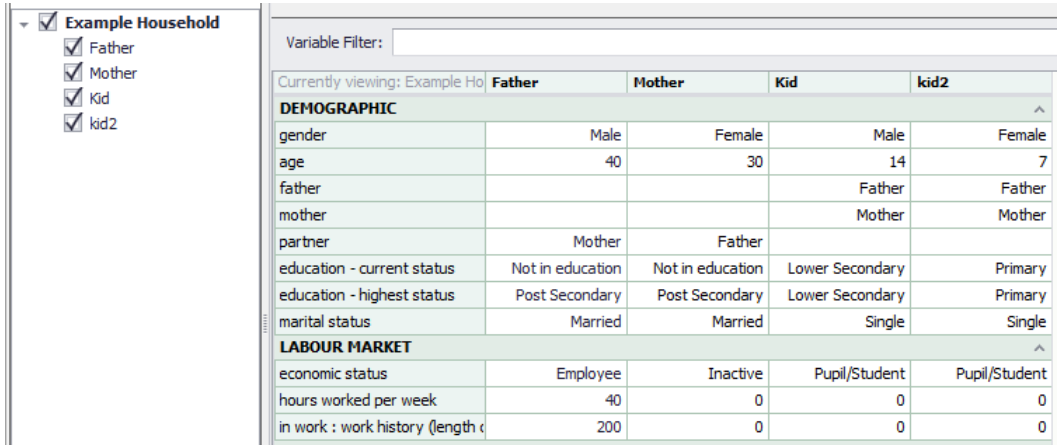
- EUROMOD creates a folder using the Project Name and stores the following files in there:
- VariableSettings.xml
- HouseholdData.xml
- ReferenceTables.xml
- Next time, HHoT will open this project automatically

HHoT user interface



- The ribbon bar (1)
- Defined households (2)
- Details of the household members (3)
- Selection countries and years (4)
- The Variable Filter bar (5)
- The generate button (6)

Existing household type



Currently viewing: Example Ho	Father	Mother	Kid	kid2
DEMOGRAPHIC				
gender	Male	Female	Male	Female
age	40	30	14	7
father			Father	Father
mother			Mother	Mother
partner	Mother	Father		
education - current status	Not in education	Not in education	Lower Secondary	Primary
education - highest status	Post Secondary	Post Secondary	Lower Secondary	Primary
marital status	Married	Married	Single	Single
LABOUR MARKET				
economic status	Employee	Inactive	Pupil/Student	Pupil/Student
hours worked per week	40	0	0	0
in work : work history (length (	200	0	0	0

- First step is to define the household type we are interest to create data for.
- plug-in already contains an example household

Existing household type

Currently viewing: Example Ho	Father	Mother	Kid	kid2
DEMOGRAPHIC				
gender	Male	Female	Male	Female
age	40	30	14	7
father			Father	Father
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marital status	Married	Married	Single	Single
LABOUR MARKET				
economic status	Employee	Inactive	Pupil/Student	Pupil/Student
hours worked per week	40	0	0	0
in work : work history (length c	200	0	0	0
INCOME				
Main employment income	1000	0	0	0
Main self-employment income	0	0	0	0
employment : previous earning	0	0	0	0
BENEFIT/PENSION				
Main contributory old-age pen:	0	0	0	0
ASSETS				
main residence : tenure	Rented	Rented	Rented	Rented
EXPENDITURE				
housing cost : rent	250	0	0	0
housing cost : other	0	0	0	0

- basic characteristics for each household members.
- Columns are household members.
- By default only basic variables displayed.

Existing household type

Currently viewing: Example Ho	Father	Mother	Kid	kid2
DEMOGRAPHIC				
gender	Male	Female	Male	Female
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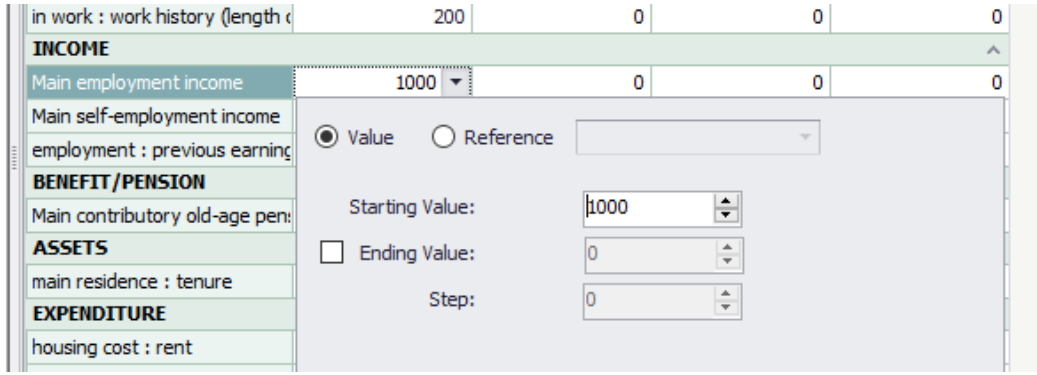
ASSETS				
main residence : tenure	Rented	Rented	Rented	Rented
EXPENDITURE				
housing cost : rent	250	0	0	0
housing cost : other	0	0	0	0

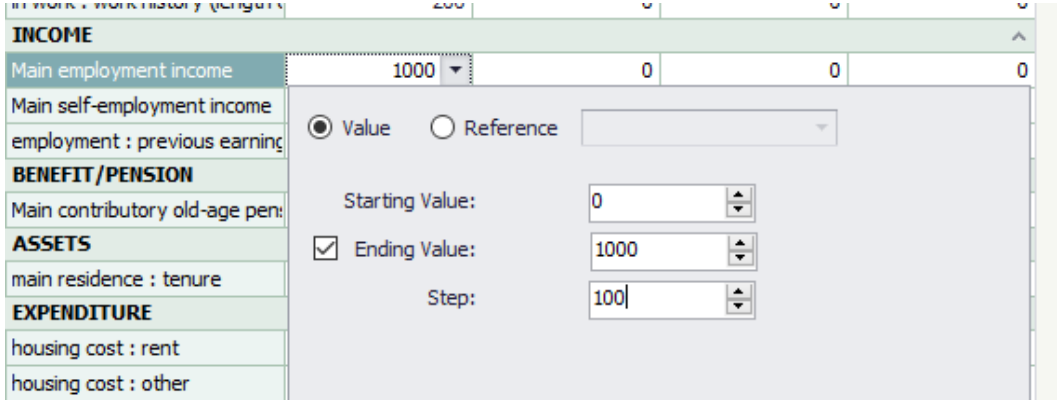
- The basic characteristics are classified into six categories:
  - **Demographics**
  - **Labour market characteristics**
  - **Income components**
  - **Benefits/pensions**
  - **Assets**
  - **Expenditures**

Numerical variables



- Most variables are numeric variables (e.g. incomes).
- Numeric Variable Editor to change value or set range.

Numerical variables



- Range of values by filling in a starting and ending value.
- The hypothetical household is automatically copied for each specified step

Numerical variables

	sft_h	sid_h	idhh	idperson	yem
1	Example Household	143230940	1	101	1000
2	Example Household	143230940	1	102	0
3	Example Household	143230940	1	103	0
4	Example Household	143230940	1	104	0

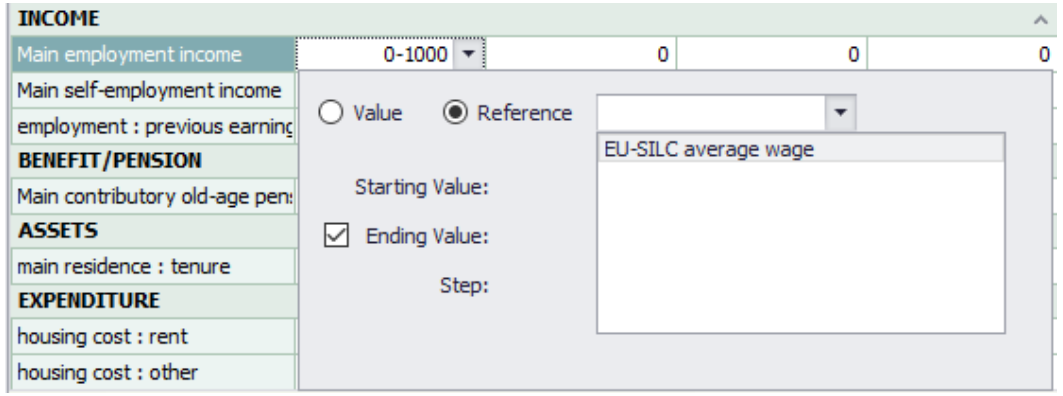
- Case of Income, yem =1000, only one hh

Numerical variables

	sft_h	sid_h	idhh	idperson	yem
1	Example Household	143230940	1	101	0
2	Example Household	143230940	1	102	0
3	Example Household	143230940	1	103	0
4	Example Household	143230940	1	104	0
5	Example Household	143230940	2	201	100
6	Example Household	143230940	2	202	0
7	Example Household	143230940	2	203	0
8	Example Household	143230940	2	204	0
9	Example Household	143230940	3	301	200
10	Example Household	143230940	3	302	0
11	Example Household	143230940	3	303	0
12	Example Household	143230940	3	304	0
13	Example Household	143230940	4	401	300
14	Example Household	143230940	4	402	0
15	Example Household	143230940	4	403	0
16	Example Household	143230940	4	404	0
17	Example Household	143230940	5	501	400
18	Example Household	143230940	5	502	0
19	Example Household	143230940	5	503	0
20	Example Household	143230940	5	504	0
21	Example Household	143230940	6	601	500
22	Example Household	143230940	6	602	0
23	Example Household	143230940	6	603	0
24	Example Household	143230940	6	604	0
25	Example Household	143230940	7	701	600
26	Example Household	143230940	7	702	0
27	Example Household	143230940	7	703	0
28	Example Household	143230940	7	704	0

- With income defined as a range.
- Several househols

Reference table

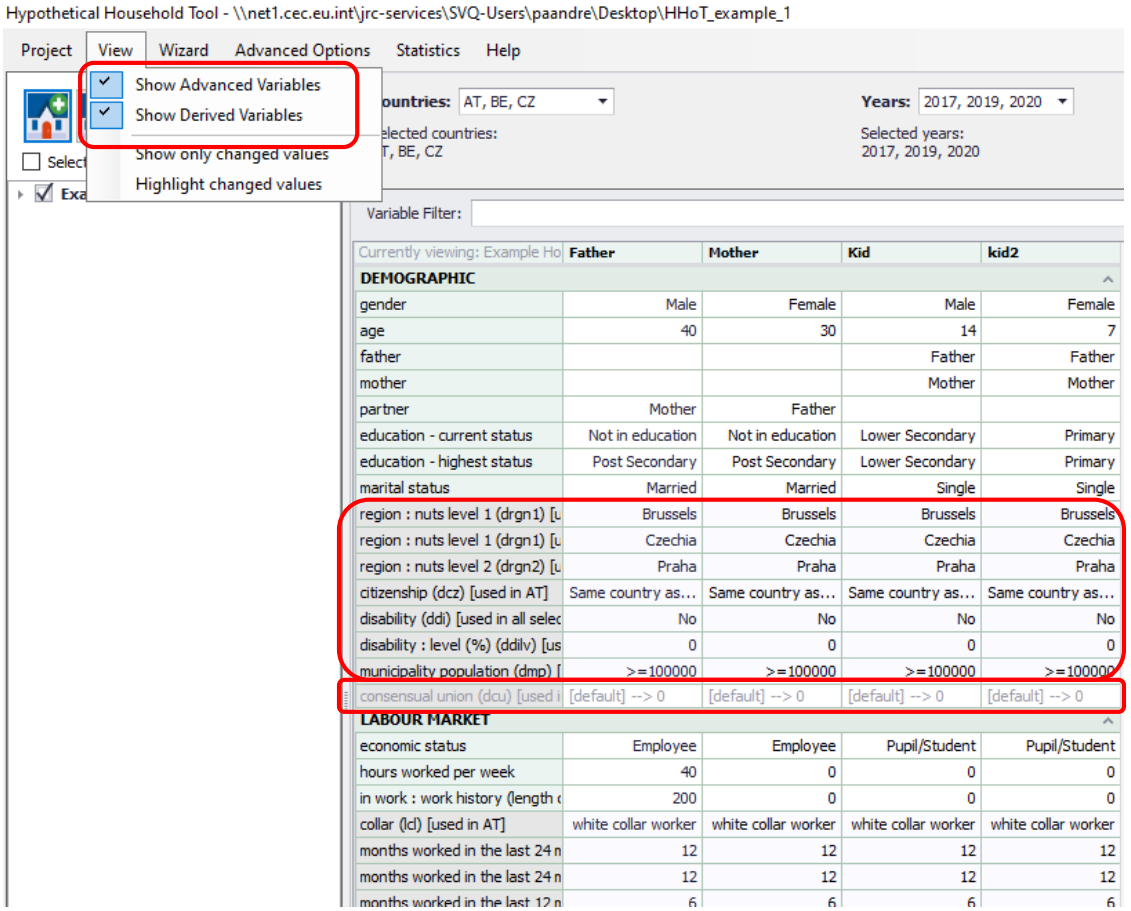


- Use of reference values.
- The EU-silc average employment income are provided in the reference table.
- Advance option→ manage settings→ manage reference table
- Also range.

Other types of variables

- **Connection variables**: relationships between household members (defining parents and partners).
- **Categorical variables**: group or nominal category (e.g. education or economic status) and is implemented with a combo-box editor which provides a set of characteristics. The editor allows you to choose only one of several choices.

Advanced/derived variables



- **Advanced variables**: additional characteristics.
- **Derived variables:** value depends on another variable.
- view→show advanced/derived variable
- options → managed settings → manage advanced/derived variables

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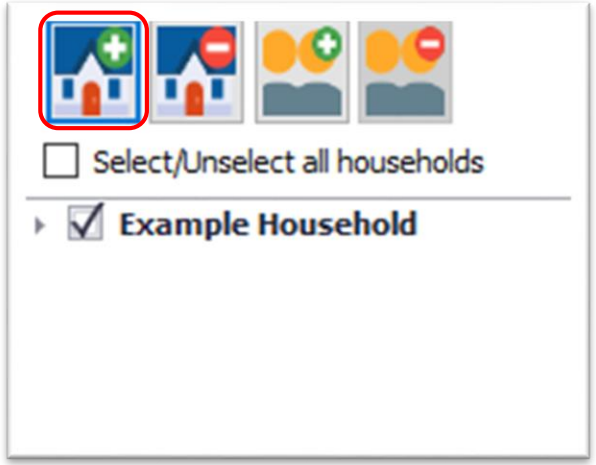
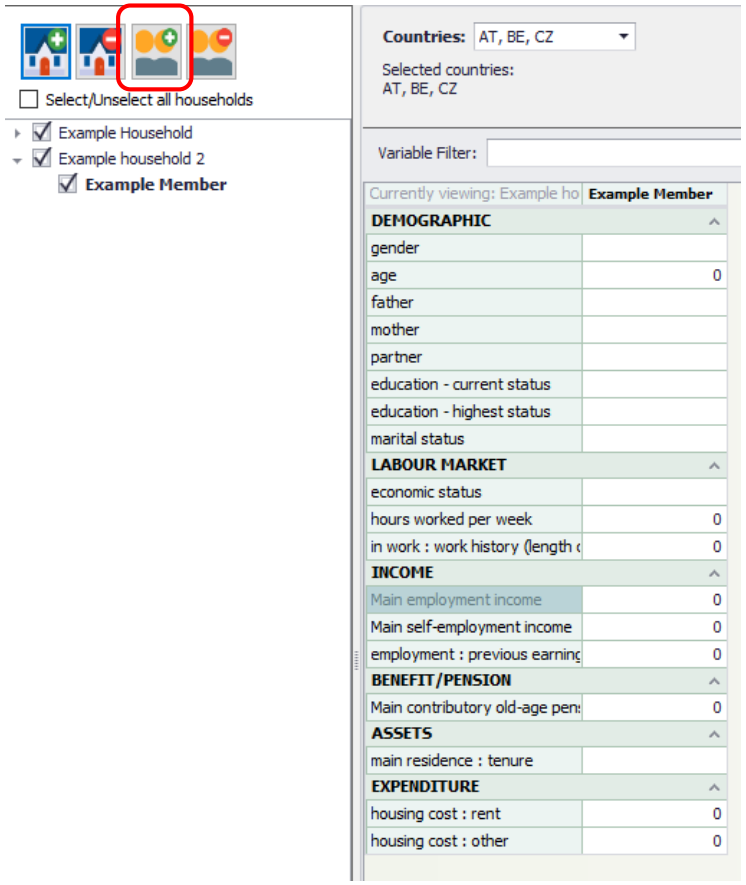
Adding/deleting a household type



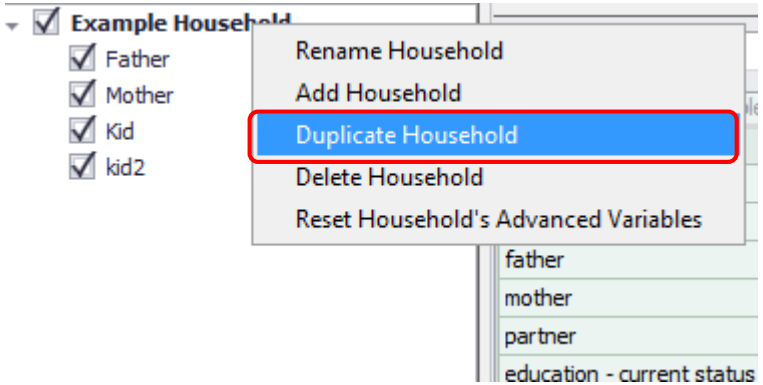
- New types of households can be created

Adding household member



- ‘Add Person to Household’ button.
- The user can modify the name of each household member by double left-clicking

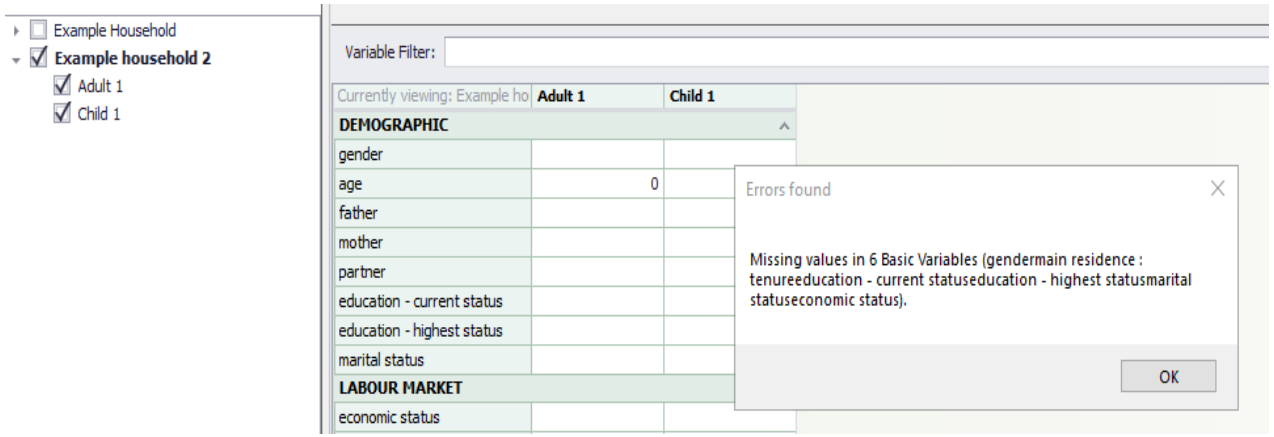
Duplicating a household type



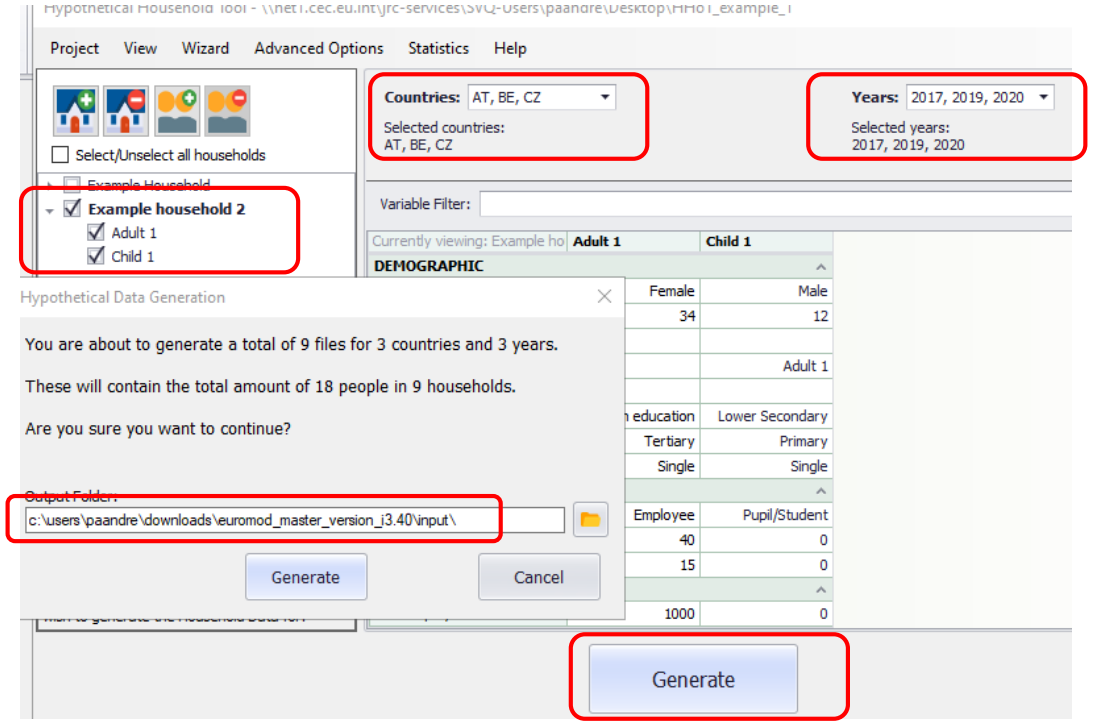
- A new household can be also be created by duplicating an existing one

New household

- Some basic characteristics missing!

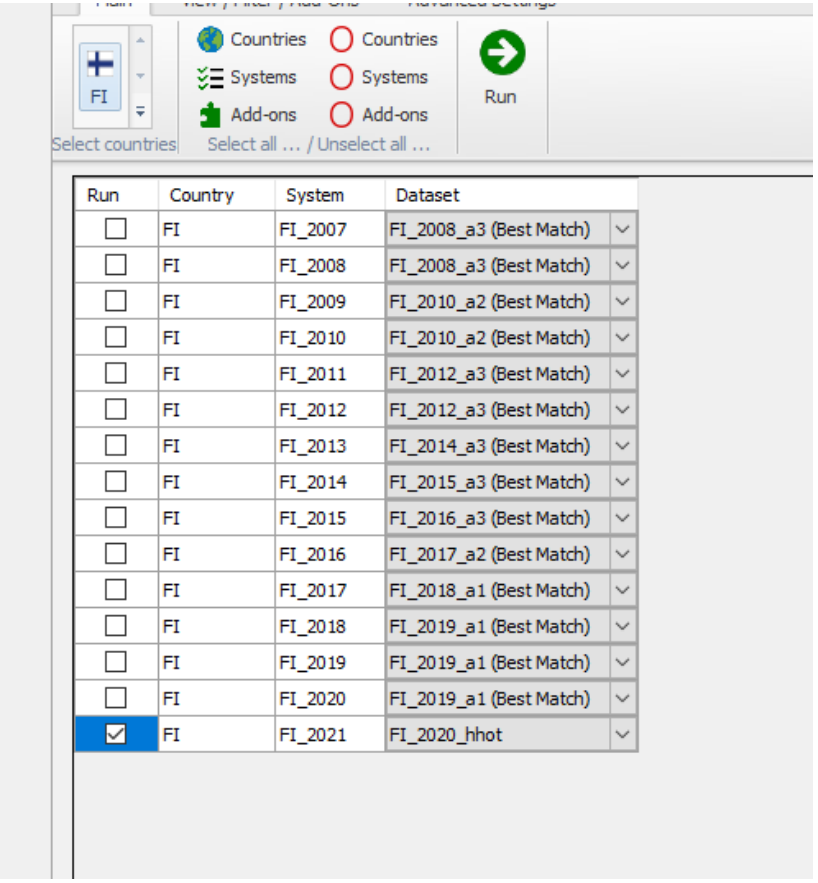


Generate data



- You can select for which household types (only household 2), individuals, countries and years the data to be generated.
- By defaults, data is stored in the EUROMOD input data folder of the EUROMOD Project you started HHoT from.

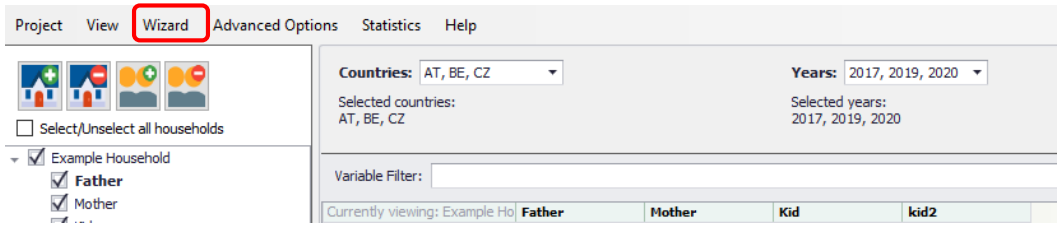
Running EUROMOD with HHoT data



Run	Country	System	Dataset
☐	FI	FI_2007	FI_2008_a3 (Best Match)
☐	FI	FI_2008	FI_2008_a3 (Best Match)
☐	FI	FI_2009	FI_2010_a2 (Best Match)
☐	FI	FI_2010	FI_2010_a2 (Best Match)
☐	FI	FI_2011	FI_2012_a3 (Best Match)
☐	FI	FI_2012	FI_2012_a3 (Best Match)
☐	FI	FI_2013	FI_2014_a3 (Best Match)
☐	FI	FI_2014	FI_2015_a3 (Best Match)
☐	FI	FI_2015	FI_2016_a3 (Best Match)
☐	FI	FI_2016	FI_2017_a2 (Best Match)
☐	FI	FI_2017	FI_2018_a1 (Best Match)
☐	FI	FI_2018	FI_2019_a1 (Best Match)
☐	FI	FI_2019	FI_2019_a1 (Best Match)
☐	FI	FI_2020	FI_2019_a1 (Best Match)
☑	FI	FI_2021	FI_2020_hhot

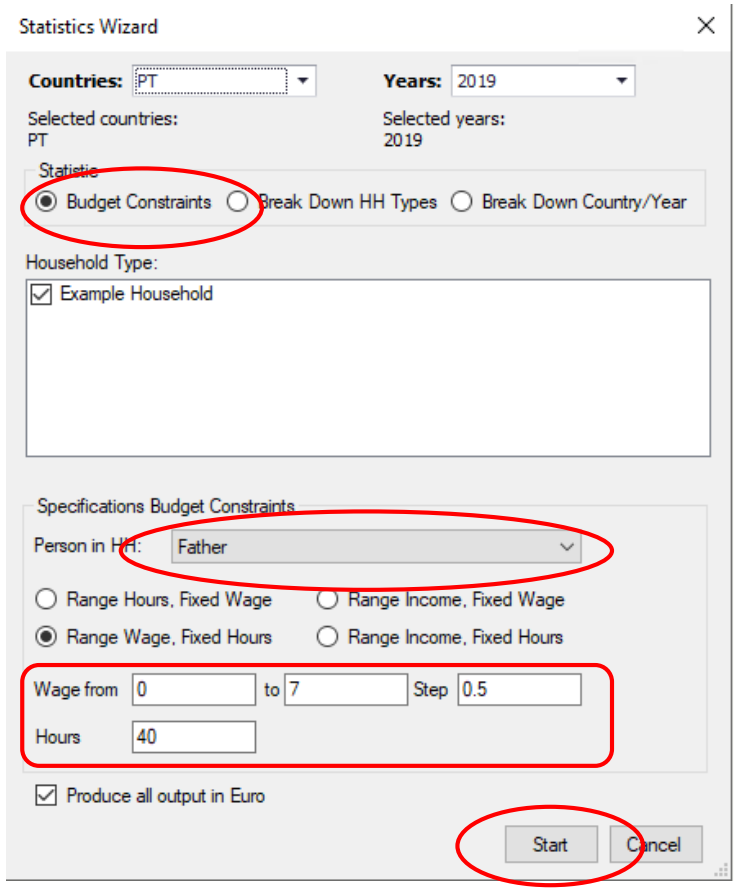
- HHoT data is generated with the name cc_yyyy_hhot.
- Each system since 2009 in EUROMOD has been tested and can be run with HHoT data for that year
- Selection possible in the run dialog

HHoT Statistics Wizard



- Statistics Wizard to create graphs and tables.
- The wizard uses the specified households, generates one or more HHoT input datasets,
- runs EUROMOD and creates graphs.

1) The ‘Budget Constraints’ Report



- budget constraints:
  - varying hours, wage fixed
  - Varying wage, hours fixed
  - Varying monthly earnings, fixed wage
  - Varying monthly earnings, fixed hours

1) The ‘Budget Constraints’ Report

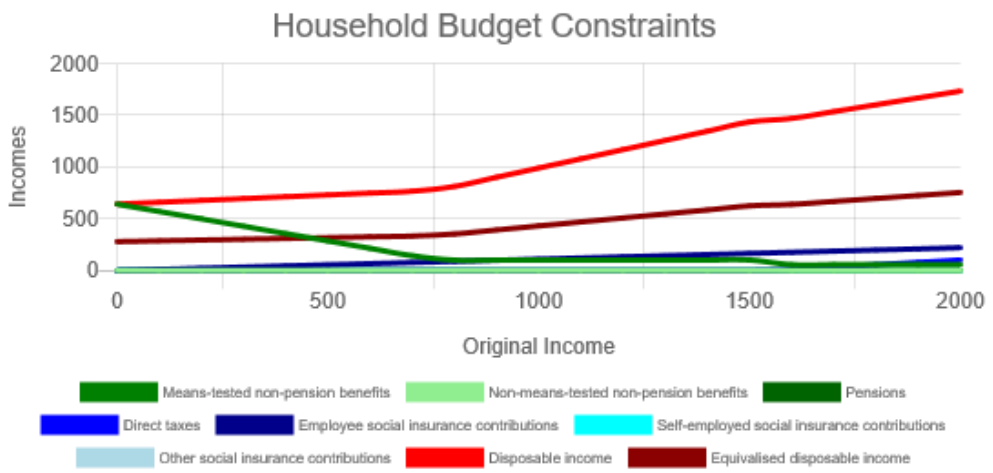
EUROMOD Hypothetical Households

Budget Constraints

Example Household, PT_2019

Household Budget Constraints, Example Household

PT_2019



- Disposable income for increasing original income (yem, horizontal line)
- Components of disposable income shown
- The graph and underline data can be exported in Excel clicking on the floppy disk.

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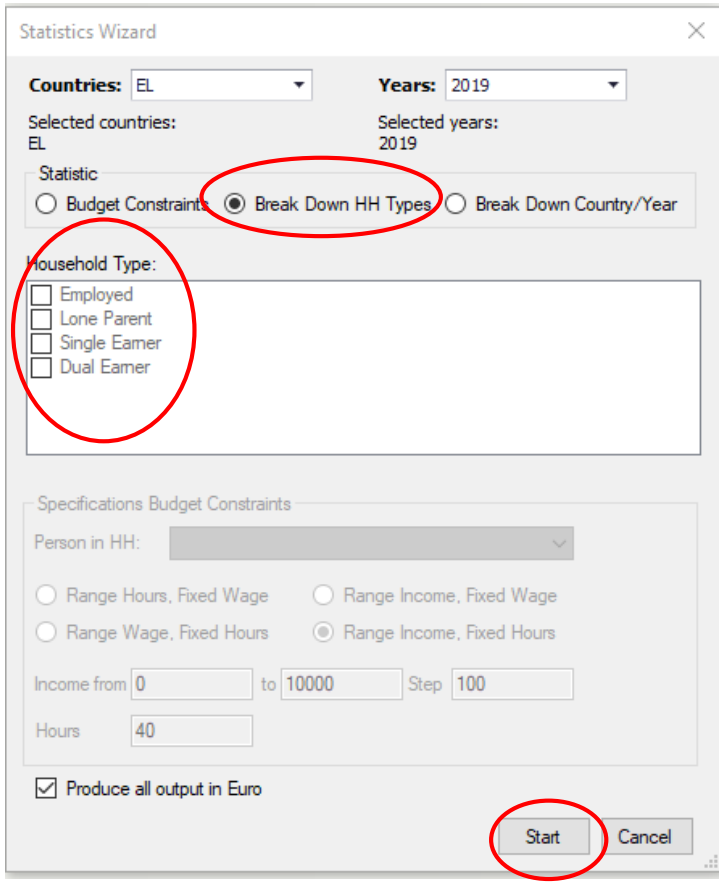
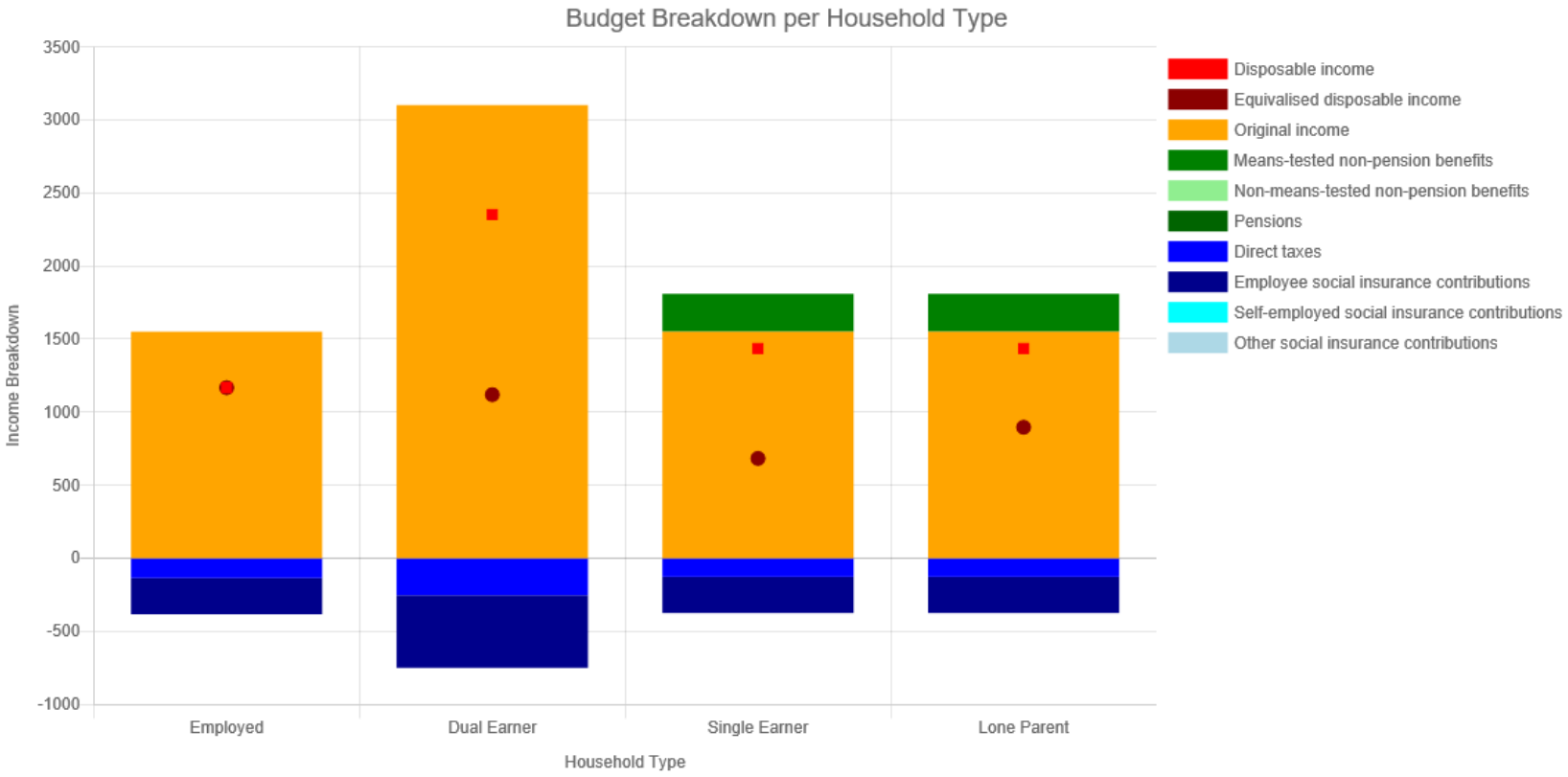
2)The ‘Breakdown by Household Types’ report



- Option 2: different type of Households budget as created in HHoT.

2)The ‘Breakdown by Household Types’ report

Budget Breakdown per Household Type



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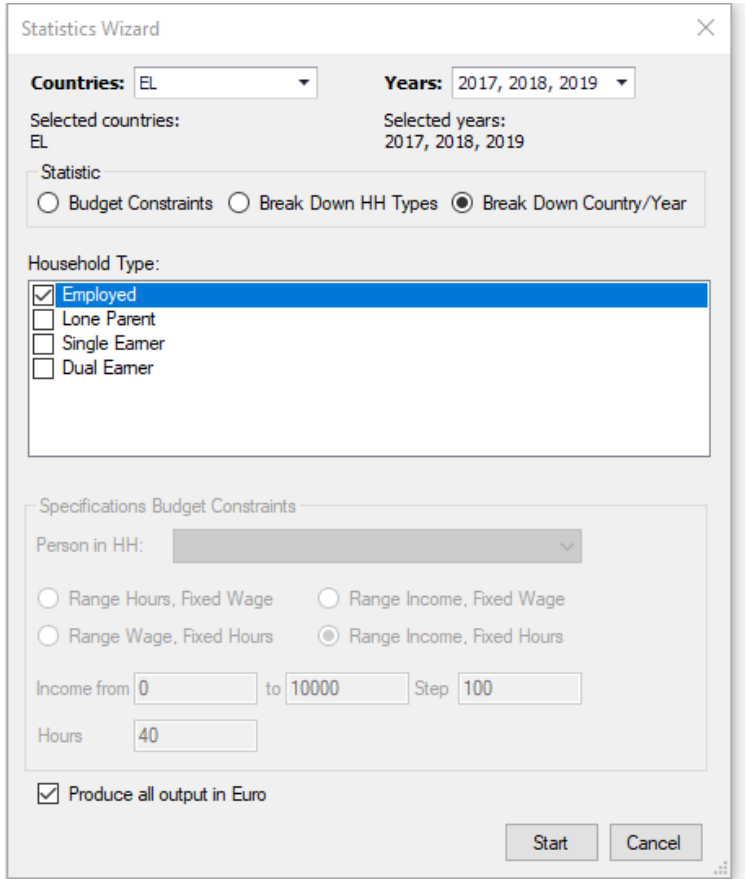
3) The ‘Breakdown by Country/Year’ report

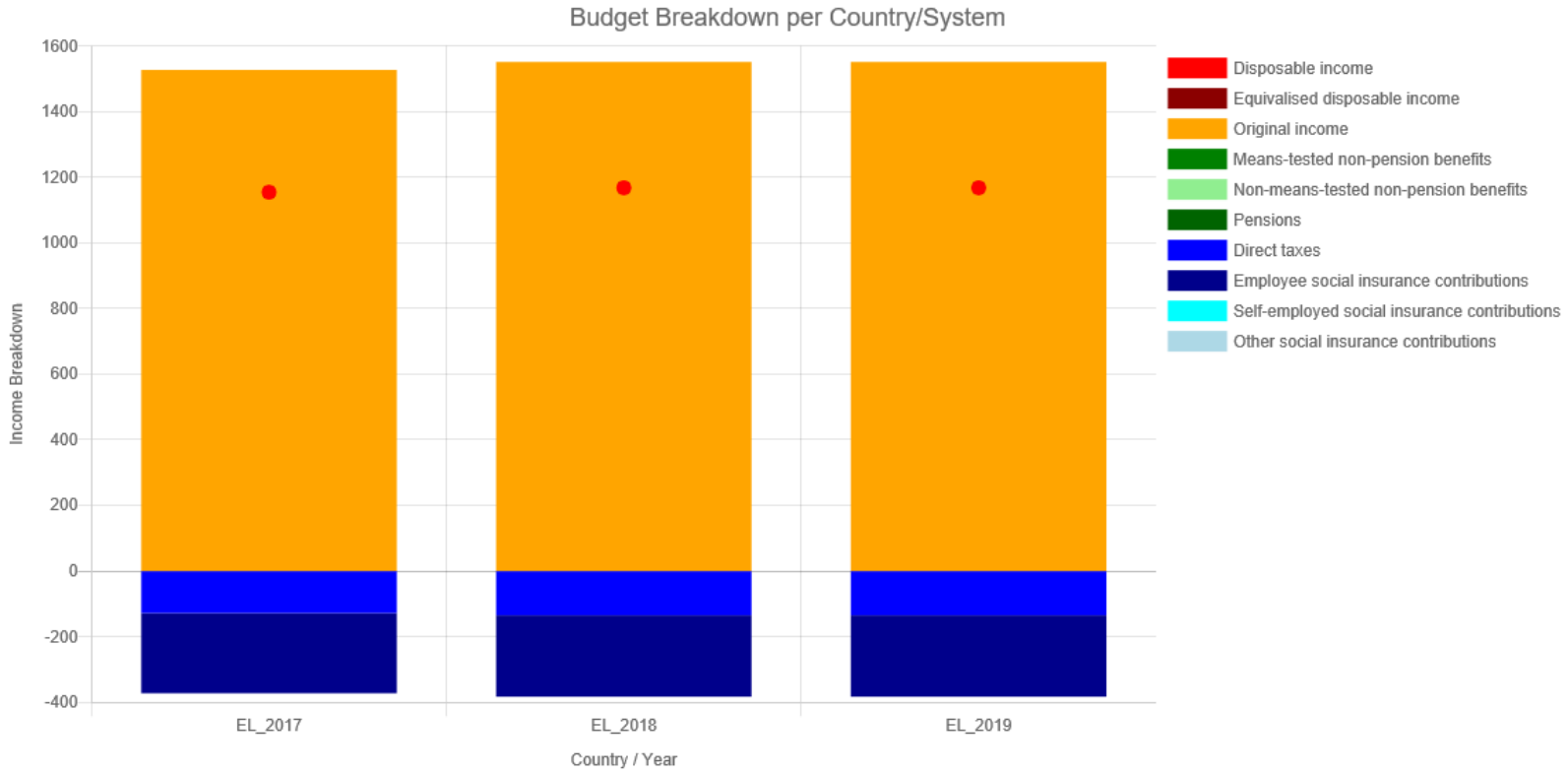


- Option 3: break down by country (this case only EL) and year (2017, 2018, 2019).

Breakdown by Country/Year

Budget Breakdown per Country/System

Employed



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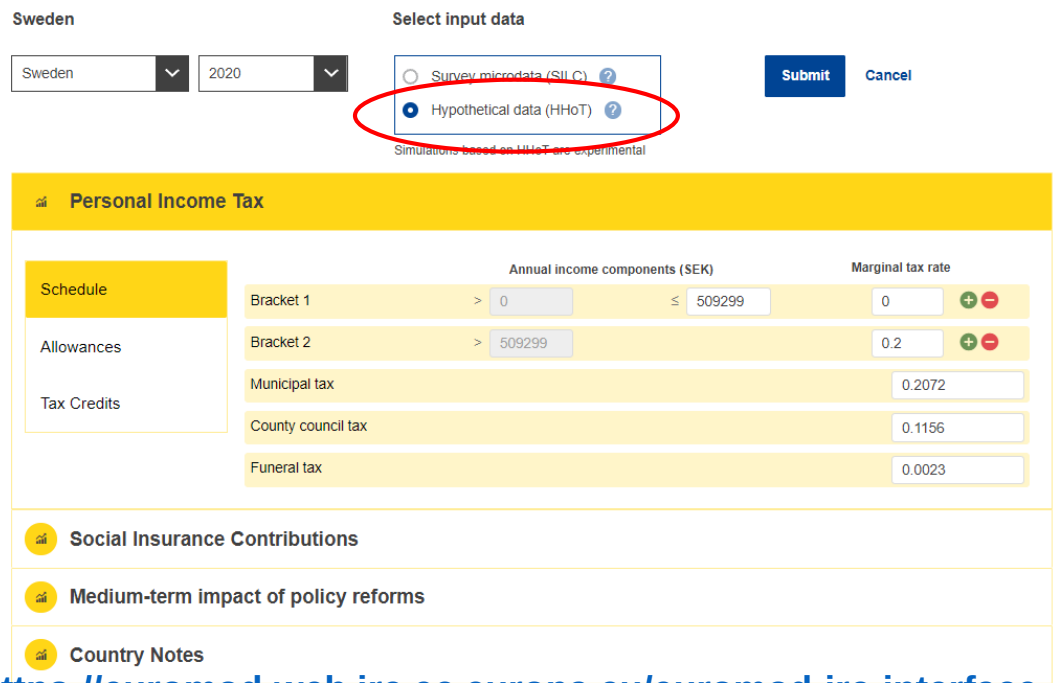
EUROMOD-HHoT available on the web-interface



https://euromod-web.jrc.ec.europa.eu/euromod-jrc-interface

- Simplified online interface of EUROMOD that allows to run parametrical simulations on PIT and SIC reforms for all EU countries.
- Simulations can be now also run on a set of hypothetical households produced with HHoT.

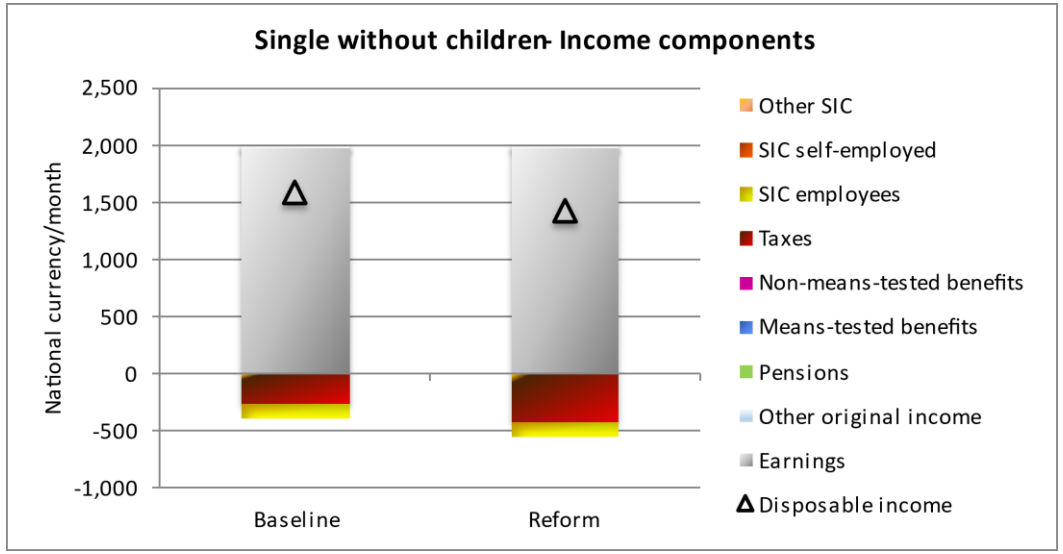
EUROMOD-HHoT available on the web-interface

Main characteristics of the hypothetical households*				
Household composition	Adult 1	Adult 2	Child 1	Child 2
Single without children (1)	X			
One-earner couple without children (2)	X	X		
Two-earner couple without children (3)	X	X		
Single with two children (4)	X		X	X
One-earner couple with two children (5)	X	X	X	X
Two-earner couple with two children (6)	X	X	X	X
Main characteristics of household members	Adult 1	Adult 2	Child 1	Child 2
Gender	Male	Female	Female	Male
Age	40	40	13	7
Education - current status	Not in education	Not in education	Lower secondary	Primary
Education - highest status	Upper secondary	Upper secondary	Primary	n/a
Marital status	Single (1 & 4) / Married (rest)	Married	Single	Single
Salary (only source of income)	100% of EU-SILC average wage	150% of EU-SILC average wage (3 & 6) / 0 (2 & 5)	0	0
Main residence	Rented	Rented	Rented	Rented

- Set of households is fixed for the moment.

European Commission

JRC EUROMOD-HHoT on the EUROMOD-JRC Interface



- Output is excel tables and graphs.
- Budget constrains, tax-wedges, marginal tax rates.
- In the future more flexibility.

Keep in touch

https://euromod-web.jrc.ec.europa.eu/

https://euromod-web.jrc.ec.europa.eu/news-and-events/newsletters

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Thank you

European Commission