# Annex 1 – User manual

# **EUROMOD INDIRECT TAX TOOL – MANUAL**

# 1. INTRODUCTION

The Indirect Tax Tool (or ITT) imputes expenditures into the EUROMOD output, and calculates VAT and excises. This tool expands EUROMOD's functionality such that policy makers and researchers can analyse the effects of indirect tax reforms, in addition to the analysis of direct tax and benefit reforms. This manual is intended to guide you through the ITT, and to explain its functionality. For a more technical documentation of the estimation and imputation process, and of the simulation of indirect taxes we refer to the project report. The ITT is developed as part of a research project for the European Commission's Joint Research Centre in Seville.

## 2. GETTING STARTED

#### Installation

Use the ITT installer to install the tool in EUROMOD. The ITT will appear in the *Application* menu, under the *EUROMOD plugins* section.



Note that the ITT requires a EUROMOD version of 1.13.4 or later.

#### Input

The ITT requires three input files to run:

- the *prediction\_data\_CC\_bud20yy\_pol20yy.xlsx* file containing the information form the estimation process as well as which goods and services are subject to VAT and excise duties, the file also contains information on the general uprating index;
- (2) the cc\_yyyy\_tax.txt, which contains information on VAT rates, specific and ad valorem excises, and on consumer prices for the goods subject to specific excises (in the baseline)
- (3) the *cc\_yyyy\_tco.txt*, which contains the household information, including household disposable income, needed to impute the expenditures.

# Imputation of the baseline expenditures and calculation of baseline tax rates

To upload the data, go to the *File* menu, choose *Load data & parameters*, and click the *All* button. You may also choose to load the three files separately.

	Reform	Analyse	Help			
Id			Name	Vat	Has Excises	
Г	Load Data	& Paramet	ters			
	Event Elec				Province	-
	Excel file:				browse	
	TAX File:				Browse All	~
	TCO File:				Browse	
	TCO data I	level: 💿 I	Household 🔘 Indiv	vidual Calculate equivalent	scales	
	show a	dvanced		Load Data & Parameters	Cancel	

The ITT will ask you to upload the three files. Make sure that the files have the correct suffixes. Select whether the data in the tco-file contains information at individual or on households level, and click the *Load Data & Parameters* button. The ITT will start the imputation process, and will calculate the indirect taxes for each commodity group.

Id		Name	Vat	Has Excises	
	Running			_	
	Plea	ase wait Running 'Imputa'	tion' at 33%	_	
				Close	
		Export baseline	Cinculate enforce		Class

# Interface

The main interface of the ITT lists the commodity groups, containing 15 non-durable commodity groups and one group consisting of durable goods, and reporting the tax rate. The tax rate equals the total of VAT and excises as a percentage of producer prices.

Indirec	t Taxes: Belgium			_					
File	Reform Analyse	Help							
Id		Name	Vat	Has Excises					
• •	Category 1: Food an	d non-alcoholic beverage	s (Weighted Average Indi	rect Tax: 6.11%)	<u></u>				
+	Category 2: Alcoholic beverages (Weighted Average Indirect Tax: 45.32%)								
Þ	<ul> <li>Category 3: Tobacco (Weighted Average Indirect Tax: 239.46%)</li> </ul>								
+	Category 4: Clothing	and footwear (Weighted	Average Indirect Tax: 21	%)					
+	Category 5: Home f	uels, electricity and water	(Weighted Average Indir	ect Tax: 15.19%]					
+	Category 6: Rents (excluding imputed rents) (Weighted Average Indirect Tax: 0%)								
+	Category 7: Househ	old goods and services (W	eighted Average Indirect	Tax: 17.49%)					
+	Category 8: Health	Weighted Average Indire	ct Tax: 1.81%)						
Þ	Category 9: Private	transport (Weighted Avei	age Indirect Tax: 45.13%	<b>b</b> )					
ŀ	Category 10: Public	Transport (Weighted Ave	rage Indirect Tax: 6%)						
ŀ	Category 11: Comm	unication (Weighted Aver	age Indirect Tax: 20.52%	)					
ŀ	Category 12: Recrea	ation and culture (Weighte	d Average Indirect Tax:	14.77%)					
					*				
		Export baseline imputations	Simulate reform		Close				
Baselin	e policies: 2014 Dema	nd system: 2014 Indexed b	у: срі						

The categories can be expanded such that the different goods and services within each category are listed. This detailed view also shows which VAT is applicable to each of the goods, and whether the good is subject to excises.

-	<ul> <li>Category 1: Food and non-alcoholic beverages (Weighted Average Indirect Tax: 6.11%)</li> </ul>									
	01111A	Rice and rice flakes, bag	\$VAT_REDUCED1	False						
	01111B	Rice and rice flakes (bio)	\$VAT_REDUCED1	False						
	01112A	Wheat flour, flour, self-r	\$VAT_REDUCED1	False						
	01112B	Maize flour, rice flour an	\$VAT_REDUCED1	False						
	01112C	Semolina (semoule), grou	\$VAT_REDUCED1	False						
	01112D	Oat flakes, oatmeal or ot	\$VAT_REDUCED1	False						
	01112E	Wheat flour, flour, self-r	\$VAT_REDUCED1	False						
	01112F	Maize flour, rice flour an	\$VAT_REDUCED1	False						
	01112G	Semolina (semoule) and r	\$VAT_REDUCED1	False						
	01112H	Oat flakes, oatmeal and	\$VAT_REDUCED1	False						
	01113A	White bread	\$VAT_REDUCED1	False						

On the bottom of the window *Baseline policies* refers to the indirect tax policy year (the year included in the name of the *cc\_yyyy\_tax.txt*), *Demand system* refers to the year of the Household Budget Survey that was used for the estimation of the Engel curves. Finally the banner indicates which general uprating indicator was used in the process.

Baseline policies: 2014 Demand system: 2014 Indexed by: cpi

# **Exporting baseline imputations**

By clicking the Export baseline imputations, you can export the baseline results. The ITT will then create four txt files:

- cc\_yyyy\_cat\_info\_baseline.txt: contains the aggregate expenditures and indirect tax rates for each of the commodity groups.
- cc\_yyyy \_com\_info\_baseline.txt: contains the information on the different commodities, the reported expenditures on each of the goods in the Household

Budget Survey, which commodity group they belong to, and which VAT rate they are subject to.

- cc\_yyyy \_tco\_hh\_baseline.txt: contains for all households the baseline output of the imputation, including the monthly expenditures, and monthly VAT, and specific and ad valorem excises paid.
- cc\_yyyy \_temp\_results\_baseline.txt: contains for all households the covariates used in the imputation process from the *cc\_yyyy\_tco.txt* file.

# Saving a session

In case you want to save the session into a xml-file, by choosing *Session – Save (as)* in the *File*-menu. The session can later be restored easily by selecting *Session – Open* in the same menu.

# 3. SIMULATING A REFORM

The ITT allows for a variety on reforms:

- a change in VAT rates (both the level of the rate, and the attribution of products and services to the different rates;
- a change in excises;
- a change in disposable household incomes.

# Simulation of a change in the VAT rates and/or the excise duties

Select *Edit constants* in the *Reform* menu.

	Name	Baseline Value	Reform Value
Þ	\$VAT_ZERO	0	0
	\$VAT_REDUCED1	0.06	0.06
	\$VAT_REDUCED2	0.12	0.12
	\$VAT_STD	0.21	0.21
	\$PRICE_BEER_TABLE	231.2	231.2
	\$SPECIFIC_BEER_TABLE	9.2	9.2
	\$PRICE_BEER_LAGER	231.2	231.2
	\$SPECIFIC_BEER_LAGER	23.1	23.1
	\$PRICE_BEER_HEAVY	712.9	712.9
	\$SPECIFIC_BEER_HEAVY	29.5	29.5
	\$PRICE_SPIRITS	2258	2258
	\$SPECIFIC_SPIRITS	847.6	847.6

This window portrays the baseline and reform vat rates and excises values, as well as the consumer prices of the goods subject to excise duties. You can enter new values for the vat rates and excises in the *Reform Value* column.

## Changing the attribution of excises to products

In case you want to change the excise duty that is attributed to a specific commodity, you can open the *Manage Excises* window in the *Reform* menu. Here you can select different available specific excises from the drop-down menu.

Ma	nage Excises									
	Commodity ID	Commodity Name	Consumer price (q)	Baseline Excise Specific	Reform Excise Specific	Baseline Excise ad	Val	Reform Excise ad Valo	Unit	
a.	01211A	Coffee beans, ground	\$PRICE_COFFEE	\$SPECIFIC_COFFEE	\$SPECIFIC_COFFEE -	0		0	100 l	-
	01211B	Soluble coffee and co	\$PRICE_COFFEE	\$SPECIFIC_COFFEE	Name		Value		<b>^</b>	
	01211C	Chicory and other cof	\$PRICE_COFFEE	\$SPECIFIC_COFFEE	\$SPECIFIC_BEER_TABLE		9.2			
	01211D	Senseo coffee	\$PRICE_COFFEE	\$SPECIFIC_COFFEE	\$SPECIFIC_BUTANE \$SPECIFIC_CHAMPAGNE		18.5			U
	01221B	soda water	\$PRICE_SODA	\$SPECIFIC_SODA	\$SPECIFIC_CIGARETTES	; N	36.9			
	01221C	Flavored waters (Fruit)	\$PRICE_SODA	\$SPECIFIC_SODA	\$SPECIFIC_COFFEE	63	0.25			
	01221D	Water z.o.	\$PRICE_SODA	\$SPECIFIC_SODA	\$SPECIFIC_ELECTRICITY	Y	1.9		-	
	01222A	Other non-alcoholic dr	\$PRICE_SODA	\$SPECIFIC_SODA	×				1.	
	01222B	Energy drink for athle	\$PRICE_SODA	\$SPECIFIC_SODA	\$SPECIFIC_SODA	0		0	100	
	01223C	Fruit syrup (grenadin	\$PRICE_SODA	\$SPECIFIC_SODA	\$SPECIFIC_SODA	0		0	100 l	
	02111A	Whiskey	\$PRICE_SPIRITS	\$SPECIFIC_SPIRITS	\$SPECIFIC_SPIRITS	0		0	100 l	
	02111B	Cognac	\$PRICE_SPIRITS	\$SPECIFIC_SPIRITS	\$SPECIFIC_SPIRITS	0		0	100 l	-
F	eset all to Baseline								ок	Cancel

## Changing the attribution of VAT to goods or services

You can easily change the VAT rate that applies to a specific good or service by clicking *Edit VAT (for detailed groups)* in the *Reform* menu. You can click on the individual commodity goods (or services) and use the drop-down menu to change the VAT-rate. Remember that you can change the level of each of the VAT-rates in the *Edit constants* window.

	Id		Name	Baseline Value	Reform Value				
	<ul> <li>Category 1: Food and non-alcoholic beverages</li> </ul>								
	Þ	Category 2	: Alcoholic beverages						
	÷	Category 3	: Tobacco			U			
	ŀ	Category 4	: Clothing and footwear						
	Category 5: Home fuels, electricity and water								
	ŀ	Category 6	: Rents (excluding imputed rents)						
	Ŧ	Category 7	': Household goods and services						
1.		04310A	Paints and walked out	\$VAT_STD	\$VAT_STD				
		04310B	wallpaper Paper	\$VAT_STD	VAT Category	VAT Rate			
		04310C	Sanitary (toilet, bathtub, sink, faucet, shower spray head)	\$VAT_STD	\$VAT_REDUCED1	0.06			
		04310D	Articles in wood for the house (moldings, panels, shelves, doors).	\$VAT_STD	\$VAT_REDUCED2 \$VAT_STD	0.12			
		04310E	Building materials (bricks, blocks, tiles, pipes, plaster, gypsum, cement, glass)	\$VAT_STD	\$VAT_ZERO	0			

# Simulating the reform

Once you are finished with the adjustments to the baseline indirect tax system you can click *Simulate reform*.

Simulate reform		
Disposable Inc	ome	
Baseline		
O Reform	Income file	
Output		
Folder: C:\D	ropbox\ECON\EUROMOD\EM - RuRo\Outpu	Browse
Prefix:		
	Simulate	Close

The tool provides you with the option to import new disposable household incomes, such that an integrated policy reform of a change in direct and indirect tax system becomes feasible. By clicking *Simulate* the ITT simulates new expenditures and indirect taxes, both under the assumption of households consuming constant quantities, and under the assumption of households consuming the same shares of their income on each of the different commodity groups.

Running Simulation	
Please wait Running 'Simulation' at 39%	
	Close

The results are exported in a tab-delimited txt file.

# 4. OUTPUT AND THE ANALYSIS TOOL

The ITT has a build-in analysis-tool, which can be accessed by selecting *Analyse results* in the *Analyse* menu. Then click *Add files* to upload one or more output files to analyse. Note that it is possible to run the *Analysis Tool* for output of different simulation results, and for different countries at once.

Indirect Taxes Analysis	_		×
Indirect Taxes Analysis			
	F	Add Files Remove Files	
Analyse files			

Running the analysis of a given output file (by clicking the *Analyse files* button) generates an output screen, containing a number of tables describing the levels and distribution of income, expenditures and indirect taxes in the baseline and in the reform scenario, and that present a selection of welfare measures.

Indirect Taxes Analysis - Results									
Results for Belgium 2014 (r_be_2014_tco_hh_reform.txt)									
Table 1.1 Table 1.2	Table 1.3	Table 1.4 Ta	ble 1.5 Table 1.6 Table 1.7						
Total disposable i	ncome, exp	enditures an	d indirect taxes (in million)						
Total	Monthly	Annual							
Disposable Income	13391.84	160702.08							
Expenditures	12325.25	147903.01							
Indirect taxes	1492.09	17905.03							
VAT	1256.49	15077.82							
Excises	235.60	2827.21							
Specific excises	194.15	2329.76							
Ad valorem excises	41.45	497.46							
r_be_2014_tco_hh_reform - base r_be_2014_tco_hh_reform - refcq r_be_2014_tco_hh_reform - refcs r_be_2014_tco_hh_reform - welfare									
Definitions			Export						

The results are grouped by four tabs (on the bottom of the window), the names of which start with the output file(s) name(s), followed by a reference to the four output categories:

- (1) base: results in the baseline
- (2) refcq: results of the reform simulation, assuming constant quantities
- (3) refcs: results of the reform simulation, assuming constant expenditure shares
- (4) welfare: results of the welfare metrics

# Levels and distribution of income, expenditures and indirect taxes

Results under tabs (1) - (3) are organised identically: Table X.1 to Table X.7. All results are calculated using survey weights and shown in the currency of EUROMOD output files.

- Table X.1: Total disposable income, expenditures and indirect taxes (in million);
- Table X.2: Mean household disposable income, total expenditure and indirect taxes by income decile;
- Table X.3: Mean household disposable income, total expenditure and indirect taxes by expenditure decile;
- Table X.4: Incidence of indirect taxes by income decile, % of household disposable income and total expenditure;
- Table X.5: Incidence of indirect taxes by expenditure decile, % of household disposable income and total expenditure;
- Table X.6: Mean household indirect taxes by expenditure category and income decile;
- Table X.7: Mean household indirect taxes by expenditure category and expenditure decile.

Monetary amounts shown are unequivalised and in monthly terms unless otherwise specified. Income deciles are constructed on the basis of equivalised household disposable income (using the modified OECD equivalence scale), with an equal number of households in every decile group. Expenditure deciles are constructed on the basis of equivalised household total expenditure (using the modified OECD equivalence scale), with an equal number of households in every decile group. Households with zero total baseline expenditure are excluded from calculations.

#### Welfare effects

The fourth tab on the bottom contains the effect on the levels and the distribution of a selection of welfare measures.

Indirect Taxes Analysis - Results											
Results for Belgium 2014 (r_be_2014_tco_hh_reform.txt)											
Total	Total instal and weiliare effects (in million)										
Change in disposable income	566.96	566.96	6803.56	6803.56							
Change in expenditures	0.00	539.46	0.00	6473.53							
Change in indirect taxes	0.00	64.84	0.00	778.10							
Change in VAT	0.00	54.65	0.00	655.76							
Change in excises	0.00	10.20	0.00	122.34							
Change in specific excises	0.00	8.44	0.00	101.23							
Change in ad valorem excises	0.00	1.76	0.00	21.12							
Compensating Variation (CV)	0.00		0.00								
Equivalent Variation (EV)		0.00		0.00							
CV welfare effect	566.96		6803.56								
EV welfare effect		566.96		6803.56							
r_be_2014_tco_hh_reform - base	r_be_2014_tco_hh_reform - refc	q r_be_2014_tco_hh_reform	-refcs r be 2014 tco hh refo	orm - welfare							
Definitions		Export		Close							

The three tables are portraying:

- Table 4.1: total fiscal and welfare effects (in million);
- Table 4.2: mean household welfare change by income decile;
- Table 4.3: mean household welfare change by expenditure decile.

The welfare effect can be decomposed in the effect of the change in disposable income, and the change in prices. Each time two welfare measures are provided: the compensating variation (CV) and the equivalent variation (EV). The compensating variation is the monetary compensation a household should receive in the post-reform situation, that is under the new prices and given the new income, in order to be equally well off as before the reform, that is under the old prices, and given the old income. The equivalent variation welfare concept is the monetary compensation a household would have to forego in the baseline, that is under the old prices, and given the old income , in order to be indifferent between this baseline and the post-reform situation with new prices and new income

### **Export results**

Clicking *Export* will create an Excel-file that contains all the tables presented by the Analysis tool, maintaining the same structure.