



# EUROMOD: the EU-wide fiscal microsimulation model

Francesco Figari

University of Insubria and ISER - University of Essex

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# Microsimulation

- Microsimulation is a general term for modelling the behaviour and interactions of micro units (persons, households, firms etc)
- Microsimulation model is a set of rules operating on a representative sample of micro units
- Given the available information, microsimulation allows one to build a system that imitates the reality
- Microsimulation models provide customised data for analysis
- Many possible types of issue and micro-unit:
  - traffic flows, water supply...
- Here, focus on income and households (persons)



# Tax-benefit models

- Deal with household income, (re-)calculating income components, i.e. taxes and benefits
- To analyse the effects of tax-benefit reforms on income, welfare and behaviour of individuals
- Typical outcome of a (static) MSM:
  - budgetary effects
  - income distributions (poverty and inequality indicators)
  - gainers and losers
  - indicators of work incentives (RRs, METRs) and budget constraints
- Tax-benefit calculations underlie most dynamic or behavioural microsimulation models
  - e.g. generate budget constraints for labour supply (or other behavioural) modelling



# Microdata versus family type calculations

- Microsimulation models generally are based on sample surveys, which provide detailed information about individual and family characteristics, labor force status, housing status, earnings.
  - It is also common to analyze tax-benefit effects using a range of representative households (e.g. OECD Model family calculations)
  - Atkinson and Sutherland (1983) found that some 4% of actual families were covered by the hypothetical family model used by the Department of Health and Social Security
  - This concern is even more relevant for some of the theoretical simulation models used to investigate the effects of government policy in a complex intertemporal setting.



# Added value to survey/register microdata

- Information which is otherwise not (publicly) available
  - e.g. tax deductions, benefit eligibility, net/gross values
- Indicators which only exist as output from a MSM
  - e.g. METRs, RRs, budget constraint charts, child contingent payments, net social benefits
- More up-to-date results (as data collection and release takes time)
- Results under alternative scenarios/assumptions
  - policy changes (reforms or illustrative changes)
  - changes in personal/household characteristics



# EUROMOD – a model

- Multi-country tax-benefit MSM for the EU countries: unique
- It was built because of difficulties in making national model calculations comparable
- National models exist in many of the countries covered
- A tool for comparative multi-country research and policy analysis: consistent results



# Introduction

- Typical features but unique for its multi-country dimension:
  - designed for comparative analysis of the effects of policies on household income
  - harmonised data and simulations
  - achieved through maximising user choice and model flexibility
  - Tax-benefit modelling language: universal
  - Library of policies
  
- Consistent results across countries allow:
  - Comparative analysis
  - EU-level outputs
  - Implications of common changes or changes with common objectives
  - Policy learning across countries



# Policies simulated in EUROMOD

- Income taxes
- Employee, self-employed and employer Social Insurance Contributions
- Benefits that depend on current income and observed characteristics
- Plus unemployment benefits, with assumptions
- Remaining benefits (e.g. contributory pensions, disability benefits) taken from input data and updated to policy year where necessary
- (Selected countries): Indirect taxes, non cash incomes (imputed rent, public education, public health and child care services)
- Benefit non take-up and tax evasion are considered in some countries





# What can EUROMOD do?

- Simulate previous, current, future and “potential” tax-benefit rules
  - Distributive analysis
  - Budgetary effects
  - Indicators of work incentives
- Complex policy reforms (e.g. revenue-neutral)
- Policy swapping
- Counterfactual (“what if”) scenarios (e.g. stress test)
- EU-wide policy reforms
- Legal taxes/benefits: estimate evasion and non-take-up



# EUROMOD – a software platform

- A programming language specific to (static) tax-benefit calculations
- ... yet generic to accommodate different countries
- Again, unique
- Typically much more flexible than national models
  - Flexibility vs complexity
- A framework for building new country models: a short cut
  - Library of tax-benefit routines (i.e. a combination of EM functions)
  - South-Africa, Serbia, Australia (+ Turkey, Russia)



# EUROMOD: work in progress

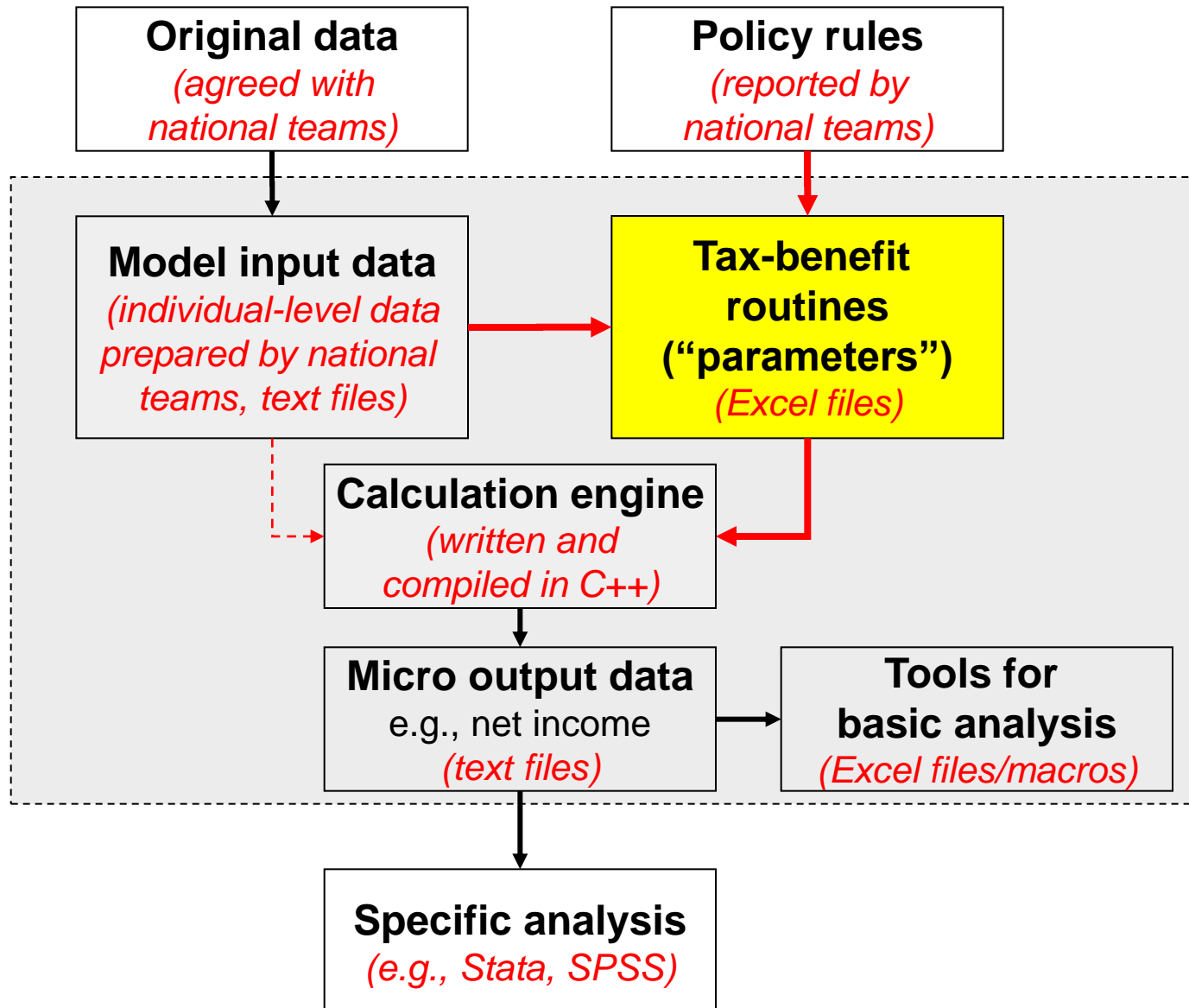
- Continuously being developed and improved
- EUROMOD *update* (2009-2012, 2012-2014) project:
  - funded by DG-EMPL
  - extend EUROMOD to EU27
  - re-base using (mainly) the EU-SILC (up to SILC 2010)
  - update policies to a very recent policy year (2005-2011)
  - establish a regular (annual) programme of updating (data and policies)
  - relies on a network of national experts in each country + core team of developers (researchers), led by U of Essex



# What is special about EUROMOD?

- Many countries in a common framework
- Highly flexible and transparent
  - Comparability
  - Easy to simulate major structural reforms
  - Short cut to model building (non-EU)
- Core EUROMOD: effects of policy changes on income (+ effects of other changes on impact of policy)
  - First round budgetary, distributional and incentive effects
  - Cross country comparisons, EU-level analysis, “policy swaps”
- Up to the model user to (e.g.)
  - Link to labour supply (or other behavioural) or macro models
  - Extend policy scope (input data issues)
  - Re-weight or adjust data in other ways
  - Make adjustments for non take up or tax evasion
  - Build proper extensions and linkages (EM “talks” to Stata)

# EUROMOD structure





# EUROMOD input database

- Input databases contain information on
  - household demographic
  - labour market characteristics
  - gross market income
  - all available tax and benefit instruments
    - those not simulated by EUROMOD (e.g. pensions) due to lack of information (e.g. on work histories)
    - those also simulated by EUROMOD – for comparison if needed
  - grossing weights
- Observations at the individual level



# Tax-benefit routines (“parameters”)

- Stored in Excel
- One file for each country (e.g. Belgium.xls)
  - All policy years for that country
  - General settings: available input datasets, currency etc
  - Dataset adjustments (e.g. uprating of monetary variables)
  - Order of policy simulations (“policy spine”)
  - All policy details:
    - Definition of assessment units (“tax units”)
    - Definition of income concepts (“income lists”)
    - Rules of calculations (using EUROMOD functions) etc
  - Output definition
- One common file (variables.xls) for variable definitions

# EUROMOD

Live presentation



# EUROMOD folders/files

The screenshot shows a Windows Explorer window with the following details:

- Address Bar:** << 2011-11\_User\_course >> EUROMODFiles\_F4.21+ >
- Search Bar:** Search EUROMODFiles\_F4.21+
- Menu Bar:** File, Edit, View, Tools, Help
- Toolbar:** Organize, Burn, New folder
- Left Pane (Favorites):** Desktop, \_TODO, \_EMUP, 2011-11\_User\_course, EUROMOD, PROJECTS, PUBLICATIONS, EU-SILC data, REM\_Yr3, \$EuroModSFTP, Downloads, Recent Places
- Main Pane (Table):**

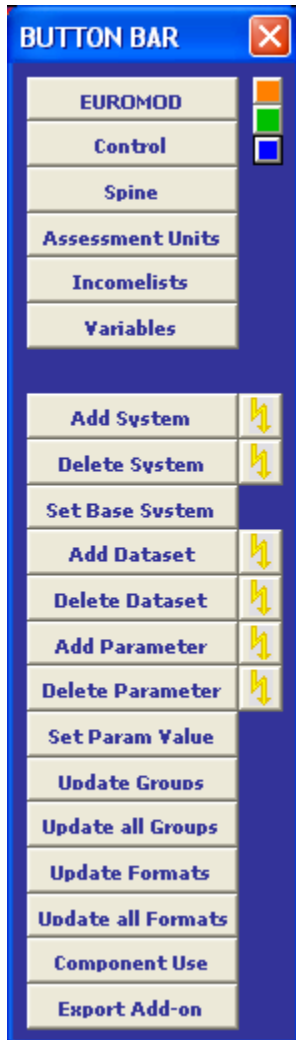
Name	Date modified	Type	Size
Executable	21/11/2011 10:07	File folder	
Input	29/11/2011 10:46	File folder	
Manuals	21/11/2011 10:07	File folder	
Output	29/11/2011 10:46	File folder	
Param	29/11/2011 10:42	File folder	
Tools	29/11/2011 10:43	File folder	
EUROMOD.xls	29/11/2011 10:01	Microsoft Office E...	

**Status Bar:** 7 items Offline status: Online Offline availability: Not available

# Operating system



# EUROMOD button bar



- **Navigation buttons:** they serve easier navigation, i.e. allow to jump to the named sheet
- **Implementation buttons:** they provide all functionalities necessary for implementing (basic or reform) tax-benefit systems, like adding and adapting of systems, policies, datasets, functions and parameters
  - Frequently accompanied by the **flash buttons** which serve the same purpose as the button right of them, they just do it “quickly”.
- **Other buttons:** with miscellaneous tasks, e.g. formatting or providing convenient information or views.

# Control

Estonia [Compatibility Mode] - Microsoft Excel

	A	B	C	D	F	G	H	I
1	ESTONIA		EE_2005	EE_2006	EE_2007	EE_2008		
2			DEF: DATASETS AND GENERAL SETTINGS (CONTROL)					
3			<b>func_GeneralSettings</b>					
4		Country	ee	ee	ee	ee	country to be simulated	
5		currency_output	national	national	national	national	currency in which output is calculated	
6		currency_param	national	national	national	national	currency of parameter values	
7		decsign_param	n/a	n/a	n/a	n/a	decimal sign used for parameter values	
8		exch_rate_euro_to_nat	15.6466	15.6466	15.6466	15.6466	exchange rate from euro to national currency	
9		HeadDefInc	ils_origy	ils_origy	ils_origy	ils_origy		
10			<b>func_Dataset</b>				<b>Household Budget Survey (Leibniz)</b>	
11		datayear_col	EE_2005_a3.txt	EE_2005_a3.txt	EE_2005_a3.txt	EE_2005_a3.txt	year of data collection	
12		datayear_inc	2005	2005	2005	2005	year of income data	
13		datapath	n/a	n/a	n/a	n/a	path to dataset (defined in run tool)	
14		currency_db	national	national	national	national	currency of dataset	
15		baseline	yes	yes	yes	yes		
16		decsign_data	.	.	.	.	decimal sign used for parameter values	
17		use_default	HBS_defaults	HBS_defaults	HBS_defaults	HBS_defaults	if a variable is not found, use a default value	
18		start_hhid	0	0	0	0	start calculations with this household	
19		nLoops	1	1	1	1	number of times to run through the model	
20		uprate	n/a	upr_ee_2005	upr_ee_2005	upr_ee_2005	reference to function uprating monetary values	
21			<b>func_Dataset</b>				<b>Estonian version of SILC (Eesti)</b>	
22		datayear_col	EE_2006_b1.txt	EE_2006_b1.txt	EE_2006_b1.txt	EE_2006_b1.txt	year of data collection	
23		datayear_inc	2006	2006	2006	2006	year of income data	
24		datapath	2005	2005	2005	2005	path to dataset (defined in run tool)	
25		currency_db	n/a	n/a	n/a	n/a	currency of dataset	
26		baseline	national	national	national	national	system-dataset.com	
27		decsign_data	yes	yes	yes	yes	decimal sign used for parameter values	
28		use_default	.	.	.	.	if a variable is not found, use a default value	
29		start_hhid	SILC_defaults	SILC_defaults	SILC_defaults	SILC_defaults	start calculations with this household	
30		nLoops	0	0	0	0	number of times to run through the model	
31		uprate	1	1	1	1	reference to function uprating monetary values	

**Grouping used**

**General settings**

**Dataset 1**

**Dataset 2**

**Parameter names**

**Parameter values**



# Policies

Microsoft Excel - Estonia.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

	A	B	C	D/E	F	G	H	I	J	K	L	M
1		ESTONIA			EE_2005							
2					TAX: Income Tax (final liability)							
3			<b>func_ArithOp</b>	<b>on</b>	<b>Determine taxable business income</b>							
4		Control	formula		yse - tintaag_s - (tscse_s - tp	in case of non self-employed, coYSE* can be only positive and c						
5		Spine	lowlim_amount		0	negative outcome can be deduct from business income next ye						
6			output_var		ysetx_s	note that funded pension contribution (2%) cannot be deducte						
7		Taxunits	TAX_UNIT		individual_ee							
8			<b>func_ArithOp</b>	<b>on</b>	<b>Basic allowance</b>							
9		Incomelists	formula		\$IT_BasicAlw							
10			output_var		tinta_s							
11		EUROMOD	TAX_UNIT		individual_ee							
12			<b>func_Elig</b>	<b>on</b>	<b>Eligibility for pension allowance</b>							
13		Variables	elig_cond		{il_Pensions > 0}							
14			output_var		sin01_s							
15			TAX_UNIT		individual_ee							
16		Add Function	<b>func_ArithOp</b>	<b>on</b>	<b>Pension allowance</b>							
17		Delete Function	formula		\$IT_PensionAlw * sin01_s	co_sin01 - number of people receiving pensions in the tax unit						
18			uplim_il		il_Pensions	applied only to pension income						
19		Add Param	result_var		sin02_s	(retain for validation purposes)						
20		Delete Param	output_add_var		tinta_s							
21			TAX_UNIT		ITmarried_ee	individuals or married couples (children separately)						
22		Set Param Value	<b>func_ArithOp</b>	<b>on</b>	<b>Deductible expenses: housing and study loan interest, traini</b>							
23			formula		(il_IT_MaxDed_baseY * 0.5) <	absolute limit on deductions either 50% of taxable income or ..						
24			#1_amount		50000#y	.. 50,000 per person						
25		Copy Function	uplim_il		il_IT_Expenses	limit to the amount of actual expenses (housing loan interests,						
26			result_var		sin03_s	(retain for validation purposes)						
27		Copy Policy	output_add_var		tinta_s							
28			TAX_UNIT		ITmarried_ee							
29		Update Groups	<b>func_ArithOp</b>	<b>on</b>	<b>Deductible expenses: pension contributions to the 3rd pillar</b>							
30			formula		il_IT_MaxDed_baseY * 0.15	absolute limit on deductions either 15% of taxable income						
31			uplim_var		xpp	limit to the amount of actual expenses						
32			result_var		sin04_s	(retain for validation purposes)						
33			output_add_var		tinta_s							
34			TAX_UNIT		ITmarried_ee							
35			<b>func_Elig</b>	<b>on</b>	<b>Considering only adults in the family ...</b>							

Navigation: BEN\_CC\_EE / BEN\_CC\_Large\_EE / ERSIC\_EE / EESIC\_EE / SESIC\_EE / IT\_AgrAlw\_EE / IT\_WH\_EE / IT\_EE / BEN\_SA\_EE

# Constants

ESTONIA EE\_2005

Define Constants

func_DefConst	on		
Const1_Name	\$PensionAgeMale		
Const1_Amount	63		official pension age (males) --> used in p
Const2_Name	\$PensionAgeFemale		
Const2_Amount	60		official pension age (females) --> used in
Const3_Name	\$CB_Base_m		
Const3_Amount	150#m		base amount for child benefits (monthly)
Const4_Name	\$CB_Base_q		
Const4_Amount	150#q		base amount for child benefits (quarterly)
Const5_Name	\$CB_Base_y		
Const5_Amount	150#y		base amount for child benefits (annual) -
Const6_Name	\$CC_Base		
Const6_Amount	1200#m		base amount for childcare benefits --> u
Const7_Name	\$SIC_MinBase		
Const7_Amount	700#m		SIC minimum base --> used in polERSIC
Const8_Name	\$SIC_RatePension1		
Const8_Amount	0.2		SIC rate for the pension contributions (th
Const9_Name	\$SIC_RatePension2		
Const9_Amount	0.02		SIC rate for the pension contributions (th
Const10_Name	\$SIC_RatePension1to2		
Const10_Amount	0.04		SIC rate for the pension contributions (tr
Const11_Name	\$SIC_RateHealth		
Const11_Amount	0.13		SIC rate for the health contributions -->
Const12_Name	\$IT_BasicAlw		
Const12_Amount	20400#y		amount of basic allowance for income tax
Const13_Name	\$IT_PensionAlw		
Const13_Amount	36000#y		amount of pension allowance for income
Const14_Name	\$IT_Rate		
Const14_Amount	0.24		income tax rate --> used in polIT_WH ar

sys\_end\_par

Control EE Spine EE Uprate EE ConstDef\_EE IDef\_EE TUDef\_EE BEN\_UI\_EE BEN\_UA\_EE BEN\_CB\_EE BEN\_CB\_Large\_EE BEN\_CB\_School\_EE

# Income lists

Microsoft Excel - Estonia.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

	A	B	C	D	E	F	G	H	I	J	K	L
1		ESTONIA				EE_2005						
2						DEFINITION OF INCOME CONCEPTS						
3			<b>func_DefIL</b>	<b>on</b>								
4		Control	name	il_ERSIC_Benefits								
5		Spine	+	bcc00_s								
6		Taxunits	+	bcc0g_s								
7		Incomelists	+	bmact								
8			<b>func_DefIL</b>	<b>on</b>								
9			name	il_Pensions								
13			<b>func_DefIL</b>	<b>on</b>								
14		EUROMOD	name	il_SESIC_baseY								
17		Variables	<b>func_DefIL</b>	<b>on</b>								
18			name	il_IT_WH_baseY_Alw								
19			-	tscee_s								
20		Add Function	+	pdi								
21		Delete Function	+	bmact								
22			+	bunct								
23			+	yem								
24		Add Param	-	xmp								
25		Delete Param	+	poa00								
26			+	psu								
27		Set Param Value	+	yptmptx								
28			<b>func_DefIL</b>	<b>on</b>								
29			name	il_IT_WH_baseY_Rate								
33		Copy Function	<b>func_DefIL</b>	<b>on</b>								
34		Copy Policy	name	il_IT_MaxDed_baseY								
50			<b>func_DefIL</b>	<b>on</b>								
51			name	il_IT_Expenses								
54		Matrix View	<b>func_DefIL</b>	<b>on</b>								
55		Update Groups	name	il_IT_baseY								
71			<b>func_DefIL</b>	<b>on</b>								
72			name	il_SA_HousingCosts								
74			<b>func_DefIL</b>	<b>on</b>								
75			name	il_SA_MeanTest								

Control\_EE / Spine\_EE / TUDef\_EE / ILDef\_EE / Uprate\_EE / ConstDef\_EE / output\_std\_EE / output\_ext\_std\_EE / OUT



# Assessment (tax) units

Microsoft Excel - Estonia.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

	A	B	C	DE	F	G	H	I	J	K	L
1		ESTONIA				EE_2005					
2						DEFINITION OF ASSESSMENT UNITS					
3			<b>func_DefTU</b>		<b>on</b>						
4		Control	Name		hh_oecd_co						
5		Spine	Type		HH						
6		Taxunits	DepChildCond		{dag<14}						
7			<b>func_DefTU</b>		<b>on</b>						
8		Incomelists	Name		individual_ee						
10			<b>func_DefTU</b>		<b>on</b>						
11			Name		household_ee						
13		EUROMOD	<b>func_DefTU</b>		<b>on</b>						
14		Variables	Name		CBfamily_ee						
15			members		Partner & OwnDepChild & LooseDepChild						
16			DepChildCond		{dag<=16}   ({dag<=19} & {dec>=2} & {dec<=4})						
17		Add Function	AssignDepChOfDependents		yes						
18		Delete Function	Type		SUBGROUP						
19			<b>func_DefTU</b>		<b>on</b>						
20			Name		CBbirth_ee						
24		Add Param	<b>func_DefTU</b>		<b>on</b>						
25		Delete Param	Name		ERSICmater_ee						
29			<b>func_DefTU</b>		<b>on</b>						
30		Set Param Value	Name		ITmarried_ee						
34			<b>func_DefTU</b>		<b>on</b>						
35		Copy Function	Name		ITfamily_ee						
41		Copy Policy									
42											
43											
44		Update Groups									
45											
46											
47											
48											
49											

Control\_EE / Spine\_EE / TUDef\_EE / ILDef\_EE / Uprate\_EE / ConstDef\_EE / output\_std\_EE / output\_ext\_std\_EE / OUT

# Up-rating factors

Estonia.xls [Compatibility Mode] - Microsoft Excel

ESTONIA		EE_2006	EE_2007	EE_2008	EE_2009	
<b>func_SetDefault</b>	3	on	on	on	off	
name	4	HBS_defaults	HBS_defaults	HBS_defaults	n/a	
<b>func_SetDefault</b>	16	on	on	on	on	
name	17	SILC_defaults	SILC_defaults	SILC_defaults	SILC_defaults	
<b>func_SetDefault</b>	36	on	on	on	on	
name	37	training_defaults	training_defaults	training_defaults	training_defaults	
amrar	38	50	50	50	50	area of main residence (50
<b>func_Uprate</b>	39	on	on	on	off	
name	40	upr_ee_2005	upr_ee_2005	upr_ee_2005	upr_ee_2005	
def_factor	41	1.044	1.112904	1.228646016	1.22741737	CPI (applies e.g. to bsals, I
bchab	42	1	1	1	1	No change in benefits from
bchba	43	1.481481481	1.481481481	1.481481481	1.481481481	Increased from 3750/3000
bchlp	44	1	1	1	1	No change in lone parent b
bmaab	45	1	1	1	1	Changes for benefits from
buntr	46	1	1	1	1	No change in training bene
bunnc	47	1	2.5	2.5	2.5	since 2010 60 EEK per day
pdi	48	1.17674113	1.379106439	1.70499343	1.837056505	increased from 400 to 100
poa00	49	1.183346364	1.384284597	1.702892885	1.843236904	Average pension increase i
poaab	50	1	1	1	1	Average pension increase i
psu	51	1.172859451	1.369951535	1.693053312	1.831987076	Changes for benefits from
tpr	52	1.022892301	1.092150482	1.492946953	1.491938415	Average pension increase i
xhcmomi	53	1.162162162	1.432432432	1.567567568	1.054054054	Statistics Estonia database
xhcrt	54	1.141509434	1.264150943	1.08490566	0.783018868	Bank of Estonia: Househol
xhcot	55	1.103593684	1.264613227	1.464364365	1.479256575	of 30 June - growth rate o
yyit	56	0.857154315	0.656679415	0.656679415	0.656679415	average rent, Statistics Es
yyiot	57	3.726521636	1.739684613	1.739684613	1.739684613	in a two-living-room apart
						growth of housing costs in
						SILC data, average per rec
						SILC data, average per rec

Ready | Control\_ee | Spine\_ee | **Uprate\_ee** | ConstDef\_ee | ILDef\_ee | TUDef\_ee | yse\_ee | yem\_ee | bch00\_ee | bchlg\_ee | bched\_ee | bchl | 115%

# Variable definitions

Microsoft Excel - Variables.xls

File Edit View Insert Format Tools Data Window Help

H50    Type a question for help

	A	B	C	D	E	F	G	H
1	VARIABLES	Variable Name	Model Generated	Monetary	Default Variable	Default Value	Automatic Label	
2								A7
3	➔ EUROMOD	afc	0	1	n/a	0	assets : financial capital	-
4		aldagariv	0	0	n/a	0	assets : land : agriculture : area in m2 : imputed value	-
5		aldar	0	0	n/a	0	assets : land : area in m2	-
6		aldnaar	0	0	n/a	0	assets : land : non agricultural : area in m2	-
7	Add Variable	amrar	0	0	n/a	50	assets : main residence : area in m2	-
8		amriv	0	1	n/a	0	assets : main residence : imputed value	-
9	Delete Variable	amrrm	0	0	n/a	0	assets : main residence : number of rooms	-
10		amrtv	0	0	n/a	0	assets : main residence : tenure	-
11	Change Variable	aobiv	0	1	n/a	0	assets : other building : imputed value	-
12	Variable Usage	aoc	0	1	n/a	0	assets : other capital	-
13		bac	0	1	n/a	0	benefit : accident/disease	-
14		bcc00_s	1	1	n/a	1E-13	benefit : child care : main/basic : simulated	-
15		bccct	0	1	n/a	0	benefit : child care : contributory	-
16		bccgl_s	1	1	n/a	1E-13	benefit : child care : large family : simulated	-
17		bcclt_s	1	1	n/a	1E-13	benefit : child care : long term : simulated	-
18		bccnc_s	1	1	n/a	1E-13	benefit : child care : non-contributory : simulated	-
19		bch	0	1	n/a	0	benefit : child	-
20		bch_s	1	1	n/a	1E-13	benefit : child : simulated	-
21		bch00	0	1	n/a	0	benefit : child : main/basic	-
22		bch00_s	1	1	n/a	0	benefit : child : main/basic : simulated	-
23		bchab	0	1	n/a	0	benefit : child : abroad	-
24		bchba	0	1	n/a	0	benefit : child : birth/adoption	-
25		bchba_s	1	1	n/a	1E-13	benefit : child : birth/adoption : simulated	-
26		bchdied_s	1	1	n/a	0	benefit : child : disability-invalidity : education : simulated	-
27		bched_s	1	1	n/a	0	benefit : child : education : simulated	-
28		bchlg_s	1	1	n/a	0	benefit : child : large family : simulated	-
29		bchlp	0	1	n/a	0	benefit : child : lone parent	-
30		bchlp00_s	1	1	n/a	0	benefit : child : lone parent : main/basic : simulated	-
31		bchmt_s	1	1	n/a	1E-13	benefit : child : means-tested : simulated	-
32		bchnm_s	1	1	n/a	1E-13	benefit : child : not means-tested : simulated	-
33		bchot	0	1	n/a	0	benefit : child : other	-
34		bchpl	0	1	n/a	0	benefit : child : parental leave	-
35		bchunlp	0	1	n/a	0	benefit : child : unemployment : lone parent	-
36		berchdi	0	1	n/a	0	benefit : caring : child : disability-invalidity	-
37		berchdi_s	1	1	n/a	0	benefit : caring : child : disability-invalidity : simulated	-
38		bersvcc	0	1	n/a	0	benefit : caring : severe disability : child care	-
39		bdi	0	1	n/a	0	benefit : disability-invalidity	-
40		bdica	0	1	n/a	0	benefit : disability-invalidity : receiving care (any type)	-
41		bdicc	0	1	n/a	0	benefit : disability-invalidity : child care	-
42		bed	0	1	n/a	0	benefit : education	-
43		hfa	0	1	n/a	0	benefit : family	-

Country-specific descriptions

# Variable naming convention

**Class 2 subgroups**  
(order must be followed)

**Class 2**  
**acronyms**

ACRONYMS	Type	Level	Acronym	Description	Categorical	Categories
<b>DEMOGRAPHIC</b>	<b>D</b>					
<b>Main</b>						
	AG	Age		0		
	CT	Country		1	1: AT	2: BE 3: DK
	CZ	Citizenship		1	1: This country	2: other EU 3: Other
	DI	Disability		1	0: no disability	1: low disability 2: medium disabil
	DT	Date Of Interview		0		
	EC	Education - Current Status		1	0: Not in Educati	1: Primary 2: Lower Second.
	EH	Education - Highest Status		1	0: Not completed	1: Primary 2: Lower Second.
	GN	Gender		1	0: Female	1: Male
	MS	Marital Status		1	1: Single	2: Married 3: Separated
	RG	Region		0		
	RS	Resident		0		
	WT	Weight		0		
<b>Status</b>						
	CS	Current Status		0		
	HS	Highest Status		0		
	ST	Status		0		
<b>Region</b>						
	N1	NUTS Level 1		0		
	N2	NUTS Level 2		0		
	N3	NUTS Level 3		0		
	RU	Rural		0		
	UR	Urban		0		
<b>Time/Date</b>						
<b>Other</b>						
<b>Numbers</b>						
<b>LABOUR MARKET</b>	<b>L</b>					
<b>Main</b>						
	ES	Economic Status		1	0 Pre-school	1 Farmer 2 Employer or
	FS	Firm size		1	10	2 1-4 3 5-9
	IN	Industry (NACE)		1	1 Agriculture	2 Industry 3 Services
	OC	Occupation (ISCO 1-Digit)		1	0 Armed force	1 Senior offici. 2 Professional
<b>Lab Mkt Status</b>						
	FT	Full time Worker		0		
	IW	In work		0		

**Class 1**  
**acronyms**

# Adding variables

**Add/Change Variable**

Type

Name

Monetary  Model generated

Defaults

Variable

Value

Description by country

be	-
cz	-
ee	-
el	-
hu	-
it	-
lt	-
pl	-
sl	-
si	-
es	-
uk	-

Close after run

**Generate variable name**

Variable name

Disposable Acronyms

- Level 'Main' (1): AG Age
- Level 'Main' (1): CT Country
- Level 'Main' (1): CZ Citizenship
- Level 'Main' (1): DI Disability
- Level 'Main' (1): DT Date Of Interview
- Level 'Main' (1): ED Education (in)
- Level 'Main' (1): EC Education - Current Status
- Level 'Main' (1): EH Education - Highest Status
- Level 'Main' (1): GN Gender
- Level 'Main' (1): MS Marital Status
- Level 'Main' (1): RG Region
- Level 'Main' (1): RS Resident
- Level 'Main' (1): WT Weight
- Level 'Main' (1): EY Education - Number of Years
- Level 'Main' (1): EW Education - When achieved Highest Status
- Level 'Main' (1): SU Sample Units
- Level 'Main' (1): QB Quarter of Birth
- Level 'Main' (1): HR Home responsible
- Level 'Status' (2): CS Current Status
- Level 'Status' (2): HS Highest Status
- Level 'Status' (2): ST Status
- Level 'Status' (2): CU Consensual Union

Level  Acro

# Implement a simple reform...

...to make the family support in Simpleland more generous

- Add system tool (i.e. to add SL\_reform system)
- Modify parameters in sben\_cb\_sl

	A	B	C	D/E	F	G	H
1		SIMPLELAND			SL_demo	SL_reform	
2					Child Benefit		
3			func_ArithOp	on		on	
4		Control	formula	nDepChildrenInTU*amount#1	nDepChildrenInTU*amount#1		
5		Spine	#1_amount	200#m	250#m		
6		Taxunits	output_var	bch_s	bch_s		
7		Incomelists	TAX_UNIT	sben_family_sl	sben_family_sl		
8							
9							
10							
11		EUROMOD					
12		Variables					
13							
14							
15							
16		Update Groups					
17							
18							

- Run SL\_reform system in Simpleland
- (Analyse the results using Summary Statistics Tool)

# Running Euromod I

Select:

-countries

-systems

-data

-output path

Run EUROMOD

Select countries

- Belgium
- Estonia
- Greece
- Lithuania
- Poland
- Simpleland
- Slovenia
- Spain
- UK

Select systems

- EE\_2005 (data: EE\_2005\_a3.txt)
- EE\_2005 (data: EE\_2006\_b1.txt)
- EE\_2005 (data: EE\_2006\_c1.txt)
- EE\_2005 (data: hypo\_ee)
- EE\_2005 (data: training\_data)
- EE\_2006 (data: EE\_2005\_a3.txt)
- EE\_2006 (data: EE\_2006\_b1.txt)
- EE\_2006 (data: EE\_2006\_c1.txt)
- EE\_2006 (data: hypo\_ee)
- EE\_2006 (data: training\_data)
- EE\_2007 (data: EE\_2005\_a3.txt)
- EE\_2007 (data: EE\_2006\_b1.txt)
- EE\_2007 (data: EE\_2006\_c1.txt)
- EE\_2007 (data: hypo\_ee)
- EE\_2007 (data: training\_data)
- EE\_2008 (data: EE\_2005\_a3.txt)
- EE\_2008 (data: EE\_2006\_b1.txt)
- EE\_2008 (data: EE\_2006\_c1.txt)
- EE\_2008 (data: hypo\_ee)
- EE\_2008 (data: training\_data)

Run

To select more than one sys:

Close

Advanced Options

Run Sum Stats

Set Std. Pathes

Sel all Sel no

Baselines only  Pol. year  only Sel all Sel no

Show Add-Ons  Data

Output path  Sel

# Running Euromod 2

*Select:*

*-Executable path*

*-Input data path*

*-Other settings*

**Run EUROMOD - Advanced options**

Path and filename of EUROMOD executable  
\\Iusersftp\euromodsftp\COURSES&TRAINING\2010-11 Us

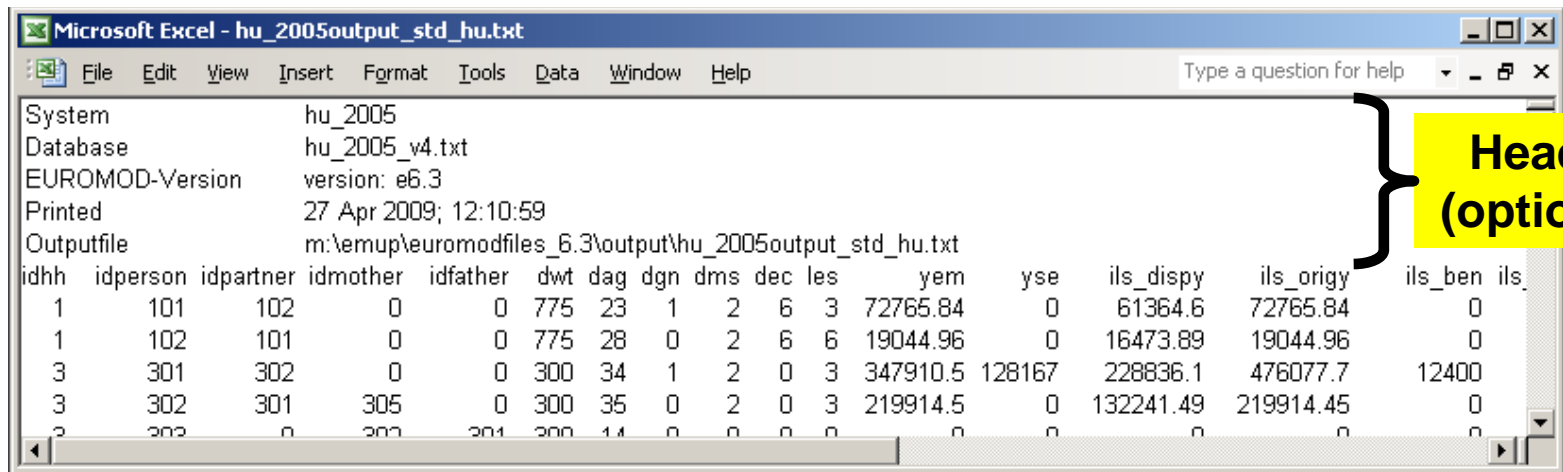
Path to EUROMOD datasets  
\\Iusersftp\euromodsftp\COURSES&TRAINING\2010-11 Us

Save settings  Separate header  
 Close after run  Add date to output-filename  
 Do not stop on non-critical errors  Log runtime in detail



# Output files

- micro-data (with an optional header)



Microsoft Excel - hu\_2005output\_std\_hu.txt

File Edit View Insert Format Tools Data Window Help

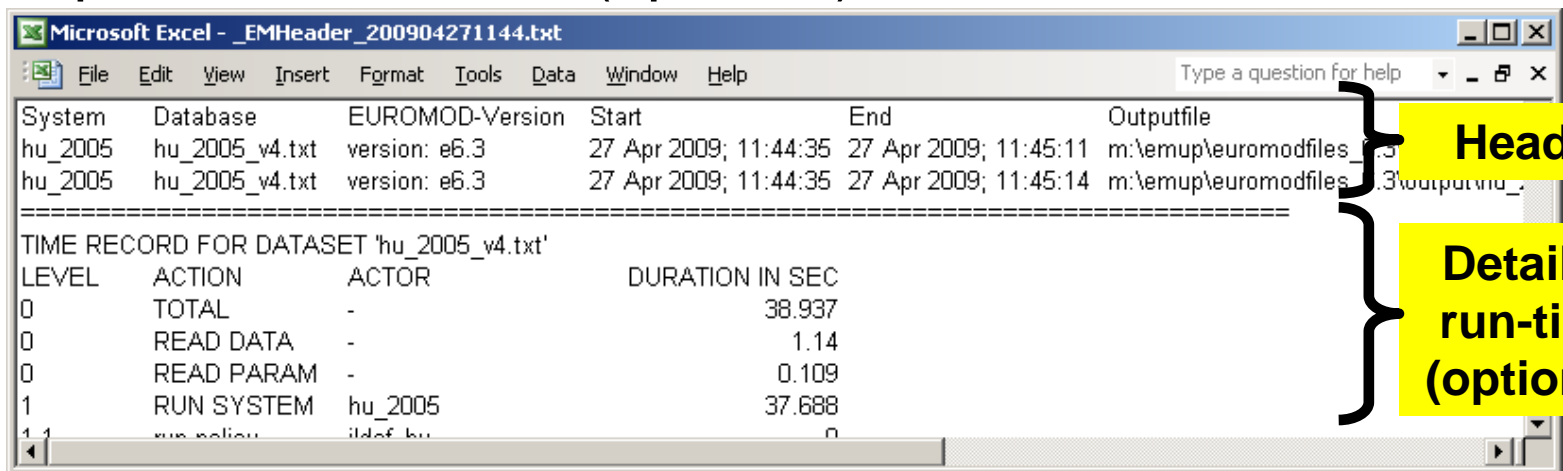
Type a question for help

System hu\_2005  
Database hu\_2005\_v4.txt  
EUROMOD-Version version: e6.3  
Printed 27 Apr 2009; 12:10:59  
Outputfile m:\emup\euromodfiles\_6.3\output\hu\_2005output\_std\_hu.txt

**Header (optional)**

idhh	idperson	idpartner	idmother	idfather	dwt	dag	dgn	dms	dec	les	yem	yse	ils_dispy	ils_origy	ils_ben	ils_
1	101	102	0	0	775	23	1	2	6	3	72765.84	0	61364.6	72765.84	0	
1	102	101	0	0	775	28	0	2	6	6	19044.96	0	16473.89	19044.96	0	
3	301	302	0	0	300	34	1	2	0	3	347910.5	128167	228836.1	476077.7	12400	
3	302	301	305	0	300	35	0	2	0	3	219914.5	0	132241.49	219914.45	0	

- separate header file (optional)



Microsoft Excel - \_EMHeader\_200904271144.txt

File Edit View Insert Format Tools Data Window Help

Type a question for help

System	Database	EUROMOD-Version	Start	End	Outputfile
hu_2005	hu_2005_v4.txt	version: e6.3	27 Apr 2009; 11:44:35	27 Apr 2009; 11:45:11	m:\emup\euromodfiles_6.3\output\hu_2005output_std_hu.txt
hu_2005	hu_2005_v4.txt	version: e6.3	27 Apr 2009; 11:44:35	27 Apr 2009; 11:45:14	m:\emup\euromodfiles_6.3\output\hu_2005output_std_hu.txt

=====

TIME RECORD FOR DATASET 'hu\_2005\_v4.txt'

LEVEL	ACTION	ACTOR	DURATION IN SEC
0	TOTAL	-	38.937
0	READ DATA	-	1.14
0	READ PARAM	-	0.109
1	RUN SYSTEM	hu_2005	37.688
1.1	run-system	ildef_hu	0

**Header**

**Detailed run-time (optional)**



# Micro output file: income concepts

## **Original Income (ils\_origy)**

(employment and self-employment income, property income, investment income, private pensions, private transfers etc)

## **+ Social Benefits (ils\_ben)**

(public pensions, family benefits, health related benefits, unemployment benefits, social assistance benefits, housing benefits)

## **- Social Insurance Contributions (ils\_sicee, ils\_sicse)**

(employee, self-employed)

## **- Personal Taxes (ils\_tax)**

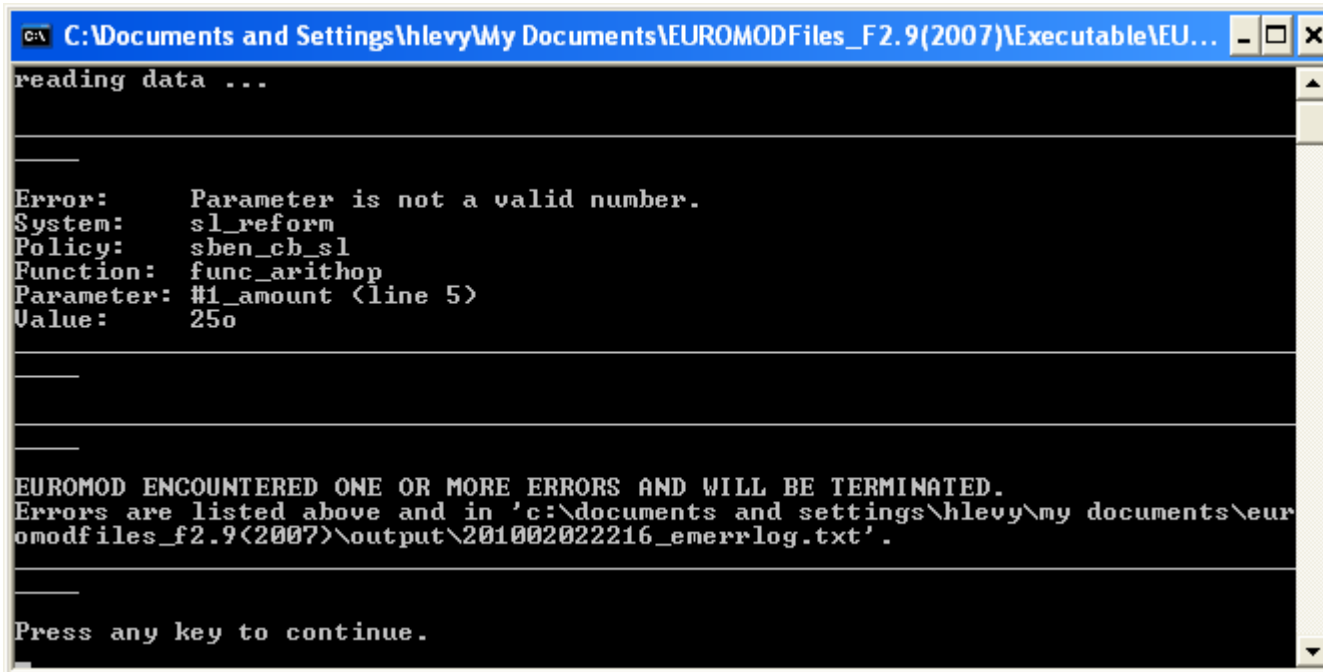
(national and local income taxes)

## **= Standard Disposable Income (ils\_dispy)**

# Error handling: producing an error

SIMPLELAND		SL_demo	SL_reform	
		Child Benefit		
func_ArithOp	on	on	benefit calculation	
formula		nDepChildrenInTU*amount#	nDepChildrenInTU*amount#1	
#1_amount	200#m	25o#m		
output_var	bch_s	bch_s		
TAX_UNIT	sben_family_sl	sben_family_sl		There are age limits set for dep. children in TU.
sys_end_par				

# Error handling: error message

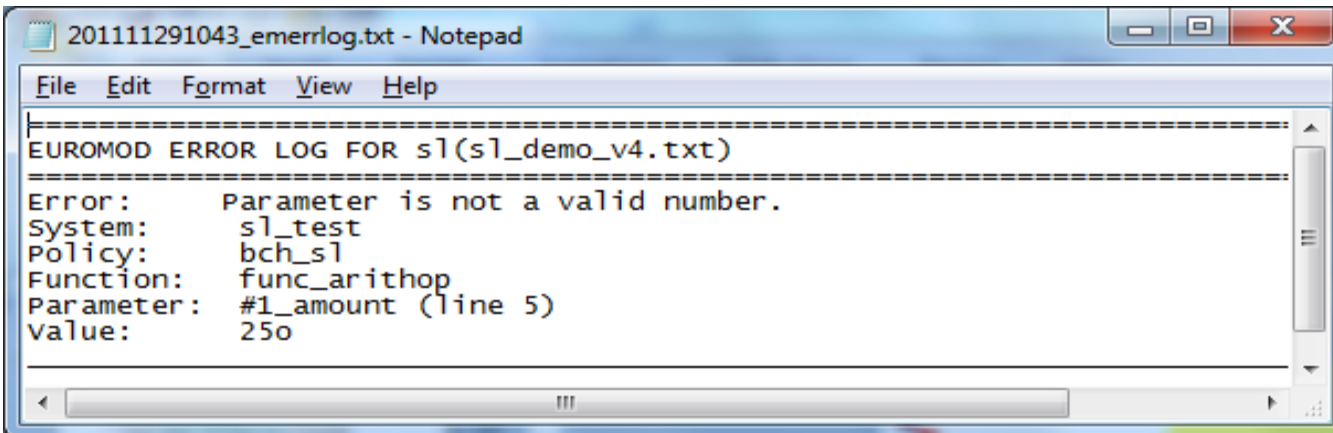


```
C:\Documents and Settings\hlevy\My Documents\EUROMODFiles_F2.9(2007)\Executable\EU... - [ ] X
reading data ...

Error:      Parameter is not a valid number.
System:    sl_reform
Policy:    sben_cb_sl
Function:  func_arithop
Parameter: #1_amount (line 5)
Value:    250

EUROMOD ENCOUNTERED ONE OR MORE ERRORS AND WILL BE TERMINATED.
Errors are listed above and in 'c:\documents and settings\hlevy\my documents\eur
omodfiles_f2.9(2007)\output\201002022216_emerrlog.txt'.

Press any key to continue.
```



```
201111291043_emerrlog.txt - Notepad
File Edit Format View Help
=====
EUROMOD ERROR LOG FOR sl(sl_demo_v4.txt)
=====
Error:      Parameter is not a valid number.
System:    sl_test
Policy:    bch_sl
Function:  func_arithop
Parameter: #1_amount (line 5)
Value:    250
```

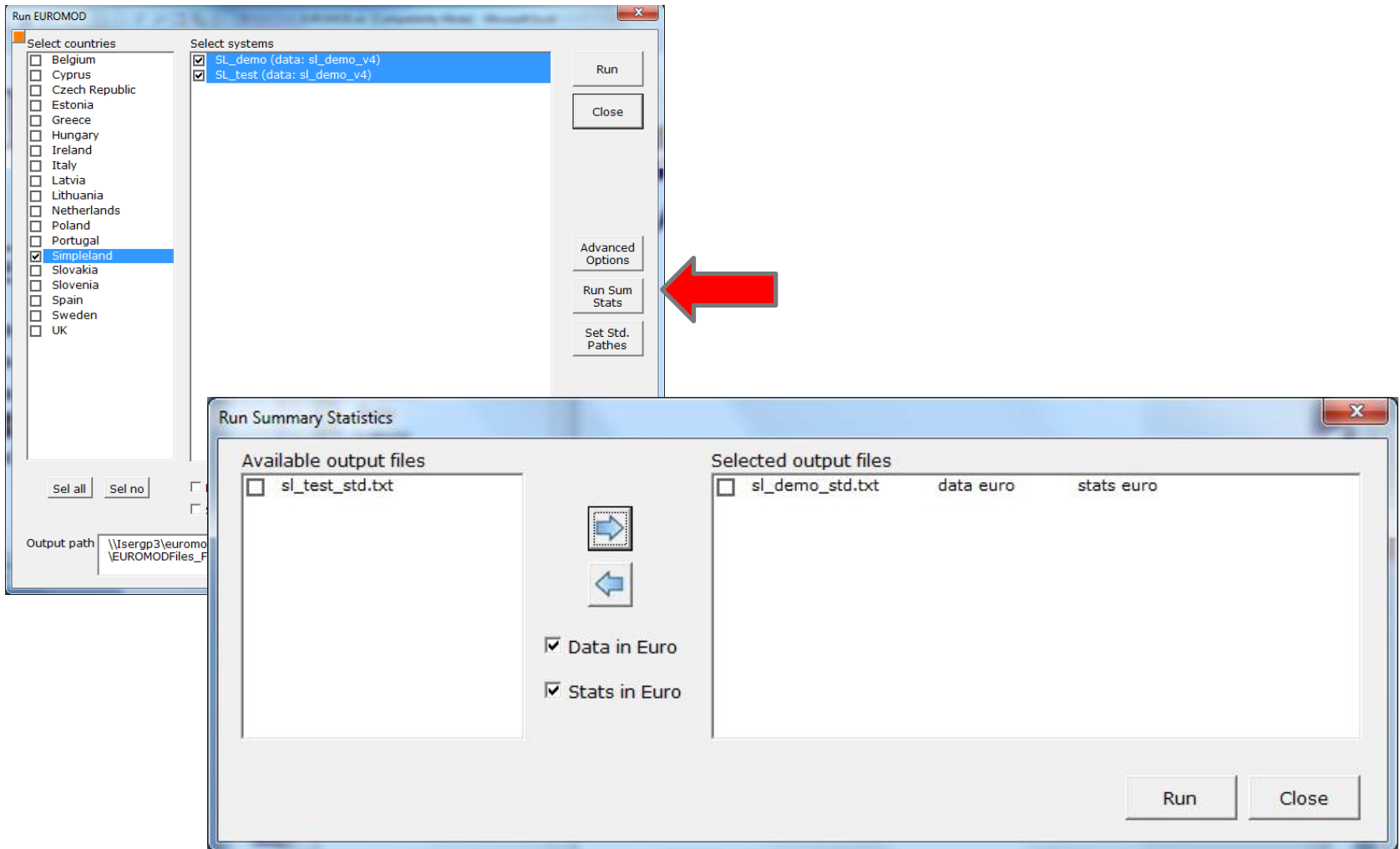


# Summary Statistics Tool

Computes a range of commonly used indicators and statistics for analysing EUROMOD micro-output:

- ❑ poverty rates for the overall population and for selected groups and the Gini coefficient
- ❑ distribution of household income, taxes and benefits by income group
- ❑ demographic information on households by income group

# Summary Statistics Tool: running





# Additional features

## ■ Documentation

- Country Reports
- Data Requirement Documents
- Manuals
- Recipes
- Working Papers

## ■ Tools:

- Summary statistics
- Budget constraint charts (for standard hh types)
- METRs calculation



# Country report

## 1. Basic information

- background information (e.g. country statistics)
- brief description and statistics of all policies

## 2. Simulation of taxes and benefits in Euromod

- scope and order of simulation
- detailed information on simulated policies (incl. assumptions)

## 3. Data

- general description, sample quality and weights
- data adjustment, imputations and assumptions

## 4. Validation

- policy validation
- income distribution validation: poverty and inequality
- “health warnings”





# Access to model and data

- Web <http://www.iser.essex.ac.uk/research/euromod>
  - Summary statistics
  - Documentation: Country Reports, Working Papers ....
- Model is freely available for non-commercial use
  - Contact [euromod@essex.ac.uk](mailto:euromod@essex.ac.uk) to obtain the link for downloading (incl. manuals)
- Data access conditions set out by the original data provider
  - EU-SILC (UDB): (for now) EUROMOD users need to join our project network contract with Eurostat
  - Other data: relatively straightforward procedures
- Free training courses



# Responsibilities of EUROMOD hand-on users

- Respect data access rules and conditions
- Acknowledge EUROMOD when it is used
- Submit all papers using EUROMOD for inclusion in the WP series
- Take responsibility for your own use of the model
- Tell us about bugs or errors
- Keep us informed about what you are working on and when you are working actively: that way we can keep you informed of relevant changes



# Further information on EUROMOD

- Technical papers:
  - Immervoll H, C O'Donoghue and H Sutherland (1999), An Introduction to EUROMOD, EM 0/99.
  - Sutherland H (ed) (2001), EUROMOD: an integrated European Benefit-tax model. Final Report, EM 9/01.
  - Lietz C and D Mantovani (2006): Lessons from building and using EUROMOD, EM 5/06.
- Web site: <http://www.iser.essex.ac.uk/research/euromod>
  - Country Reports
  - Recipes
  - Working Papers



# Useful links and references

- International Microsimulation Association <http://www.microsimulation.org/>
- International Journal of Micosimulation  
<http://www.microsimulation.org/IJM/index.htm>
- Zaidi A., A. Harding and P. Williamson (eds) 2009, *New Frontiers in Microsimulation Modelling*, Ashgate.
- Lelkes O. and H. Sutherland (eds) 2009, *Tax and Benefit Policies in the Enlarged Europe: Assessing the Impact with Microsimulation Models*, Ashgate.
- Bourguignon F. and Spadaro A. 2006, Microsimulation as a tool for evaluating redistribution policies, *Journal of Economic Inequality* 4(1): 77-106.
- Bargain O. (ed) 2006, *Microsimulation In Action: Policy Analysis in Europe using EUROMOD*, Research In Labor Economics Vol 25, Elsevier.
- A. Gupta and V. Kapur (eds) 2000, *Microsimulation in Government Policy and Forecasting*, Elsevier.
- Mitton L., H. Sutherland and M. Weeks (eds) 2000, *Microsimulation Modelling for Policy Analysis: Challenges and Innovations*, Cambridge University Press.



# Some recent academic papers using EUROMOD

- O. Bargain, The Distributional Effects of Tax-Benefit Policies under New Labour: A Shapley Decomposition, Oxford Bulletin of Economics and Statistics, forthcoming
- M. Dolls, C. Fuest, A. Peichl, Automatic stabilizers and economic crisis: US vs. Europe, Journal of Public Economics, 2012.
- F. Figari, A. Salvatori, H. Sutherland, Economic downturn and stress testing European welfare systems, Research in Labour Economics, 2011.
- F. Figari, H. Immervoll, H. Levy, H. Sutherland, Inequalities within couples in Europe: market incomes and the role of taxes and benefits, Eastern Economic Journal, 2011
- F. Figari, A. Paulus, H. Sutherland, Measuring the size and impact of public cash support for children in cross-national perspective, Social Science Computer Review, 2011.
- H. Immervoll, H. J. Kleven, C. T. Kreiner, N. Verdellin, Optimal tax and transfer programs for couples with extensive labor supply responses, Journal of Public Economics, 2011.



# Some recent academic papers using EUROMOD

- F. Figari, Can In-work Benefits Improve Social Inclusion in the Southern European countries?, *Journal of European Social Policy*, 2010.
- A. Paulus, A. Peichl, Effects of flat tax reforms in Western Europe, *Journal of Policy Modeling*, 2009.
- O. Bargain, T. Callan, Analysing the effects of tax-benefit reforms on income distribution: a decomposition approach, *Journal of Economic Inequality*, 2008.
- H. Immervoll, H.J. Kleven, C.T. Kreiner, E. Saez, Welfare Reform in Europe: A Micro-simulation Analysis, *Economic Journal*, 2007.
- H. Levy, C. Lietz, H. Sutherland, Swapping Policies: Alternative Tax-Benefit Strategies to Support Children in Austria, Spain and the UK, *Journal of Social Policy*, 2007.
- O. Bargain K. Orsini, In-work policies in Europe: killing two birds with one stone? *Labour Economics*, 2006.