MIDAS includes the descriptions of models in use by the Commission in support to the policy cycle. MIDAS is developed and managed by the **Competence Centre on Modelling** of the European Commission.

Find out more at https://ec.europa.eu/knowledge4policy/modelling_en
Contact: EU-MIDAS@ec.europa.eu

Factsheet

SWD/2018/282 final

Impact assessment accompanying the document Proposals for a Regulation of the European Parliament and of the Council on: the European Regional Development Fund and on the Cohesion Fund and; Proposal for a Regulation of the European Parliament and the Council on: a mechanism to resolve legal and administrative obstacles in a cross-border context and; Proposal for a Regulation of the European Parliament and the Council on: specific provisions for the European territorial cooperation goal (Interreg) supported by the European Regional Development Fund and external financing instruments

Supporting model(s)

QUEST, RHOMOLO

Impact assessment
SWD/2018/282 final

Fact sheet on model contributions

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

Date of Report Generation: 08/10/2020

Overview

Title

Impact assessment accompanying the document Proposals for a Regulation of the European Parliament and of the Council on: the European Regional Development Fund and on the Cohesion Fund and; Proposal for a Regulation of the European Parliament and the Council on: a mechanism to resolve legal and administrative obstacles in a cross-border context and; Proposal for a Regulation of the European Parliament and the Council on: specific provisions for the European territorial cooperation goal (Interreg) supported by the European Regional Development Fund and external financing instruments

Document ID

SWD/2018/282 final

Year of publication

2018

Led by

 REGIO

Model(s) used

QUEST, RHOMOLO

QUEST

Full title

Macroeconomic model QUEST

Run for this impact assessment by

European Commission

Contributed to

Baseline and assessment of policy options

Helped to assess the following impacts

Impact area	Impact category	Impact subcategory
Economic impacts	Macroeconomic environment	Economic growth and employment
Economic impacts	Operating costs and conduct of business	Investment cycle
Economic impacts	Operating costs and conduct of business	Affects on individual Member States
Economic impacts	Innovation and research	Stimulation of research and development
Economic impacts	Innovation and research	Innovation for productivity/resource efficiency

RHOMOLO

Full title

Regional Holistic Model

Run for this impact assessment by

European Commission

Contributed to

Baseline and assessment of policy options

Helped to assess the following impacts

Impact area	Impact category	Impact subcategory
Economic impacts	Operating costs and conduct of business	Investment cycle
Economic impacts	Operating costs and conduct of business	Affects on individual Member States
Economic impacts	Innovation and research	Stimulation of research and development
Economic impacts	Innovation and research	Innovation for productivity/resource efficiency
Economic impacts	Specific regions or sectors	Impact on regions
Economic impacts	Specific regions or sectors	Disproportionately affected region or sector
Economic impacts	Macroeconomic environment	Economic growth and employment

Macroeconomic model QUEST

Fact sheet

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

Date of Report Generation: 08/10/2020

Overview

Acronym QUEST

Full title Macroeconomic model QUEST

Main purpose:
A macro-economic model used to analyse and understand the state of the EU economy.

Summary
QUEST is a macro-economic model (Dynamic Stochastic General Equilibrium) used to analyse and understand the state of the EU economy. It is developed by DG ECFIN, and estimated model variants have been developed jointly with support from the JRC. The first version of QUEST was applied in 2007, and many extensions have been developed since.

QUEST belongs to the class of New-Keynesian Dynamic Stochastic General Equilibrium (DSGE) models that are now widely used by international institutions and central banks. These models have rigorous microeconomic foundations derived from utility and profit optimisation and include frictions in goods, labour and financial markets. With empirically plausible estimation and calibration they are able to fit the main features of the macroeconomic time series. The QUEST model has been estimated on euro area and US data using Bayesian estimation methods. Calibrated model versions are used in wider applications.

QUEST supports questions related to policy formulation, implementation and evaluation. Many of the main applications deal with fiscal and monetary policy interactions. In order to deal with the wide range of policy issues in DG ECFIN, different model versions of the QUEST model have been constructed, each with a specific focus and regional and sectoral disaggregation.

Keywords
macroeconomic model , DSGE model

Model category (thematic)
Economy

Model home page
https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/economic-research/macroeconomic-models_en

Ownership & license

Ownership

Sole copyright [European Union]

Ownership details

The model is owned by DG ECFIN.DDG2.B.3

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

QUEST structure and approach

QUEST III belongs to the class of New-Keynesian Dynamic Stochastic General Equilibrium (DSGE) models that are now widely used by international institutions and central banks. These models have rigorous microeconomic foundations derived from utility and profit optimisation and include frictions in goods, labour and financial markets. With empirically plausible estimation and calibration they are able to fit the main features of the macroeconomic time series. Calibrated model versions are used for most policy applications, but the QUEST III model has also been estimated on Euro Area, US and specific Euro Area countries (ES, DE) data using Bayesian estimation methods.

In order to deal with the wide range of policy issues in DG ECFIN, different model versions of the QUEST III model have been constructed, each with a specific focus and regional and sectoral disaggregation. Many of the main applications deal with fiscal and monetary policy interactions and either use a one-sector model or models that explicitly distinguish tradable and nontradable sectors, and include trade in intermediates. Other model variants also include housing and collateral constraints.

QUEST III has also been used for the analysis of structural reforms and another version has been employed for the analysis of energy and climate change policies. All these models are employed using different country disaggregations, focusing on the euro area or EU as a whole, and other global regions, or on individual member states.

The models are developed by the modelling unit in DG ECFIN. The Joint Research Centre of the European Commission supports QUEST development providing econometric, computational and methodological expertise in estimation and calibration, maintaining dedicated IT resources.

An update of some new developments of the QUEST III models was described in ECFIN Research Letter Vol.3.Issue 1/2009 (pp 10-13). For further references on the QUEST model, see the model homepage.

Input and parametrization

Key inputs for the estimated model versions are coming from national accounts and other macroeconomic data source. The main ones are:

- National account data (GDP and its components, current and constant prices)

- Labour market data (wages, employment)

- Financial variables (interest rates)

- Trade data

- Monetary data (interest rates)

Main output

Key outputs produced by the model:

- Model parameter estimates to be used for simulation (time evolution of all macro-variables of interest in response to a shock in the economy or changes in policy) and model-based policy analysis;

- Among the macroeconomic variables of interest, the model allows to study dynamics and economic drivers of:

  - GDP and its components

  - Price deflators

  - Fiscal variables

  - Employment, wages

  - Interest rates

  - Trade

Spatial - temporal extent

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

Parameter	Description
Spatial Extent / Country Coverage	Global, incl. individual EU countries, various EU aggregates (EU, Euro area, OMS, NMS, etc).
(Spatial) resolution	Up to country aggregation
Temporal extent	Estimation data range: 1985-2013 for Euro area aggregate; 1995-2013 for individual countries. Simulation horizon: the model is simulated for several periods ahead to allow convergence.
Temporal resolution	Quarterly

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?	yes	Possible
Sensitivity analysis helps identifying the uncertain inputs mostly responsible for the uncertainty in the model responses. Has the model undergone sensitivity analysis?	yes	Very often model versions are subject to sensitivity analysis.
Has the model undergone external peer review by a panel of experts, or have results been published in peer-reviewed journals?	yes	The model has many publications in peer-reviewed journals.
Has model validation been done? Have model predictions been confronted with observed data (ex-post)?	yes	k-periods ahead behavior of the model variables is compared with historical observations.

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

- Ratto M, Roeger W, Int Veld J. QUEST III: An Estimated Open-Economy DSGE Model of the Euro Area with Fiscal and Monetary Policy. ECONOMIC MODELLING 26; 2009. p. 222-233. JRC46465

Transparency

Question	Answer	Details
Is the model underlying database (i.e. the database the model runs are based on) publicly available?	yes	Taken from public sources.
Can model outputs be made publicly available?	yes	In publications.
Is the model transparently documented (including underlying data, assumptions and equations, architecture, results) and are these documents available to the general public?	yes	Model structure is typically documented in scientific publications (e.g. Ratto et.al 2009). Technical algorithms and codes are available upon request.
Is the model source code publicly accessible or open for inspection?	no	Technical algorithms and codes of estimated model versions published in academic journals are made available upon request.

References related to documentation:

- Fiscal stimulus and exit strategies in the EU : a model-based analysis. – DOI: 10.2765/44208

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
- Taxation
- Employment and social affairs
- Trade

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

- Anticipation
- Formulation
- Implementation
- Evaluation

The model's potential

QUEST III is a tool suitable for policy preparation and implementation. It is designed to analyze economic issues like the occurrence boom-bust cycles, the study of structural reforms (Lisbon process), fiscal policy, country debt stabilization and sustainability. Main policy areas requiring QUEST based analysis concern MIP (Macroeconomic Imbalance Procedure) assessments, EDP (Excess Deficit) procedures and debt sustainability analysis.

DG ECFIN uses QUEST III for macroeconomic policy analysis and research. Results of the studies feed into ECFIN policy repots. JRC supports DG ECFIN for the development of QUEST III, focusing on the estimation. JRC provides estimated versions of QUEST models for individual member states, used to support policy studies for macro-economic surveillance by DG ECFIN

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

Use of the model in ex-ante impact assessments <u>since July 2017</u>.

In the Year	QUEST contributed to the Impact assessment called	Led by	By providing input to the	The model was run by	Details of the contribution
2018	Impact assessment accompanying the document Proposals for a Regulation of the European Parliament and of the Council on: the European Regional Development Fund and on the Cohesion Fund and; Proposal for a Regulation of the European Parliament and the Council on: a mechanism to resolve legal and administrative obstacles in a cross-border context and; Proposal for a Regulation of the European Parliament and the Council on: specific provisions for the European territorial cooperation goal (Interreg) supported by the European Regional Development Fund and external financing instruments SWD/2018/282 final	REGIO	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Economic growth and employment - Investment cycle - Affects on individual Member States - Stimulation of research and development - Innovation for productivity/resource efficiency
2018	Impact assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council on: the establishment of a European Investment Stabilisation Function SWD/2018/297 final	ECFIN	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Budgetary consequences for public authorities - Economic growth and employment - Macro-economic stabilisation
2018	Impact assessment accompanying the document Proposal for a Regulation of the European Parliament and the Council on: establishing Horizon Europe - the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination and; Proposal for a Decision of the European Parliament and the Council on: establishing the specific programme implementing Horizon Europe - the Framework Programme for Research and Innovation and; Proposal for a Regulation of the European Parliament and the Council on:	RTD	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Investment cycle - Affects on individual Member States - Stimulation of research and development - Innovation for productivity/resource efficiency - Economic growth and employment

establishing the Research and Training Programme of the European Atomic Energy Community for the period 2021-2025 complementing Horizon Europe - the Framework Programme for Research and Innovation

SWD/2018/307 final

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- *Int Veld J, Kollmann R, Pataracchia B, Ratto M, Roeger W. International Capital Flows and the Boom-Bust Cycle in Spain. JOURNAL OF INTERNATIONAL MONEY AND FINANCE 48 (Part B); 2014. p. 314-335. JRC89811*

- *Varga, J., Roeger, W. & in't Veld, J. Growth effects of structural reforms in Southern Europe: the case of Greece, Italy, Spain and Portugal; Empirica (2014) 41: 323. doi: 10.1007/s10663-014-9253-3*

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- *Int Veld J, Raciborski R, Ratto M, Roeger W. The Recent Boom-Bust Cycle: The Relative Contribution of Capital Flows, Credit Supply and Asset Bubbles. EUROPEAN ECONOMIC REVIEW 55; 2011. p. 386-406. JRC62821*

- *Fiscal stimulus and exit strategies in the EU : a model-based analysis. – DOI: 10.2765/44208*

- *Varga, J., in 't Veld, J. A model-based analysis of the impact of Cohesion Policy expenditure 2000–06: Simulations with the QUEST III endogenous R&D model; Economic Modelling (2010) doi: 10.1016/j.econmod.2010.06.004*

- *Roeger, W., in't Veld, J. & Vogel, L. Fiscal consolidation in Germany; Intereconomics (2010) 45: 364. doi: 10.1007/s10272-010-0357-0*

- *Ratto M, Roeger W, Int Veld J. QUEST III: An Estimated Open-Economy DSGE Model of the Euro Area with Fiscal and Monetary Policy. ECONOMIC MODELLING 26; 2009. p. 222-233. JRC46465*

- *Roeger, W., Varga, J. & Veld, J. Modelling the Lisbon Strategy: Analysing Policies to Promote Knowledge Investment with an Endogenous Growth Model; Comp Econ Stud (2009) 51: 520. doi: 10.1057/ces.2009.13*

- *Breuss, F., Roeger, W. & in't Veld, J. Global impact of a shift in foreign reserves to euros; Empirica (2009) 36: 101. doi: 10.1007/s10663-008-9094-z*

- *Breuss, F., Roeger, W. & in't Veld, J. Global impact of a shift in foreign reserves to euros; Empirica (2009) 36: 101. doi: 10.1007/s10663-008-9094-z*

RHOMOLO - Regional Holistic Model

Fact sheet

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

Date of Report Generation: 08/10/2020

Overview

Acronym RHOMOLO
Full title Regional Holistic Model

Main purpose:
RHOMOLO is a model used to simulate the impact of EU policies at the regional level (NUTS 2), providing policy support in the evaluation of investments, reforms, and structural changes in the economy.

Summary
RHOMOLO is a recursively dynamic spatial computable general equilibrium (spatial CGE) model used to simulate the sector-, region-, and time-specific impact of EU policies and to provide support to policy makers in the evaluation of investments, reforms, and structural changes in the economy.

The current version of RHOMOLO (v3) covers 267 EU NUTS 2 regions and one residual Rest of the World region, disaggregating their economies into ten NACE rev.2 sectors entailing a constant effort on data updating and maintenance. All the monetary transactions in the economy are included in the model resulting from agents taking optimising decisions. Goods and services are consumed by households, governments, and firms, and are produced in markets that can be either perfectly or imperfectly competitive. Spatial interactions between regions are captured through costly trade matrices of goods and services and factor mobility through migration and investments. This makes RHOMOLO particularly well suited for analysing policies related to investments in human capital, transport infrastructure, and innovation.

The RHOMOLO model has been developed by the JRC in collaboration with the Directorate-General for Regional and Urban Policy (DG REGIO). The explicitly modelled spatial dimension makes it a unique tool for territorial impact assessment.

An up-to-date list of policy applications and publications of the model can be found here.

The latest RHOMOLO Newsletter containing the most recent activities of the Regional Economic Modelling group can be found here.

The RHOMOLO webtool (a simplified version of the model to carry out some simple policy exercises) can be found here. Please note that the webtool should not be used for real policy analysis, only the fully-fledged RHOMOLO model can be used for that purpose.

Keywords
Dynamic spatial general equilibrium model , endogenous growth , innovation , human capital , econometrically estimated parameters , macroeconomic model , spatial computable general equilibrium

Model category (thematic)

Economy

Model home page
https://ec.europa.eu/jrc/en/rhomolo

Ownership & license

Ownership

Sole copyright [European Union]

Ownership details

A prototype was developed by an external consultant in 2009.

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

RHOMOLO structure and approach

In the tradition of Computable General Equilibrium (CGE) models, RHOMOLO relies on an equilibrium framework à la Arrow-Debreu where supply and demand depend on the system of prices. Policies are introduced as shocks. After a shock, the system moves to a new equilibrium with adjustments driven by optimal supply and demand behaviours. RHOMOLO, as all CGE models, therefore provides an evaluation of the interaction effects between all agents through markets, imposing full system consistency. The type of analysis is a scenario analysis, in which the results of simulations including policy shocks are compared to a baseline scenario with no shocks.

Given the regional focus of RHOMOLO, particular attention is devoted to the explicit modelling of spatial linkages, interactions, and spillovers between regional economies. For this reason, models such as RHOMOLO are referred to as Spatial Computable General Equilibrium (SCGE) models.

Each region is inhabited by households aggregated into a representative agent with preferences characterised by love for variety. Households derive income from labour (in the form of wages), physical capital (profits and rents), and other financial assets, as well as from government transfers (both national and regional). Factor mobility can be either switched off or on depending on the needs of the analysis to be carried out. The income of households is spent on savings, consumption, and taxes.

Firms in each region produce goods that are sold in all regions and consumed by households and governments. Other firms --either in the same or in other sectors-- can also use such goods as inputs in their production processes. Transport costs for trade between and within regions are assumed to be of the iceberg type and are sector- and region-pair specific. The market structures of the industrial sectors in each region can be modelled as either perfectly competitive or imperfectly competitive (the latter can be characterised as monopolistic competition, Cournot oligopoly, or Bertrand oligopoly). The number of firms in each sector and region is empirically estimated through the national Herfindahl indices, assuming that all the firms within one region share the same technology. Given their higher weight in the price index, firms with higher market shares are able to extract higher mark-ups from consumers than their competitors, and, since market shares vary by destination market, also mark-ups vary by destination market.

Moreover, a simplified version of RHOMOLO equivalent to the Leontief Input-Output model is available: RHOMOLO-IO is a linear version of the model capable of delivering a multipliers' analysis at a sectoral level potentially more detailed than that of the full RHOMOLO model.

Input and parametrization

RHOMOLO requires a number of calibrated inputs and exogenous parameters in order to function. For example, the interest rate is set to 0.04 and the rate of depreciation of private capital is set to 0.15. More in general, the parameters related to the elasticities of substitution both on the

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consumer side and on the producer side are either based on similar models or derived from the econometric literature.

More information on model inputs and parametrisation is available in section 4 "Data, calibration and elasticities" of the latest model description written by Lecca et al. (2018) and underline here.

Main output
All RHOMOLO output variables are produced by region, sector and year.

- Households-related output variables:

  - Factor supply by household (real); Income of household (value); Taxes paid on income by household (value); Savings of household (value); Aggregate consumption of household (real); Price of aggregate consumption of household; Consumption of each good by household (real); Transfers from household to rest of the world; Net disposable income of household.

- Firms-related output variables:

  - Price of exports; Lerner index of monopoly power; Market share; Average sales price; Average production cost; Profits (value); Fixed cost of production (real); Marginal cost of production; Aggregate intermediate input (real); Aggregate input of primary factor (real); Price of aggregate intermediate input; Intermediate demand for each good (real); Total factor productivity (index); Aggregate labour-factor demand; Price of aggregate labour-factor demand; Price of aggregate input of primary factor; Demand of each factor; Taxes paid on demand of each factor; Taxes paid on sales.

- Investment-related output variables:

  - Income of investor (value); Aggregate investment (real); Investment of household (value); Investment of Government (value); Price of investment.

- Government-related output variables:

  - Factor supply by Government (real); Income of Government; Aggregate consumption of Government (real); Price of aggregate consumption of Government; Consumption of each good by Government (real); Transfers from Government to household (value); Savings of Government (value).

- Import-related output variables:

  - Demand for composite of each good (real); Price of each composite good's demand; Exports (real, single firm); Price of the rest of the world.

- Other variables:

- Price of each factor; Unemployment rate of each factor; Sales of each good s (real); Number of firms in each sector; Price of national R&D services; National knowledge capital (index).

Spatial - temporal extent

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

Parameter	Description
Spatial Extent / Country Coverage	NUTS2 regions, ten economic sectors, 3 skill/education levels (low, medium, high), EU28 regions
(Spatial) resolution	NUTS2 (NUTS1, country-level and EU28-level results are also available depending on the type of analysis)
Temporal extent	up to 2050
Temporal resolution	annual

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?	not_applicable	The type of analysis carried out with RHOMOLO, that is scenario analysis, can take care of uncertainties by simulating several alternative scenarios to be compared with the baseline one.
Sensitivity analysis helps identifying the uncertain inputs mostly responsible for the uncertainty in the model responses. Has the model undergone sensitivity analysis?	yes	A member of the Regional Economic Modelling team is in charge of carrying out sensitivity analysis for RHOMOLO. For more details see Diukanova (2018).
Has the model undergone external peer review by a panel of experts, or have results been published in peer-reviewed journals?	yes	In 2017 a panel of experts evaluated RHOMOLO. The report Boeters, S., Hordijk, L., Korzhenevych, A., Przeor, M., Swales, K., Vandyck, T., Varga, A., Varga, J., and Wolski, M (2017). Review of the RHOMOLO model, is available at: https://ec.europa.eu/jrc/sites/jrcsh/files/review_of_the_rhomolo_model_final.pdf
Has model validation been done? Have model predictions been confronted with observed data (ex-post)?	not_applicable	Model projections cannot and should not be confronted with observed data because RHOMOLO is not a forecast model.

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

- Brandsma A, Kancs D, Persyn D. Modelling Migration and Regional Labour Markets: An Application of the New Economic Geography Model RHOMOLO. EUR EUR 25956. Luxembourg (Luxembourg): Publications Office of the European Union; 2013. JRC80825

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Transparency

Question	Answer	Details
Is the model underlying database (i.e. the database the model runs are based on) publicly available?	not_applicable	As of June 2020, work is in progress to update the base year to 2015. The plan is to make the new dataset publicly available together with the data of the FIGARO project (Spring 2021).
Can model outputs be made publicly available?	yes	Model outputs are publicly available through the publications made by the members of the Regional Economic Modelling team. Full results are available upon request.
Is the model transparently documented (including underlying data, assumptions and equations, architecture, results) and are these documents available to the general public?	yes	All the model equations are transparently documented in Lecca et al. (2018) "RHOMOLO V3: A spatial modelling framework". As of June 2020, work is in progress to update the base year to 2015. The plan is to make the new dataset publicly available together with the data of the FIGARO project (Spring 2021).
Is the model source code publicly accessible or open for inspection?	no	The model code is not publicly available and there are no plans to make it so.

References related to documentation:

- Lecca, P., Barbero Jimenez, J., Christensen, M., Conte, A., Di Comite, F., Diaz Lanchas, J., Diukanova, O., Mandras, G., Persyn, D. and Sakkas, S., RHOMOLO V3: A Spatial Modelling Framework , EUR 29229 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-85886-4, doi:10.2760/671622, JRC111861.
- Diukanova, O., Multivariate Sensitivity Analysis with a Very Large CGE Model, EUR 29148 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-81031-2, doi:10.2760/046529, JRC111144.

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

The model is designed to contribute to the following policy areas
- Institutional affairs
- Education and training
- Economy, finance and the euro
- Taxation
- Employment and social affairs
- Regional policy
- Transport
- Business and industry
- Research and innovation
- Single market
- Trade

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

The model's potential
The RHOMOLO model is designed for policy impact assessment. The explicitly modelled spatial dimension at the NUTS2 regional level makes it a unique tool for territorial impact assessment. Spatial interactions between regions are captured through trade of goods and services (which is subject to trade costs), income flows, factor mobility and knowledge spillovers, making RHOMOLO particularly well suited for simulating human capital, transport infrastructure, R&D and innovation policies.

RHOMOLO has been used for the impact assessment of the European Regional Development Fund (ERDF), Horizon Europe, the European Social Fund (ESF), and the portfolio of the European Investment Bank (including EFSI that is the first pillar of the Investment Plan for Europe). Also, the model has been recently used to evaluate the economic impact of the third pillar of the Investment Plan for Europe including the legislative proposals related to the Capital Markets Union, the Single Market Strategy, the Energy Union, and the Digital Single Market.

Moreover, RHOMOLO is used for the evaluation of specific investment projects and other reforms depending on the requests made by Member States, regional authorities, and interested DGs.

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

In the Year	RHOMOLO contributed to the Impact assessment called	Led by	By providing input to the	The model was run by	Details of the contribution
2018	Impact assessment accompanying the document Proposals for a Regulation of the European Parliament and of the Council on: the European Regional Development Fund and on the Cohesion Fund and; Proposal for a Regulation of the European Parliament and the Council on: a mechanism to resolve legal and administrative obstacles in a cross-border context and; Proposal for a Regulation of the European Parliament and the Council on: specific provisions for the European territorial cooperation goal (Interreg) supported by the European Regional Development Fund and external financing instruments SWD/2018/282 final	REGIO	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Investment cycle - Affects on individual Member States - Stimulation of research and development - Innovation for productivity/resource efficiency - Impact on regions - Disproportionately affected region or sector - Economic growth and employment
2018	Impact assessment accompanying the document Proposal for a Regulation of the European Parliament and the Council on: the European Social Fund Plus (ESF+) and; Proposal for a Regulation of the European Parliament and the Council on: the European Globalisation Adjustment Fund (EGF) SWD/2018/289 final	EMPL	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Innovation for productivity/resource efficiency - Impact on regions - Investments and functioning of markets - Impact on jobs - Impact on jobs in specific sectors, professions, regions or countries - Indirect effects on employment levels - Factors preventing or enhancing the potential to create jobs or prevent job losses - Level of education and training outcomes
2018	Impact assessment accompanying the document Proposal for a Regulation of the European Parliament and the Council on: establishing Horizon Europe - the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination and; Proposal for a Decision of the European Parliament and the Council on: establishing the specific programme implementing Horizon Europe - the Framework Programme for Research and Innovation and; Proposal for a Regulation of the European Parliament and the Council on: establishing the Research and Training	RTD	Baseline and assessment of policy options	*European Commission*	The model helped to assess the following impacts: - Investment cycle - Affects on individual Member States - Stimulation of research and development - Innovation for productivity/resource efficiency - Impact on regions - Disproportionately affected region or sector - Economic growth and employment

	Programme of the European Atomic Energy Community for the period 2021-2025 complementing Horizon Europe - the Framework Programme for Research and Innovation SWD/2018/307 final				
2016	Impact assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council: amending Directive 2012/27/EU on Energy Efficiency	ENER	Problem definition	*European Commissi on*	Evaluation of energy costs at regional level

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