

# JRC SCIENTIFIC INFORMATION SYSTEMS AND DATABASES REPORT

## Policy Effect Tool (PET) indicators – methodological note

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## **Foreword**

This note describes the methodology used to compute policy effects using EUROMOD's Policy Effect Tool (PET) and is largely based on the EUROMOD Help of the EUROMOD Software Version 3.4.7. Its main aim is to facilitate the interpretation of the results obtained with the latest public version (I4.0+) of the model, which are offered in a separate Excel sheet. The note and the Excel file have been prepared by Vanda Almeida and Klaus Grünberger, with the collaboration of the JRC EUROMOD team: Salvador Barrios, Michael Christl, Hugo Cruces, Silvia De Poli, Adrián Hernández, Tine Hufkens, Daniela Hupteva, Viginta Ivaškaitė-Tamošiūnė, Marta Jędrych, Sofia Maier, Alberto Mazzon, Bianey Palma, Andrea Papini, Fidel Picos, Mattia Ricci, Alberto Tumino and Estefanía Vázquez.

# 1 Objective and interpretation

The Policy Effect Tool (PET) tables show the impact on household disposable income of policy reforms affecting direct taxes and social benefits. A table is provided for each EU country. Each table shows the effect of policy changes as the difference between equivalised household disposable incomes<sup>1</sup>, as simulated by EUROMOD, under tax-benefit policies of two consecutive policy years. The policy effects are shown by (standard) policy component and income decile group. The total policy effect is decomposed into the following components: public pensions, means-tested benefits, non-means-tested benefits, employee, self-employed and other social insurance contributions (SIC), and direct taxes.

The values shown in the tables and figures depict relative changes (in %) of disposable income due to policy changes between two years. For example, a 3% increase of the public pension component in the third decile group, indicates that policy changes in public pensions induced a 3% increase in average equivalised household income for this decile group. In the case of taxes and SIC, a positive (negative) number implies that taxes/SIC have been reduced (increased). The sum of effects by component (columns C to J) equals the total (column K).

# 2 Methodology

The estimation of policy effects draws on the method proposed by Bargain and Callan (2010). The variation of disposable incomes over time is not only affected by changes in the tax-benefit system but also by changes attributed to nominal levels of market incomes and tax-benefit parameters. The aim of the methodology is to disentangle policy effects from changes in nominal levels.

Consider a single household and denote its market income (and other characteristics) with  $y$  and monetary values of tax-benefit parameters as  $p$ . A function  $d(p,y)$  calculates household disposable income on the basis of its market income and monetary parameters, reflecting the structure of the tax-benefit system (e.g. tax rates, benefit eligibility rules). In period  $t$ , household disposable income can be denoted as  $dt(pt,yt)$ .

The tool estimates the direct effect of policy changes on household incomes in the period from  $t=1$  to  $t=2$ . To isolate it from other changes in the income distribution (e.g. changes in household composition or market incomes), household disposable incomes under the two policy systems are assessed holding household characteristics and market incomes constant. Furthermore, to adjust for changes in nominal income levels over time, the monetary parameters of the tax-benefit system are adjusted with a factor  $\alpha$  which reflects benchmark indexation. For the PET tables, the factor  $\alpha$  is derived from Eurostat's Harmonized Index of Consumer Prices (HICPI). Specifically, the tool estimates the policy effect (for each household) as:

$$\Delta = d_2\left(\frac{1}{\alpha}p_2, y_1\right) - d_1(p_1, y_1)$$

Note that this is a particular variation of decomposition chosen for EUROMOD validation purposes; the full decomposition framework is described in by Bargain and Callan, 2010.<sup>2</sup> Technically, instead of scaling monetary policy parameters, the tool scales monetary input variables with the factor  $\alpha$  and monetary output variables with the factor  $1/\alpha$ :

$$\Delta = \frac{1}{\alpha}d_2(p_2, \alpha y_1) - d_1(p_1, y_1)$$

This relies on the assumption that tax-benefit systems are linearly homogenous, that is  $d(cp,cy)=cd(p,y)$ . Input variable adjustments are limited to market incomes, expenditures and assets.<sup>3</sup> Output variable adjustments cover all monetary variables.

Figures in the PET tables are shown as a percentage of (mean) disposable incomes in the starting year, i.e.  $d1(p1,y1)$ .

<sup>1</sup> Equivalised household disposable income is obtained by dividing the total household income by the OECD-modified equivalence scale to take into account household's economies of scale. The OECD-modified equivalence scale assigns each household member an equivalence value. It is a measure for per capita household income, considering the age-specific needs of household members. The first adult gets value 1, the second adult and each subsequent person aged at least 14 gets value 0.5. Finally, each child aged under 14 gets value 0.3.

<sup>2</sup> A further description of the methodology can be found in De Agostini et al. (2016) or in Paulus and Tasseva (2020).

<sup>3</sup> In particular, this includes all EUROMOD monetary variables whose name starts with  $y^*$  or  $x^*$ , variable  $afc$ , as well as all variables included in *ils\_origy*, while excluding variables included in *ils\_ben*.

### **3 COVID-19 monetary compensation schemes and labour market transitions**

EUROMOD systems of 2020 and 2021 introduce the possibility to include COVID-19 related monetary compensation schemes and labour market transitions. Labour market transitions are jointly triggered with monetary compensation schemes by the LMA add-on<sup>4</sup>. In all EUROMOD baseline systems the labour market transitions are turned OFF and hence no wage compensation schemes are simulated by default. The results in the PET tables are based on EUROMOD baseline systems and therefore do not account for labour market transitions and do not include the simulation of monetary compensation schemes. For this reason the results of the PET tables need to be interpreted with caution.

### **4 Description of country-specific tax-benefit policy effects**

A detailed description and interpretation of tax-benefit policy effects can be found in the Annex of EUROMOD country reports<sup>5</sup>. These documents have been prepared by the EUROMOD National Teams and their content does not reflect the position or opinion of the European Commission.

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<sup>4</sup> For more information check the LMA-related documentation that accompanies the public release of the model: "Simulating labour market transitions in EUROMOD: EUROMOD LMA Add-on and COVID-related policies" and "Labour Market Adjustment (LMA) Add-on - technical note". The two documents are available in <https://euromod-web.jrc.ec.europa.eu/resources/model-documentation>.

<sup>5</sup> The country reports corresponding to EUROMOD I4.0+ can be found in <https://euromod-web.jrc.ec.europa.eu/resources/country-reports/latest>.

## References

Bargain, Olivier and Tim Callan (2010) "Analysing the Effects of Tax-Benefit Reforms on Income Distribution: a Decomposition Approach", *Journal of Economic Inequality*, 8, 1–21

De Agostini, Paola; Alari Paulus and Iva Tasseva (2016), "The effect of changes in tax-benefit policies on the income distribution in 2008–2015" *EUROMOD Working Paper* EM6/16 Colchester: ISER, University of Essex.

Paulus, Alari and Iva Tasseva (2020) "Europe Through the Crisis: Discretionary Policy Changes and Automatic Stabilizers", *Oxford Bulletin of Economics and Statistics*, 82 (4), 864–888.

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