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Contact: EU-MIDAS@ec.europa.eu

Factsheet

SWD(2021) 41 final

IMPACT ASSESSMENT Accompanying the document Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL to strengthen the application of the principle of equal pay for equal work or work of equal value between men and women through pay transparency and enforcement mechanisms

Supporting model(s)

EUROMOD

Impact assessment SWD(2021) 41 final

Fact sheet on model contributions

Source: Commission modelling inventory and knowledge management system (MIDAS)

Date of Report Generation: 28/04/2021

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Overview

Title

IMPACT ASSESSMENT Accompanying the document Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL to strengthen the application of the principle of equal pay for equal work or work of equal value between men and women through pay transparency and enforcement mechanisms

Document ID

SWD(2021) 41 final

Year of publication

2021

Led by

JUST

Model(s) used

EUROMOD

Additional information on model use for this Impact assessment

-

EUROMOD

Full title

EUROMOD Microsimulation

Run for this impact assessment by

European Commission, JRC

Contributed to

Baseline and assessment of policy options

Helped to assess the following impacts

<i>Impact area</i>	<i>Impact category</i>	<i>Impact subcategory</i>
Economic impacts	Public authorities	Budgetary consequences for public authorities
Social	Effects on income, distribution and social inclusion	Households income and at risk of poverty rates
Social	Effects on income, distribution and social inclusion	Inequalities and the distribution of incomes and wealth
Social	Public health and safety and health systems	Specific effects on particular risk groups
Fundamental rights	General	Fundamental rights
Fundamental rights	Gender equality, equality treatment and opportunities, non-discrimination, and rights of persons with disabilities	Different impact on women and men

EUROMOD

EUROMOD Microsimulation

Fact sheet

Source: Commission modelling inventory and knowledge management system (MIDAS)

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Dissemination: Public

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Overview

Acronym EUROMOD

Full title EUROMOD Microsimulation

Main purpose

A static tax benefit microsimulation model, covering the EU Member States, used to assess the budgetary and distributional consequences of consolidated and prospective policy reforms.

Summary

EUROMOD is a static tax-benefit microsimulation model, developed at the University of Essex with the financial support of the Commission (DG-EMPL), the model enables the simulation of individual and household tax liabilities and benefit entitlements according to the policy rules in place in each EU member state. Over the last years, the model developing and maintenance has been progressively transferred to the JRC through a process ending in 2020. The transfer of EUROMOD has been a joint effort by DG EMPL together with DG ECFIN, DG TAXUD, DG REFORM, DG ESTAT and the JRC.

The model covers all European countries in a consistent manner, allowing for flexibility of the analyses and comparability of the results. EUROMOD combines information on policy rules with detailed and representative micro-data on individual and household circumstances drawn from the EU Statistics on Income and Living Conditions (EU-SILC). The simulations cover a large part of the tax and benefit components of household disposable income, in particular direct taxes and non-contributory cash benefits. The components of disposable income which are not simulated are taken directly from the data. Additionally, a specific EUROMOD module allows performing simulations based on hypothetical household data, a synthetic set of microdata where family and labour market characteristics are defined by the user.

EUROMOD can be used for policy formulation or evaluation, to analyse the effects of actual and prospective changes in tax-benefit policies over time, studying for example their budgetary implications, the effects on policy and inequality and the impact on work incentives.

A EUROMOD extension (Indirect Tax Tool) allowing the simulation of indirect taxes in 18 EU countries is currently under development. The JRC intends to further extend the number of countries included by end 2021.

Keywords

tax-benefit , microsimulation

Model category (thematic)

Economy

Model home page

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

Ownership & license

Ownership

Multiple ownership [Original code owned by 3rd party]

Ownership details

EUROMOD was developed by the University of Essex, Institute for Social & Economic Research. Over the last years, the model developing and maintenance have been progressively transferred to the JRC through a process ending in 2020. The transfer of EUROMOD has been a joint effort by DG EMPL together with DG ECFIN, DG TAXUD, DG REFORM, DG ESTAT and DG JRC.

Licence type

Non-Free Software licence. The license has one or more of the following restrictions: it prohibits creation of derivative works; it prohibits commercial use; it obliges to share the licensed or derivative works on the same conditions.

Details

EUROMOD structure and approach

For a complete overview of EUROMOD readers are invited to consult Sutherland and Figari (2013), "EUROMOD: The European Union Tax-Benefit Microsimulation Model", International journal of microsimulation, 6(1) 4-26". The paper is the main source of information for the following sections (Detail on EUROMOD structure and approach; Input and parameters).

EUROMOD is a static tax-benefit calculator that allows the simulation of tax liabilities and benefit entitlements for a representative sample of households and individuals in each EU Member State. The model is static, in the sense that it does not take into account behavioural responses of individuals. The scope of EUROMOD simulations includes Personal Income Tax, Social Insurance Contributions paid by employees, self-employed and employers and most non-contributory benefits. Contributory benefits are usually not simulated because of lack of relevant information (e.g. contribution history) in the underlying data. Nevertheless, some contributory benefits such as unemployment benefits are simulated making use of assumptions where needed.

Tax benefit instruments that are not simulated are used as collected in the underlying data and included in the concept of disposable income. This is the case for most contributory benefits, for example pensions.

Depending on when a country module was first introduced in EUROMOD, the first policy system included in the model varies from 2005 to 2007 (2011 for Croatia). All the following policy systems are included up to the current year (2020).

EUROMOD baseline simulations are validated and tested both at a micro level (i.e. case-by-case validation) and at macro level (comparing aggregate amounts and recipients/payers with official statistics). A similar process is applied to income distribution and poverty statistics. The results of the validation exercises are reported in the Country Reports (available on the EUROMOD web pages).

Although EUROMOD simulations usually assume full benefit take up and full tax-compliance, adjustments for benefit non take-up and/or tax evasion are simulated in a number of country modules. Such adjustments are modelled in a transparent way that can be activated or deactivated by users.

EUROMOD code is written in C# and compiled. Users use the model through a standalone user interface, programmed using Microsoft .net Framework.

See Sutherland and Figari (2013) for a complete overview of EUROMOD.

Input and parametrization

EUROMOD input datasets are usually derived from the European Union Statistics on Income and Living Conditions (EU-SILC). In some cases the EU-SILC is enriched using variables contained in the national SILC surveys which are at the basis of the SILC. In some other cases the national SILC surveys are used directly. The EUROMOD input datasets include the following key inputs:

- Demographics at household and individual level
- labour market characteristics
- gross incomes from market and other income sources (i.e. pensions, public transfers and private incomes)

A network of teams of national experts also collects information on the policy rules in place in each country each year.

The original survey data undergo a process of transformation and imputation before being used as EUROMOD input dataset. In particular, a process of imputation aimed at “splitting” the aggregated benefit variables provided in EU-SILC is applied. The process is described in the EUROMOD country reports. In addition, variables are renamed to follow the EUROMOD naming convention (aimed at improving cross-country comparability).

The income variables contained in a EUROMOD input dataset are uprated using specific uprating factors when the year to which the income variables refers to differs from the tax-benefit systems to be simulated.

See Sutherland and Figari (2013) for a complete overview of EUROMOD.

Main output

The output microdata contains information on the:

- demographic characteristics of individual and households, as well as their financial circumstances
- simulated and non-simulated tax-benefit instruments
- disposable income.

The information contained in the output microdata can be analysed using statistical software such as STATA.

Spatial - temporal extent

The output has the following spatial-temporal resolution and extent:

Parameter	Description
Spatial Extent / Country Coverage	EU Member States
(Spatial) resolution	Individual and household level
Temporal extent	2005 – current year (9 countries); 2006 – current year (18 countries); 2007-current year (27 countries); 2011-current year (28 countries)
Temporal resolution	Yearly

Quality & transparency

Quality

Question	Answer	Details
Models are by definition affected by uncertainties (in input data, input parameters, scenario definitions, etc.). Have the model uncertainties been quantified? Are uncertainties accounted for in your simulations?	no	Deterministic model. Users can design uncertainty through simulating various scenarios.
Sensitivity analysis helps identifying the uncertain inputs mostly responsible for the uncertainty in the model responses. Has the model undergone sensitivity analysis?	not_applicable	Due to the nature of the model this does not apply.
Has the model undergone external peer review by a panel of experts, or have results been published in peer-reviewed journals?	yes	Model review is assured by its academic and policy uses and annual validation. EUROMOD coding language allow users to check what is modelled and how. Papers using EUROMOD are published in peer-reviewed journals.
Has model validation been done? Have model predictions been confronted with observed data (ex-post)?	yes	Simulation results are validated against official statistics. The validation process is documented in a series of country reports.

References related to external peer-review and publication in scientific journals:

- No references provided in MIDAS

Transparency

Question	Answer	Details
Is the model underlying database (i.e. the database the model runs are based on) publicly available?	no	Underlying input data are made available by the University of Essex and the European Commission to researchers who have been granted access to the model. See EUROMOD website for more information.
Can model outputs be made publicly available?	yes	Output microdata can be only made available to approved researchers. Aggregate measures derived from output microdata are made available in the EUROMOD website.
Is the model transparently documented (including underlying data, assumptions and equations, architecture, results) and are these documents available to the general public?	yes	The model structure is documented in a user manual included in the model. Model simulations and content are described in country reports publicly available on the EUROMOD website. The process of data manipulation for the creation of the EUROMOD input dataset is described in the Data Requirement Documents (DRDs), provided together with the EUROMOD input datasets. Other references related to documentation are the EUROMOD country reports (https://www.euromod.ac.uk/using-euromod/country-reports).
Is the model source code publicly accessible or open for inspection?	no	The University of Essex and the JRC are working toward releasing the source code, the user interface and the country parameter files as open source.

References related to documentation:

- No references provided in MIDAS

The model's policy relevance and intended role in the policy cycle

The model is designed to contribute to the following policy areas

- Economy, finance and the euro

The model is designed to contribute to the following phases of the policy cycle

- Formulation
- Evaluation

The model's potential

EUROMOD is unique in being a research tool that is relevant not only at national level and as an integrated tool for European comparative social science research, but also as a model of the EU as a whole. EUROMOD brings a distinctive economic research on the redistributive effects of tax-benefit policies across Europe. See the publication section of the EUROMOD website (<https://www.euromod.ac.uk/publications/type/Journal%20Article>) for a list of publications.

The JRC has developed an interaction of EUROMOD with the DG ECFIN model QUEST and in close collaboration with DG ECFIN and ZEW-Mannheim, see Barrios et al. (2016). Published JRC research includes analyses of in-work tax expenditures for low income workers, see Barrios et al. (2015) and contributions to the Commission Tax reforms in the EU Member States report (see European Commission 2014, 2015). EUROMOD is also used in combination with the GEM-E3 model to analyse the distributional impact of green taxes. EUROMOD provides also the micro-parameters needed to run the EDGE-M3 model.

The model has increasingly been used by the Commission services over the past few years. DG EMPL use results from the model for its Quarterly and Annual reports on Employment and Social Developments in Europe (European Commission 2018) and different research notes delivered in the context of the Social Situation Monitor are based on EUROMOD. EUROMOD based simulations are also used by DG ECFIN in the Report on Public Finances in EMU (European Commission 2017). EUROMOD is also used by ESTAT for the production of the flash estimates on income and poverty <https://ec.europa.eu/eurostat/web/experimental-statistics/income-inequality-and-poverty-indicators>. Improved timeliness in the data production and the flash estimates using EUROMOD are part of a two-pillar strategy in order to ensure more recent data for income indicators for policy making. The use of the EUROMOD model for the provision of near-real time information on income indicators is therefore critical in the context of the European Semester. The JRC uses the model in cooperation with policy DGs, in particular DG ECFIN, DG TAXUD, DG EMPL and the SRSS. Since 2015 the JRC contributes to the preparation of the Country reports for the European Semester and produces regular notes also circulated in other policy DGs (the so-called "In-depth analyses of tax reforms using the EUROMOD model"). These notes were extensively used in the Country reports of the European Semester. EUROMOD has also been used for the Social Impact Assessment of the third Greek Stabilisation programme in cooperation with DG EMPL and with the SRSS for the assessment of the reform of the

personal income system in Greece in 2015 and 2016. EUROMOD has also been used to provide technical assistance to the Greek Ministry of Finance in 2018-2020. It is planned to extend this assistance to Romania, Lithuania and Slovakia as from 2020.

Ongoing work with DG TAXUD extends the model to improve the coverage of wealth taxation and for future analyses of tax shifting between corporate income taxes and personal income taxes. The model has been extended to account for labour supply adjustment combining EUROMOD and an econometrically estimated labour supply model. This extension covers all the EU Member States. The JRC is also currently extending the model to cover consumption taxation (VAT and excises). The model provided also input to a study on the fiscal impact of migration (forthcoming 2020) in cooperation with IIASA.

The JRC has developed a "simplified" version of EUROMOD, based on a web interface, which can be accessed by registered users within the Commission.

Previous use of the model in ex-ante impact assessments of the European Commission

Use of the model in ex-ante impact assessments since July 2017.

In the Year	EUROMOD contributed to the Impact assessment called	Led by	By providing input to the	The model was run by	Details of the contribution
2021	IMPACT ASSESSMENT Accompanying the document Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL to strengthen the application of the principle of equal pay for equal work or work of equal value between men and women through pay transparency and enforcement mechanisms SWD/2021/41 final	JUST	Baseline and assessment of policy options	European Commission	The model helped to assess the following impacts: <ul style="list-style-type: none"> - Budgetary consequences for public authorities - Households income and at risk of poverty rates - Inequalities and the distribution of incomes and wealth - Specific effects on particular risk groups - Fundamental rights - Different impact on women and men
2020	IMPACT ASSESSMENT Accompanying the document Proposal for a Directive of the European Parliament and of the Council: on adequate minimum wages in the European Union SWD/2020/245 final	EMPL	Baseline and assessment of policy options	European Commission	The model helped to assess the following impacts: <ul style="list-style-type: none"> - Budgetary consequences for public authorities - Economic growth and employment - Impact on jobs - Impact on jobs in specific sectors, professions, regions or countries - Wages, labour costs or wage setting mechanisms - Households income and at risk of poverty rates - Inequalities and the distribution of incomes and wealth
2018	Impact assessment accompanying the document Proposal for a Council recommendation on: access to social protection for workers and the self-employed SWD/2018/070 final	EMPL	Baseline and assessment of policy options	European Commission	The model helped to assess the following impacts: <ul style="list-style-type: none"> - Employment protection - Households income and at risk of poverty rates - Inequalities and the distribution of incomes and wealth - Financing and organisation of social protection systems
2018	Impact assessment accompanying the document Proposal for a Council recommendation on: access to social protection for workers and the self-employed SWD/2018/070 final	EMPL	Baseline and assessment of policy options	Fondazione Giacomo Brodolini	The model helped to assess the following impacts: <ul style="list-style-type: none"> - Employment protection - Households income and at risk of poverty rates - Inequalities and the distribution of incomes and wealth - Financing and organisation of social protection systems <p>Documented in:</p> <ul style="list-style-type: none"> - DOI 10.2767/65810

Bibliographic references

- *Employment and social developments in Europe 2018.* - 10.2767/875456
- *Report on public finances in EMU 2017.* - 10.2765/256263
- *The fiscal effects of work-related tax expenditures in Europe.* - 10.2765/6099
- *Tax reforms in EU Member States 2015 : tax policy challenges for economic growth and fiscal sustainability.* - 10.2765/274179
- *Tax reforms in EU Member States : tax policy challenges for economic growth and fiscal sustainability : 2014 report.* - 10.2778/68699