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Improving the capacity and usability of EUROMOD

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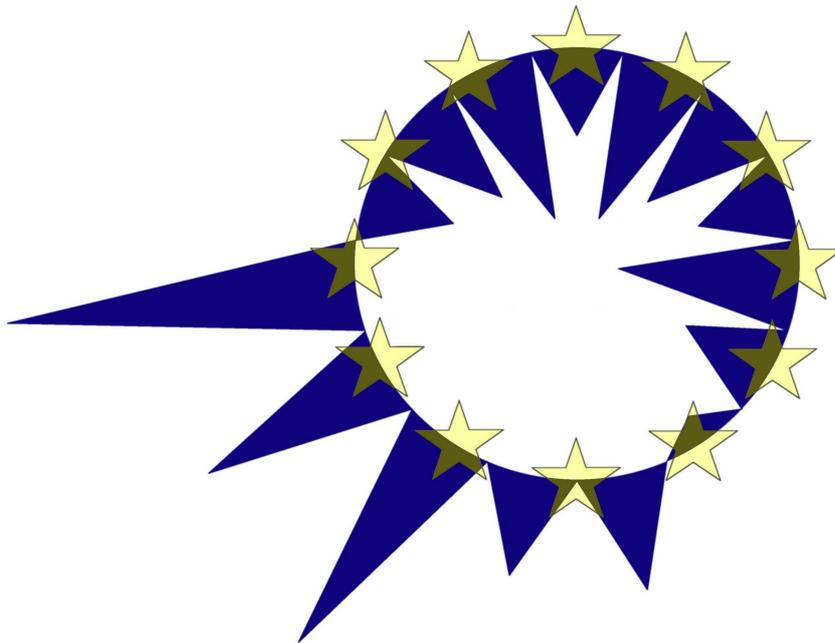
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EUROMOD

WORKING PAPER SERIES



EUROMOD Working Paper No. EM4/08

IMPROVING THE CAPACITY AND
USABILITY OF EUROMOD – FINAL
REPORT

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June 2008

Improving the Capacity and Usability of EUROMOD – Final Report[‡]

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Note

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[‡] Figure 3 presented in this paper is based on micro-data from 17 different sources for 19 countries. These are the: European Community Household Panel (ECHP) User Data Base made available by Eurostat; the Austrian version of the ECHP made available by the Interdisciplinary Centre for Comparative Research in the Social Sciences; the Panel Survey on Belgian Households (PSBH) made available by the University of Liège and the University of Antwerp; the Estonian Household Budget Survey (HBS) made available by Statistics Estonia; the Income Distribution Survey made available by Statistics Finland; the Enquête sur les Budgets Familiaux (EBF) made available by INSEE; the public use version of the German Socio Economic Panel Study (GSOEP) made available by the German Institute for Economic Research (DIW), Berlin; the Greek Household Budget Survey (HBS) made available by the National Statistical Service of Greece; the EU Statistics in Incomes and Living Conditions (SILC) made available by Eurostat; the Living in Ireland Survey made available by the Economic and Social Research Institute; the Survey of Household Income and Wealth (SHIW95) made available by the Bank of Italy; the Socio-Economic Panel for Luxembourg (PSELL-2) made available by CEPS/INSTEAD; the Socio-Economic Panel Survey (SEP) made available by Statistics Netherlands through the mediation of the Netherlands Organisation for Scientific Research - Scientific Statistical Agency; the Polish Household Budget Survey (HBS) made available by the Polish Central Statistical Office and prepared by the Economic Department of Warsaw University; the Slovenian Household Budget Survey (HBS) and Personal Income Tax database made available by the Statistical Office of Slovenia; the Income Distribution Survey made available by Statistics Sweden; and the Family Expenditure Survey (FES), made available by the UK Office for National Statistics (ONS) through the Data Archive. Material from the FES is Crown Copyright and is used by permission. Data providers do not bear any responsibility for the analysis or interpretation of the data reported here.

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1. Project Objectives

EUROMOD is a tax-benefit microsimulation model for the European Union. It enables research on the effects of policies and policy reforms on incomes, poverty, inequality, social inclusion and work incentives. It has been deliberately constructed to be independent of any single theoretical or disciplinary perspective, as a platform on which users can implement their chosen approaches. EUROMOD is not only of relevance to social scientists but also of potential value to policy practitioners, as the model itself embodies a knowledge base about different and changing national policy structures and systems within a comparative framework.

Tax-benefit microsimulation models are based on household micro-data representative of populations of interest. They calculate disposable income for each household in the dataset. This calculation is made up of elements of income taken from the survey data (e.g. employee earnings) combined with components that are simulated by the model (taxes and benefits). The basic output from EUROMOD is the micro-level change in household disposable income as a result of changes to direct personal taxes or cash benefits. This provides a basis for the calculation of (a) estimates of aggregate effects on the government budget, (b) the impact on measures of poverty and inequality, (c) differential effects on groups of socio-economic interest, and (d) indicators of work incentives.

EUROMOD uniquely allows such calculations to be made in a comparable way across EU Member States. Use of national tax-benefit models for comparative purposes has been shown to be highly problematic because national model design and options reflect national priorities, interests and conventions. EUROMOD has reduced these difficulties by maximising flexibility in many dimensions. It enables international comparisons, makes analysis at the EU level of policy reforms a possibility; and provides a framework for analysis exploring the effects of policies from country A on the population of country B.

EUROMOD provides a foundation for a wide range of types of empirical social science research. Completed applications to date are described in EUROMOD Working Papers.[§]

Until I-CUE, EUROMOD covered the 15 pre-May 2004 Member States (MS) of the EU. The aim of I-CUE was to re-design and up-grade EUROMOD in the light of

- EU enlargement
- lessons learned from operating and using the original, pre- I-CUE, version of EUROMOD.

The combination of feasibility studies and technical tasks were structured so that together they provided the basis for

- increasing EUROMOD's capacity to address a very wide range of social science questions
- incorporating the 10 New MS
- improving ease of use and accessibility

[§] See <http://www.iser.essex.ac.uk/msu/emod/workingpapers/>

- improving the quality of results by enhancing comparability across countries
- reducing the resources necessary to maintain, update and develop EUROMOD in the future.

The study was overseen by a User Group who tested the new components and commented from the user perspective on the various trade-offs and choices that inevitably emerged.

As well as laying the technical basis for a 27-country comparative research infrastructure, a goal of I-CUE was to begin to involve researchers, data providers and institutions from the 10 New MS in the long-standing EUROMOD collaboration. Together with design up-grades (e.g. a tool to guide the user through the model) and greater clarity in presenting the knowledge base embodied in the model (e.g. a menu of classification systems for taxes and benefits) these developments prepared for a planned new phase of extending access to EUROMOD to the EU27 social science research community at large.

2. Summary of work performed and end results

The work was carried out in 11 work-packages (in addition to a management work-package). They are most usefully considered under six headings since several of them had aims and objectives that were closely related in principle, or which turned out to be addressing issues that had common solutions. These headings are (with work-package numbers):

Technical improvements

- EUROMOD framework revision (DS4.1, DS4.2, DS4.3)
- Extending the use of common components (DS5.1, DS5.2)
- The EUROMOD Operating System (DS7)
- Classifications of taxes and benefits (DS6.1, DS6.2)

Enlargement

- Extending EUROMOD to the New Member States (DS3.1, DS3.2)

Oversight

- The EUROMOD User Group (DS2)

While the following two sections of this report discuss the project results in terms of the two main areas of work – improving the model’s design (items 1 to 4 above) and enlarging EUROMOD to cover four new countries (item 5) – it is clear that there were very strong interdependencies between the two main parts of the project. On the one hand constructing the new country components was greatly facilitated by improvements to the EUROMOD framework, the development of new tools and the discipline offered by defining (a) a common and documented structure of the modules used in building new country components and (b) a powerful yet flexible system for naming variables. On the other hand, these developments were directly informed by an understanding of what was required (in terms of data, information about policy rules and also human capacity and motivation) to build the new

EUROMOD components in an effective way. Moreover, when difficult or strategic choices had to be made, consultation with the EUROMOD User Group was an invaluable resource. Again the relationship was a two-way one, with User Group members having hands-on access to new aspects of the model as they developed.

These interactions across the project make it appropriate to present a summary of the major outcomes and results for the project as a whole, before considering the work done and specific results within the main sections of the project in later parts of this report. These major results include:

- i. Inclusion of four new countries (Estonia, Hungary, Poland and Slovenia) in EUROMOD together with documentation: Country Reports and data descriptions.
- ii. Feasibility studies for six of the remaining eight New Member States, providing much of the detail needed to build country components for those countries (Cyprus, Czech Republic, Latvia, Lithuania, Malta and Slovakia).
- iii. An established method and process for identifying and cooperating with teams from the remaining countries (Bulgaria and Romania, and others in the future).
- iv. A version of EUROMOD that allows for analysis of 19 EU countries, separately or in any combination; baseline EUROMOD statistics for these countries (<http://www.iser.essex.ac.uk/msu/emod/statistics/>)
- v. Established protocols, guidelines and methods used in the inclusion of the four new countries. These elements also provide a clear blueprint for the re-building of the EU15 components of the model and a roadmap for the regular updating of the whole of EUROMOD. They include:
 - (a) A standardised variable naming convention and input data documentation template.
 - (b) A set of revised common modules that act as “building blocks” in programming tax and benefit policies for each country; allowing elements to be swapped across countries and a uniform approach in all countries.
 - (c) A template for the documentation of each country component (Country Reports).
 - (d) A long-term plan for the use of Eurostat EU-SILC data as the common input database for all countries.
- vi. A user interface and operating system that has proved to retain the full range of flexibility of choices by the user while requiring no special programming skills nor purchase of special software, but at the same time allowing use and operation of the model to be learned with modest effort.
- vii. Some new functions and features of EUROMOD including
 - (a) The ability to calculate effective marginal tax rates using a range of assumptions.
 - (b) A mapping of social benefits onto independent and official classifications of these sources of income.

viii. Insights into the feasibility of further technical improvements in the following dimensions:

- (a) Providing web access to EUROMOD in two distinct modes has been established as feasible.
- (b) On the other hand some aspects of the original plan have proved to be infeasible, impractical or not worthwhile.
 - For example, the planned EUROMOD “add-on” procedure - a set of methods that allow for the separation of model enhancements from the basic system and later ‘plugging them in’ as required – was found infeasible. Due to EUROMOD’s flexibility and complexity the scope for possible “add-ons” is too wide to devise a generic set of guidelines or protocols to comprehensively cover any type of “add-on”. Therefore an ad hoc approach, emphasising good documentation is necessary.
 - For similar reasons a universal solution for upgrading private developments to new versions of EUROMOD was found to be unrealistic.
- (c) The choice of underlying software needs to be considered with a view to improving run speed and long term sustainability. This review needs to consider the costs as well as benefits of any significant change, given that the existing configuration has proved satisfactory in many dimensions including with respect to user feedback.

ix. Some substantive applications of EUROMOD using the new features which may act as demonstrators or exemplars for future users.

3. Technical improvements to EUROMOD

EUROMOD is unique as a multi-country microsimulation model. The process of its construction has therefore been based on “learning by doing” without prior or parallel experience to build or draw on. Unforeseen challenges have been encountered and unanticipated research applications for the model have been identified. At the time when the I-CUE project started it was apparent that design improvements were necessary if the model was to become more widely used and its promise fully exploited. It was difficult to use and difficult to maintain efficiently. The project offered the necessary resources to consolidate the lessons that have been learned in order to improve or re-design parts of the model.

The aim of the technical work-packages can be summarised as follows:

- improving user friendliness in order to make the model accessible for inexperienced users, as well as reduce effort of application for experienced users;
- improving “developer friendliness” in order to reduce the time, resources and special knowledge needed to update the model or to add new countries;
- improving comparability across countries, in particular to prepare for the requirements of incorporating tax-benefit systems with potentially quite different structures than those already covered;

- standardising model appearance and modelling of country components in order to facilitate meaningful access by researchers who are not necessarily familiar with the institutional details or the social and economic background in each country;
- improving model performance in order to prepare for extensions of the coverage and scope of the model.

In the following each of the technical work-packages will be described in terms of how they contributed to these aims, with regard to why the work became necessary (*past*), how and by what means the model was improved (*present*) and how these improvements will contribute to facilitate *future* work.

EUROMOD framework revision

Within the model framework before I-CUE it was very difficult to “revive” work that had been done in the past. The model did not offer much support in redoing or replicating research applications under changed conditions or with upgraded versions of the model. Furthermore, many enhancements made to EUROMOD’s basic facilities had to be removed after addressing their immediate research question for reasons of model transparency and to avoid making the basic use of EUROMOD more complicated. The aim of this work-package was to redesign the model framework and to provide tools to avoid such wasteful steps in the future.

The initial plan for facilitating the redoing of research applications was to develop log-files recording the work done during a session, to use the information stored in the log-file to integrate the scenario into any EUROMOD version (DS4.1). To avoid losing model enhancements for reasons of transparency and user friendliness an “add-on” mechanism was planned. This was to allow for the separation of the enhancements from the basic system by developing methods for “plugging them in” as required (DS4.2). Both approaches were to be supported by a redesign in model structure that allowed for more transparency and automation in making and recording changes (DS4.3). Because of the wide range of possible applications of the model and the resulting complexity these plans were very challenging. Therefore the final outcome of the work within this work-package differs in some points from the initial plans, but clearly fulfils its aim to facilitate the replication of work done and maintain model enhancements.

To support redoing of research applications the “EUROMOD change report” tool was developed. This tool is a facility that supports users in keeping track of their changes. In a typical application of the tool a user will have implemented a reform scenario based on the policy rules of a certain base scenario, for example she may have introduced a minimum income scheme based on the Hungarian 2005 tax-benefit system. By using the change report tool she can obtain an overview of all the differences in parameters between the base scenario and the reform scenario. This report can help her in two ways. Firstly, she can check if her implementation is as intended or if mistakes crept in. Secondly, she can keep a convenient record of the detailed steps involved in her work. A second functionality of the change report tool is its capacity to facilitate the replication of a reform scenario in a more recent EUROMOD version with a simple mouse click. Currently there are some restrictions with regard to the changes the tool is able to report and replicate, which are documented. However, with some further development, the change report tool has the potential to cover the most typical applications of the model.

Moreover, the ability to keep track of changes was considerably improved by redesigns of the model structure, not only within this work-package (DS4.3), but also by other efforts to enhance transparency, in particular by extending the use of common components (DS5).

The “add-on” mechanism, planned to avoid losing model enhancements for reasons of transparency and user friendliness, proved to be less clear-cut than initially expected. In fact the range of possible model enhancements is too large and diverse to be covered by just one generic mechanism. However, two examples demonstrate that appropriate documentation and the development of supporting tools do nevertheless allow for separation of model extensions from the basic system and for “plugging them back in” if required. With some adaptations the procedures used in the examples can be applied to similar model extensions, as well as serve as templates for new procedures.

In the first example marginal tax rate calculations and within-household sharing modules were added to the model. Together they constitute an “add on” for the gendered analysis of work incentives. A facility to “switch them on and off” as well as substantive documentation prevents these additions to the model from damaging its overall transparency and ease of use. This was tested in an application of EUROMOD exploring the differences in work incentives of members of couples.

In the second example a procedure and a tool to support it were developed which enable the separation of one or more countries from EUROMOD into an independent “spin-off”. This spin-off is a copy of EUROMOD which essentially inherits the whole functionality of the EUROMOD operating system, but comprises only the selected country(ies). From the time of separation the spin-off may follow its own path of development without having to consider the requirements of its “parent”. If for some reason reintegration is desirable at a later point in time the effort for a “plug back in” is likely to be moderate, due to the same structure of EUROMOD and its spin-off, certainly depending on the dimension of the drift off. The procedure was successfully applied for creating a EUROMOD spin-off for South Africa (SAMOD). Two further EUROMOD spin-offs are emerging – a model for Turkey is under construction and a model for five Latin American countries (LATINMOD) is planned.

The redesign of the model framework together with the tools and examples developed within this work-package provide that “reviving” work once done is now manageable in EUROMOD and that wasteful steps such as removing enhancements after they have answered their immediate research questions can be avoided in future.

Extending the use of common components (DS5)

EUROMOD was originally built with comparability in mind and in order to address difficulties that arise when national tax-benefit models are used for comparative purposes. However, as mentioned above, developing EUROMOD has been based on “learning by doing” and the lessons learned showed that there is considerable scope for improving comparability across countries and ease of use by extending the use of common components, or building blocks, within the model. This becomes particularly important at a time where the model is to be expanded by a large number of new countries with potentially quite diverse tax-benefit systems.

The need to increase comparability

Two dimensions of enhancing comparability were identified. The first concerns the way in which the different tax-benefit systems are implemented in EUROMOD. Policy instruments (taxes, benefits) are implemented in EUROMOD using building blocks, known as modules. There are two types of modules - country specific and common modules. Common modules describe tax-benefit elements, e.g. eligibility conditions for benefits, which allow for implementation of a wide range of policy instruments. Our extensive experience with EUROMOD showed that many of the country specific modules can be replaced by common modules. However, the original, pre- I-CUE common modules showed some inadequacies in structure. On the one hand they lacked clear scope (i.e. several modules fulfilled similar tasks) and on the other hand they did not provide a consistent “interface” for the model developer (i.e. use of different names for similar options, different treatment of module output, etc). The aim of this work-package was to improve common modules to overcome these defects.

The second dimension for possible enhancement of comparability concerns the variables used for the EUROMOD input dataset. When EUROMOD was designed originally modellers could not anticipate the wide diversity of the national databases that would be required. In principle, it was planned that most variables in the national databases would have names and definitions that would be common across all countries and some additional country-specific variables to deal with national particularities. In practice, on average, each national component of the EUROMOD EU15 dataset contained about 100 common and 40 country specific variables. Following the same pattern, the inclusion of the EU New Member States could have well extended the number of country specific variables to reach 1,000. Such a large number of variables is, on the one hand, a technical problem in that it increases the size of parameter files and databases and as a result reduces the speed of simulation. On the other hand user friendliness is jeopardised, as it is difficult to identify the variable containing the information that one is looking for. This applies particularly when wanting to identify variables with common (or closest) meanings across countries. The objective of this work-package was to design a new method that allows the number of variables to be reduced and to increase the transparency and clarity of the dataset without sacrificing the diversity and complexity of the information used by EUROMOD.

Common modules

In revising the common modules a general structure was introduced, that guarantees a consistent “interface” for the model developer. Also a particular improvement is the introduction of a consistent error handling, which has the potential to considerably reduce the effort needed to implement new features, by facilitating the detection of incorrect modelling. The number of the common modules was greatly reduced by avoiding overlapping functionalities and increasing their flexibility. The new common modules are considered to be more transparent and easier to use, while their functionality is thought to be sufficient to model all – or nearly all – of the existing tax-benefit components in Europe. Moreover, the new common modules can be seen as using a standardised language to describe policy instruments of their sub-components. Once EUROMOD users are accustomed to this language, their understanding of other (foreign) countries' benefits and taxes improves considerably. In addition, use of common structures facilitates the detection of similarities and differences between (maybe only seemingly very different) tax and benefit instruments.

The new common modules were first tried out while constructing Simple Land (SL) in EUROMOD. This is an additional hypothetical tax-benefit system, the purpose of which is to make learning and teaching EUROMOD easier. This has also served as a “sketch” for the New Member States’ prototype models. SL provides a simple versions of policies like social insurance contributions (distinguishing employer, employee and self-employed), income tax (single flat rate with a general allowance), universal child benefit and means-tested social assistance and is based on a synthetic database of hypothetical households. The new common modules were then put to a comprehensive test by applying them to the New Member States’ policies. This revealed, as expected, the necessity for some changes and further improvement. In general however the new modules have proved to be much easier to use than the old ones. The flexibility of the new modules was further confirmed as remarkably no country specific module was necessary for the implementation of any of the new countries.

Database standardisation

As a first step in consolidating the variables used by EUROMOD an exhaustive study of the current EUROMOD dataset was carried out. This has proved that the same or similar information was stored in different countries in variables with completely different names. Although uniform across countries, common variables also showed some drawbacks. First, their names and descriptions did not follow any specific convention so it is not straightforward to group similar information together by, say, sorting or selecting variables by their names or description. Second, these variables are not comprehensive and/or flexible enough to integrate much of the country specific information available or that may be added with the inclusion of new countries and/or data. As a result of this study it was concluded that there was plenty of scope to tighten and improve the organisation of the EUROMOD dataset. However, flexible methods were needed if all the current and future information was to be stored in a efficient, transparent and comparable way. Following this conclusion, a new approach was proposed that does not intend to provide a complete and fixed list of variable names but instead provides a flexible and adaptable naming convention. This naming convention consists of an (extendable) list of acronyms that, joined together in a predetermined order, build a variable name. Basically, there are three classes of acronyms that are ordered hierarchically. The first class consists of a lowercase two digit acronym to identify whether the variable is common (co) or country specific (at, be,..., uk). The second is a one uppercase character that identifies the type of information contained in the variable (**A**sset, **L**abour market, **D**emographic, **R**egister, **S**ystem, **p**rimar**Y** income, **eX**penditure, cash **B**enefit, **i**n-**K**ind benefit, public **P**ension, **T**axes and contributions). Finally, there is a set of specific acronyms containing two uppercase characters designed for each variable type. For example the variable for employment income would be named coYEM under the new regime and the variable for self-employment income coYSE. Moreover, variables containing further detailed information about the content of a more general variable would be named in a similar and consistent way. For example, the variable for employment income of the military would be named coYEMML. Hence, this systematic and consistent approach allows the grouping together of similar variables by simply sorting their names in alphabetical order. The key advantage of this approach is its flexibility. A wide range of variable names can be created out of these acronyms. Moreover, the approach is able to adjust to the fact that the level of detail and specificity about similar information varies considerably between countries. Of course, this approach has also some drawbacks. It requires a careful examination of the list of acronyms and rules before naming a variable, which can be quite demanding. However, building databases and adding new variables are not frequent tasks and therefore the extra

time involved it is not expected to be a big burden. Moreover, some variable names are less intuitive than the current (e.g., coAGE is more intuitive than coDAG to refer to the age of the individual). It is expected that an automatic labelling alleviates this problem.

In order to test the usefulness and comprehensiveness of this method, new variable names were created for most of the existing database using the new naming convention. This showed that the current number of variables could be reduced by about 25%.

The new naming approach was put to a comprehensive test by being used in the construction of the prototype models of the New Member States. Of course some adjustments were necessary. However, in general the experience has been very positive. Remarkably, no country specific variables were used to construct the data for the four countries. Also, the documents describing each country component of the EUROMOD dataset have been revised and adapted in order to take account of the standardisation, which again allowed for making these descriptions more comparable, transparent and comprehensive and to provide methods to ensure this for data updates and the adding of new countries.

Implications for the future

To fully exploit the work done in I-CUE the model components for the “old” 15 countries need to be transferred to use common modules and standardised variable names. This is a big and challenging task, but the very positive experience with the four New Member State countries, together with a test revision of one of the “old” EU15 countries (Italy) prove that results justify the effort. Moreover, any new country component will, without doubt, apply the new approaches.

EUROMOD operating system (DS7)

EUROMOD is a research tool which is extremely flexible and powerful, but which is - inherently and necessarily - complex to use. Making national tax-benefit models user-friendly is relatively straightforward. They usually offer a selection of choices, limited to the ones that the model developers anticipate that users will require. While this has proved appropriate in the context of one country and one tax-benefit system, it is impossible to make a model that aims to cover 25 or more tax-benefit systems and make use of a variety of national datasets accessible in this way without sacrificing flexibility for the sake of user-friendliness. However, as the difficulty of operating EUROMOD was one main obstacle in making the model accessible to a wide user community, there was clearly need for improving the usability of the model. Therefore, the aim of this work-package was to consider ways to overcome these difficulties.

The approach followed was to develop a so called EUROMOD operating system. The aims can be summarised as follows:

- provide a single surface or entry-point to the model
- make simple applications, e.g. running the model, easy to accomplish
- provide some guidance for more complex uses of the model

- facilitate “navigation” within the EUROMOD parameter files (which store the information about how the tax-benefit systems of the selected countries are implemented, which datasets are used as inputs, plus all the other user options).

Figure 1 shows the surface of the operating system that emerged after some trials and design revisions. It contains flags for the implemented countries (and intimations of those which are intended to be implemented in the near future). This not only shows at first sight which countries are available, but also provides, due to its colourfulness, an attractive entry point to the model for the novice user.

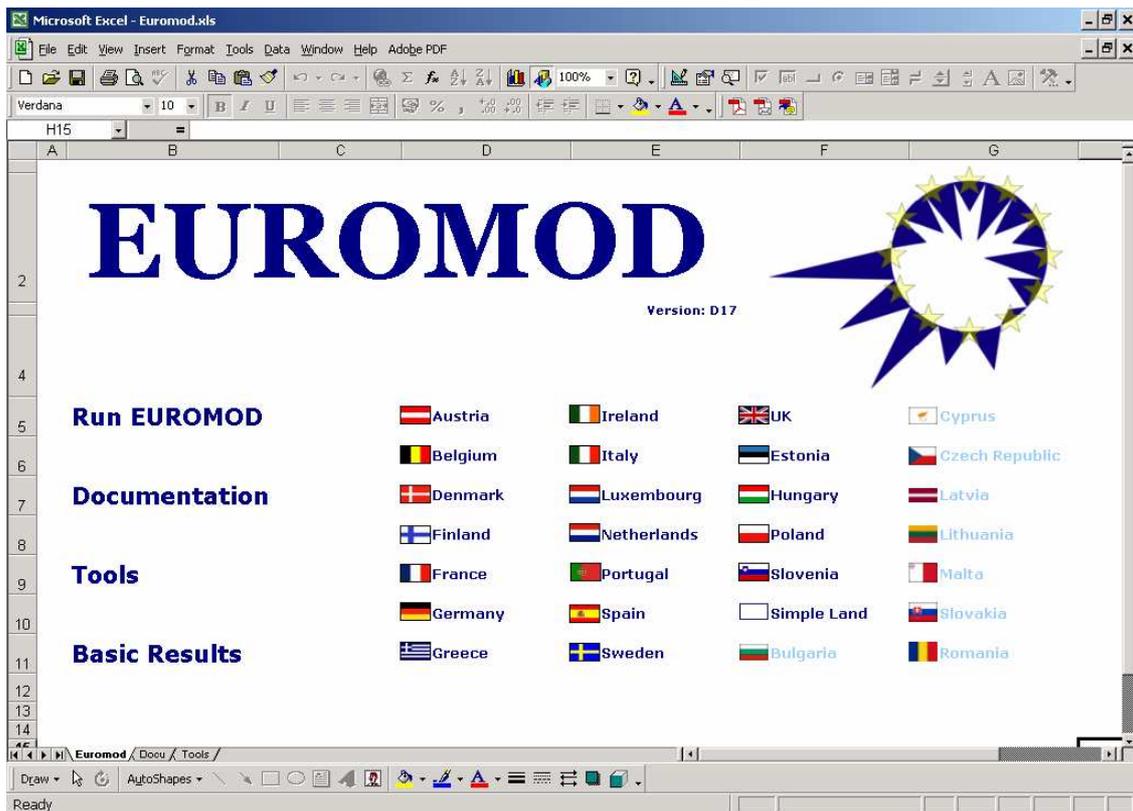


Figure 1

The left side of the surface offers some menu points which enable the second and third tasks named above to be accomplished. Clicking “Run EUROMOD” opens the interface shown in Figure 2, where users can select the countries and tax-benefit systems they want to run in a straightforward manner. Clicking “Tools” directs users to an overview of the EUROMOD tools collection, which provides many helpful tools, for example a tool that allows computing a range of commonly used indicators and statistics for analysing EUROMOD micro-output. Clicking “Documentation” directs users to an overview of the comprehensive EUROMOD documentation, which includes Manuals, which describe how to operate the model; Country Reports, which document the way in which each country’s tax-benefit system is modelled; Data Descriptions, which describe the datasets, building the EUROMOD database; “Recipes”, which provide step-by-step instructions that describe in detail what needs to be done to make EUROMOD produce the output needed for a particular research question; and a link to EUROMOD working papers.

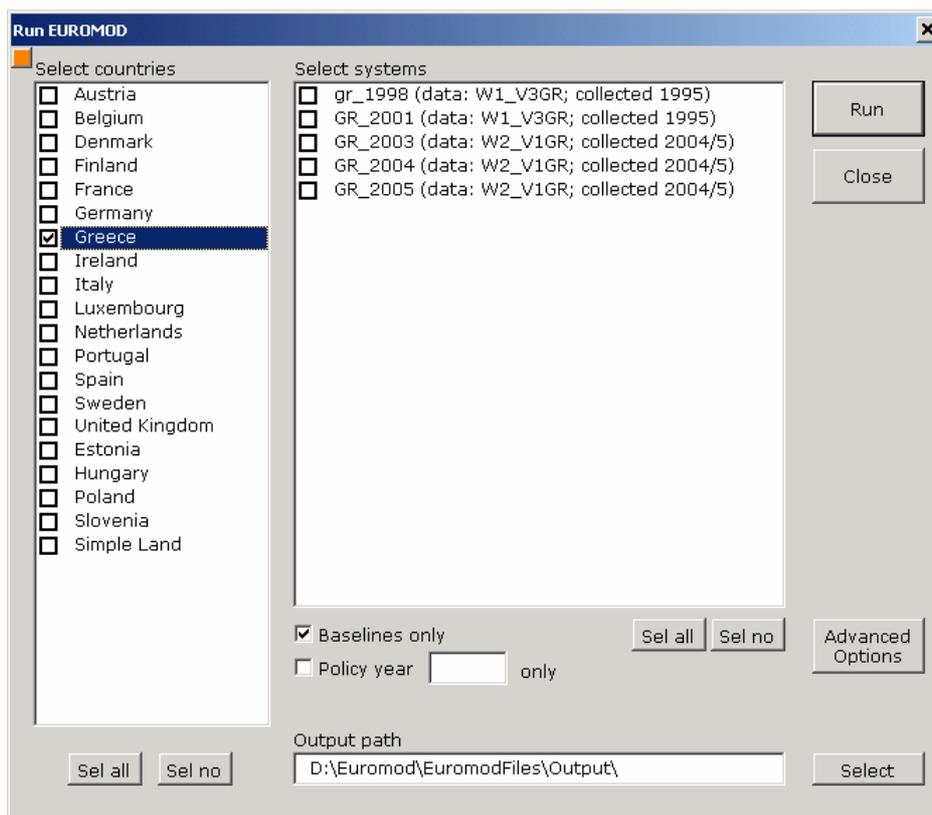


Figure 2

To fulfil the last task named above (“navigation”), firstly, the operating system provides an entry point to each country’s parameter files: the flags can be clicked to access the parameter files of the respective country. Secondly, the parameter files are intensively linked; meaning that if a parameter file applies information that is stored in another parameter file, it provides a link referring to this file. Moreover, each parameter file contains a so called “navigation-sheet” that provides further orientation. Thirdly, several interfaces support users in implementing changes, e.g. an interface that allows for implementing a sketch for a reform scenario.

Other activities within this work-package aiming to improve EUROMOD’s user-friendliness included the extension of the EUROMOD tools collection. For example a tool for the administration of variables was developed following the activities concerning database standardisation (DS5.2 see above), as well as a tool that supports adding new countries to the model. Moreover, the EUROMOD documentation was improved and extended. For example a basic manual, explaining how to run EUROMOD and its basic concepts, proved very useful in teaching new users. Another development established more flexibility concerning the form of input data. It is now possible to use other data formats than the standard (Microsoft Access). Amongst other options, plain text files can be used as input data with the essential advantage of faster run-speed.

The EUROMOD operating system was put to a comprehensive test by new users (during two EUROMOD training courses within the Essex Summer School, as well as the ECASS visitor programme at ISER in the University of Essex), “old users” and the developer team itself. The

developments were confirmed to be helpful and their contribution to facilitate work with EUROMOD was judged to be considerable.

Of course there is still room and necessity to further improve the operating system, especially if the model is to be extended in scope and scale. However, lack of user-friendliness as an obstacle to using the model has largely been overcome: evidence for this being the growth in the number of active users. Lack of usability no longer stands in the way of a further major enlargement of the EUROMOD user community.

An additional component of DS7 explored options for the future regarding **web-access to EUROMOD**. There are at least two arguments for considering this.

- a) Promoting and disseminating the model – those potentially interested in using the model may prefer to explore EUROMOD directly via the web without having to download and install anything.
- b) Enhancing access to the model - under the current circumstances where EUROMOD relies on 17 data providers, it is rather burdensome for users to obtain all necessary data access permissions. One potential solution for this is to hold the data in one secure location and allow users to run EUROMOD remotely without having direct access to the underlying data.

In order to address these issues and investigate the feasibility of providing remote/web access in general, a small study was conducted with the focus on the possibilities for the current EUROMOD version rather than considering construction of a new version for web purposes.

Web-based ‘view-only’ EUROMOD: A demo-version of the EUROMOD operating system, allowing users to browse and see everything but not to change anything was developed in prototype. The parameter files were converted into standard web format (HTM) keeping their contents, layout and functionality (e.g. navigation between files) intact. *This suggested that maintaining a web-accessible, view only version alongside the desk-top operational version is feasible.*

Remotely accessible model with full functionality: As a solution to provide a fully functional model without direct user access to the underlying data, it was suggested that all model components (micro-data, tax-benefit system parameters and the executable program file) are stored on a server and the user would be only allowed to access the parameter files. In order to use the model, the user would need to follow the following procedure:

- 1) User downloads a package of parameter files and associated documentation in order to prepare to run the model, i.e. choose which baseline policy systems to run or/and implement policy reforms.
- 2) User uploads modified parameter files to the server and requests it to process them.
- 3) Server runs the model (i.e. starts the executable), using user prepared parameter files and micro-data stored on the server.
- 4) Model finishes producing the micro-data output (or reports an error).
- 5) Server returns results to the user.

While most uncertainty was associated with step 4, it turned out to be possible to run the current EUROMOD version remotely. Although this did not require any modifications to EUROMOD, some minor improvements were identified that could be made to the EUROMOD operating system to make this process more straightforward and user-friendly.

The main question left is what form the results are returned in and/or whether analysis of the micro-results can also be performed remotely. Unless EUROMOD output is summarised or aggregated in some way, the data access issues would not be resolved. Currently this is more a strategic rather than a technical question and was not addressed by this study.

Classifications of taxes and benefits (DS6)

Related to the problems that arose from the pre- I-CUE method of naming variables, and particularly those concerning taxes and benefits, was that of classifying them into aggregates that are comparable across countries. For example in some countries there is one benefit for the unemployed but in others there may be several, covering different types of unemployed people or appropriate for different stages of unemployment. Typically a EUROMOD user would like to identify all unemployment benefits for each country, before deciding how to treat them in any particular analysis. A similar issue applies to benefits with other purposes and also to taxes.^{**} This aggregation process is made much simpler using the naming convention described above under DS5. Nevertheless, until all the EU15 country components have been converted to use the new variable names the user is faced with a particular problem of classifying individual national benefits into comparable types since the old names for country specific variables may provide *no* indication of their function.

Furthermore, for certain sorts of analysis, such as that which examines the redistributive effects of different types of benefit across countries, defining “types” of benefit is usefully done in a way that conforms to classifications already established for cross-country comparison purposes. There are many of these classifications, developed for different purposes. The aim of the work-package DS6.1 was to identify some selected established classifications onto which EUROMOD variables could be mapped and then to provide the means for users to straightforwardly adopt these classifications in their EUROMOD analysis.

This was carried out for the 2001 systems of the EU15 countries using three classifications: those of MISSOC (European Commission), SOCX (OECD) and LIS (Luxembourg Income Study). The headings under which benefits are classified are shown in Table 1 below.

EUROMOD benefit variables were aggregated into the categories as defined by the three classifications, using the documentation that was available for the definitions in each case. The EUROMOD variables included those taken from the input data that cannot be simulated, together with those simulated by the model. The aggregates are defined in “income lists” in such a way that they can be included in EUROMOD relatively straightforwardly.

As a check, a quantitative comparison was performed, for the two classifications for which information is available on total spending/receipts (SOCX and LIS). The share of benefits by category was compared with the corresponding breakdown estimated by EUROMOD. While broadly in line there are some differences, to be expected, due to (a) use of different

^{**} Taxes were not considered because among the international classifications that we worked with only the LIS classification covered taxes.

underlying data sources that may have differences in coverage (this particularly applies to the SOCX-EUROMOD comparison where the estimates in the former are based on administrative statistics) or (b) the fact that non-take-up of benefits is not captured by most EUROMOD estimates (and this affects some types of benefit more than others) or (c) remaining conceptual ambiguities preventing allocation of the EUROMOD variable to the correct category.

Table 1: Categories used by international classifications of benefits

SOCX	MISSOC	LIS
1- Old age	1- Old age	1- State Old age and Survivors
2- Survivors	2- Survivors	
3- Incapacity related benefits (<i>Disability, Occupational injury and disease, Sickness</i>)	3- Invalidity	2- Disability pay
	4- Sickness	3- Sickness
	5- Employment injuries and occupational diseases	4- Occupational injury and diseases
4 - Health	----	---
5- Family	6- Family benefits	5- Child / family
	7- Maternity	6- Maternity
6- Active labour market programmes	8- Unemployment	7- Unemployment compensation
7- Unemployment		
8- Housing	9- Guaranteeing sufficient resources	8- Social assistance near-cash
9- Other social policy areas	10- Long-term Care	9- Social assistance cash
		10- Other social insurance
---	---	11- Military/veterans/war

A second exercise distinguished between benefits that were simulated in full by EUROMOD (in 2001 for EU15), those that were not simulated at all and the information was taken directly from the underlying input data (and updated to the policy year) and those that were partly simulated, relying as well on the receipt information in the data. This investigation had two main purposes. The first was to identify feasible areas for extending the scope of simulation. The second was to document the parts of the benefits and tax systems that are not fully responsive in simulations to changes in household income or circumstances. This is important for users to know when setting up counterfactual situations (such as working one more hour or earning one more Euro).

We found that the most common reasons why some benefits are not simulated or only partly simulated are (a) eligibility and amount of the benefit depend on reference periods of income different from the year. For example unemployment benefits or social assistance may depend on incomes received in a number of previous months instead of income received in the whole previous year; (b) the benefit depends on personal conditions not reported in the data (e.g. severity of invalidity status) or (c) the benefit depends on contributory history (e.g. unemployment benefits, pensions). The degree to which benefits are simulated or not varies greatly across countries and by type of benefit. This is now documented in an Excel file which can be made available to EUROMOD users. Increasing the scope of simulation would, however, require additional information and hence additional variables in the database.

Whether these variables are available in the input datasets, or could be imputed with sufficient degree of precision, are matters that should be considered as part of a wider revision of the input data.

Both exercises provide information that is important for the user to have access to and which is especially useful in a comparative form. In addition, it provides an agenda for action for the future for (a) informing the re-naming of variables in the EU15 model and (b) in developing ways to overcome the information shortfalls listed above and to extend the scope of simulation so that it is more uniform across countries.

To summarise: the technical work done to improve the model for users and developers during the course of I-CUE resulted in a very significant reduction in the effort that needs to be invested to learn to use it, and to use it for a wide range of applications. This is demonstrated on the one hand by the way in which the number of users is growing and the reduction in the extent of support that is typically required by new or experienced users. On the other hand the fact that new models for non-EU countries are being developed with only modest amounts of assistance from the EUROMOD developer team suggest not only that maintenance and development costs will be lower in the future but also that the process of development – as well as use - will be more robust and less error prone.

4. Extending EUROMOD to cover the New Member States

Until I-CUE EUROMOD covered only the 15 pre-2004 EU Member States. The objective, therefore, was to lay the foundations for the integration of the New Member States (NMS) into EUROMOD. This was done first through a preparatory phase which included: (1) identification of experts and stakeholders in each of the ten (2004) New MS; (2) identification of appropriate data and data requirements; (3) identification of key features of national tax-benefit systems. On the basis of Feasibility Studies, four countries were then selected from the ten to be developed as prototype components of EUROMOD (referred to below as “prototype countries”) in the second phase. The selection – of Estonia, Hungary, Poland and Slovenia – was taken from a larger number of countries for which building a EUROMOD component was judged to be feasible. This was based on criteria that would lead to as much diversity as possible in terms of the challenges to be faced as well as the experience and institutional contexts of the selected teams. The underlying objective was to identify and establish processes and methods for the most effective way of building a new country into EUROMOD, as a roadmap for future enlargement of the model. The remainder of this section focuses particularly on what we learned about the process, as the technical side of the work is the focus of the preceding section and the work itself is documented in Feasibility Studies and Country Reports (see section 6) and embodied in the fully functioning EU19 version of the model.

Establishing collaboration

The first phase of work with the NMS was to find collaborators in all the countries. We were seeking experts who are interested in a long-term collaboration and are well informed on the specifics of the national tax-/benefit system as well as having knowledge about the use of representative micro-data and probably also some experience with microsimulation of taxes and benefits.

The method applied had a clear sequence, once possible collaborators had been identified through informal and formal networks: (1) first exchanging e-mails to provide basic information and to make sure we found the right people, then (2) visiting the countries and meeting all those personally who expressed interest, finally (3) organizing workshops and specific meetings for the established national teams. During (1) we aimed to clarify the main goals of the project and the nature of the work required. This phase ensured that both the I-CUE team and the NMS researchers had adequate information prior to the personal meetings. In other words, we made sure that we met the right candidates for the purpose of the project. This strategy proved to be successful, as the initial meetings were efficient and effective, establishing a working team and involving the discussion and distribution of specific tasks. The workshops enabled the creation of a network, where national teams could meet each other and exchange information.

Our collaborators from the New Member States told us that their main motivation for joining the project tends to have two main reasons: (1) to become part of the EUROMOD network, with opportunities for cross-European comparative research, (2) to benefit from knowledge transfer from the core EUROMOD developer group, in other words to learn the use of microsimulation as such, and implement it in the country itself. **Our collaborators also expressed the need for adequate funding of the development work in the future, including the updating of the dataset and the policy rules, in order to keep the model policy relevant.**

Previous experience of microsimulation modelling in the NMS

There was great diversity in terms of actual experience of countries related to microsimulation. Four of these ten countries, the Czech Republic, Hungary, Estonia and Slovenia have already built national microsimulation models, while Poland and Lithuania were in the process of constructing them. Although Cyprus, Latvia and Slovakia did not yet have such a model, the national experts were greatly motivated by the EUROMOD experience and the scientific output they have seen, and discussed with us the possibility and process of building a national model. This outcome of the I-CUE project can be regarded a positive external effect: promoting the microsimulation technique was not among the concrete goals of the project, but is a very welcome consequence, as it is also likely to establish a sounder basis for long-term collaboration. For more discussion of the use of microsimulation methods in the NMS see *Lelkes (2007)*.^{††}

However, a key task for those operating models in Eastern Europe, and particularly in Hungary which has the longest microsimulation experience - the first model was built in 1995 - is to overcome the barriers to use by policy makers. There is potential for these barriers to be eased through the integration of the countries into EUROMOD. This adds value by providing European comparative results instead of simple national ones. The increased scientific output can contribute to promoting comparative research and evidence-based policy making in these countries, thus generating a “demand” for the outcomes. All this suggests that the publicity of EUROMOD results is crucial, by finding adequate outlets in both academic, and European Union level policy-making forums.

Experiences of the collaboration thus far

^{††} Lelkes, O (2007). "Tax-benefit microsimulation models in Eastern Europe". *International Journal of Microsimulation*. 1(1) 54-56

We encouraged the establishment of national *teams*. Collaborating team members had a diversity of *institutional affiliation*, ranging from lecturers or researchers based at universities, researcher in independent research institutes, young postgraduate students, to government officials. One positive aspect was the collaboration of various parties, including e.g. a civil servant and independent researchers (Estonia), or researchers based in the country and those currently working abroad (Poland), or a postgraduate student studying abroad and a lecturer at a university (Lithuania). In such cases the project was particularly fruitful as a means of scientific exchange between people who might not have worked together otherwise.

The benefits for collaboration had to be very explicit in order to sustain the *motivation* of the teams. We had to clarify that the model development takes time and special expert knowledge and they needed to think in terms of a long-term collaboration. It was particularly challenging to keep the motivation of one country which did not have the adequate dataset at the time, and thus had no opportunity to become part of EUROMOD (Slovakia). For some other countries, we had to make explicit the purpose of EUROMOD, making clear that applications outside its current scope (e.g. the future fiscal consequences of a pension reform), however interesting in themselves, could not be covered within I-CUE. We managed to keep all country teams “on board” by engaging them in the process (commenting on other countries reports, presenting country-specific research, etc.) and encouraging them to think about future applications and horizontal collaboration with other, newly acquainted network members.

We clarified the differences between *national microsimulation models and EUROMOD* in terms of goals and methods. While national models might have specific goals, focusing on nationally relevant areas (e.g. pensions), EUROMOD has the unique virtue of providing cross-European comparison. National models may have simple, user friendly interfaces, which might, however, limit flexibility. EUROMOD is a particularly flexible research tool, and within I-CUE has improved its user-friendliness while retaining flexibility.

Overall, it was found that *workshops and meetings* were very helpful in many ways. They enforced personal attachment of the collaborators, they helped to form a group identity, plus were excellent means for knowledge transfer (some workshops explicitly aimed at this). All project collaborators were invited to *the final I-CUE conference* to present potential future ideas for using tax-benefit microsimulation techniques (see more details below). All this reinforces the view that, in spite of increasing reliance on e-mail communication, personal meetings have a unique value and need to be integral part of an international collaborative project such as EUROMOD.

Building new EUROMOD components

The general working method for the construction of the four new components (DS3.2) involved a close collaboration between country teams and EUROMOD developers. The former were responsible for data acquisition, detailed technical information on the tax- and benefit systems, while the latter carried out the implementation tasks using the software tools being developed within I-CUE as well as the existing EUROMOD framework. The country teams received intense support and training in order to become actual users of the end-product, the enlarged EUROMOD. Again, bilateral meetings proved the most effective way of taking the work forward. As explained in the previous section the new I-CUE developments proved their worth in terms of being sufficiently clear and transparent to allow the national teams to fully engage with the process. This represented a significant improvement on our experience before I-CUE.

The four new country components simulate the 2005 tax-benefit systems and use the following datasets (all survey data collected in 2005) as input:

Country	Data source
Estonia	Household Budget Survey
Hungary	EU-SILC
Poland	Household Budget Survey
Slovenia	Household Budget Survey / Personal Income Tax database

The four new countries are now fully integrated into EUROMOD and the baseline redistribution statistics provided on the web now cover the total 19 countries (see section 6). An example, showing a more detailed elaboration of one of the charts is provided in Figure 3.

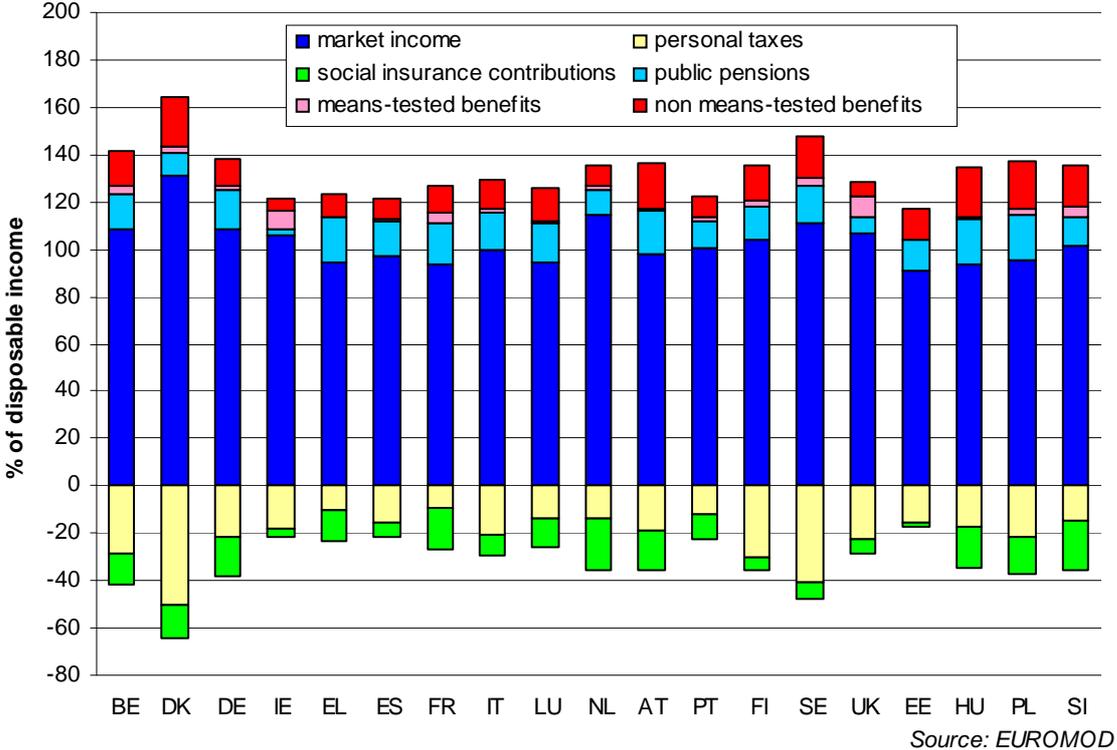


Figure 3 Household income composition: income components as a percentage of household disposable income (mean)

This plots, for all households on average in each country, the share of disposable income which is made up of its various components. Deductions (taxes and contributions) are shown negatively. This combines results for the latest policy years available in EUROMOD: 2005 for six countries (including the four new ones), 2003 for eight countries and 2001 for the remaining five. (As explained in the next section, the updating of the policy years of the EU15 countries is now a priority, after I-CUE, as is a programme of regular updating of all countries.)

All four teams completed Country Reports, which are based on the Feasibility Studies, revised and extended to conform to the template that has been developed for this purpose within I-CUE. They describe the country-specific features of the enlarged EUROMOD, containing sections on:

- key features of national tax-benefit systems,

- description of the data sources used as input, including any adjustments and imputations
- detailed descriptions of the policies implemented in EUROMOD
- considerations of specific modelling issues (e.g. tax evasion, non take-up of benefits),
- presentation of the model results, including the validation of baseline output in relation to other statistics.

See section 6 for how to obtain copies of the reports, statistics for EU19 or the new version of EUROMOD containing the four “prototype” countries.

Final conference

The most powerful way to motivate the intensive work on the national components was to plan joint research applications of the new national models, comparisons across the four NMS, or comparisons using the new EU19 version of EUROMOD. First versions of such papers were presented at the final I-CUE conference held 3-4 April 2008 in Vienna. The aims of the conference were: (1) to explore perspectives for the future in tax-benefit microsimulation, (2) to discuss work in progress and plans for model applications, (3) to present results from the I-CUE project, based on the enlarged European tax-benefit microsimulation model. As part of (3) three papers presented comparative analysis based on the “enlarged” EUROMOD, including Estonia, Hungary, Poland and Slovenia in addition to the 15 “old” Member States of the European Union. A paper authored by all members of the I-CUE team provides an overview of the impact of the redistribution systems across the 19 countries. A second paper titled “Alternative Tax-Benefit Strategies to support Children in Poland” explores what would happen if the child benefit system of Austria, France or the UK would be introduced in Poland. The third paper based on the enlarged EUROMOD assesses the introduction of three alternative flat tax scenarios in Estonia, Hungary and Slovenia, thus contributing research evidence to the ongoing debate on the introduction of flat tax schemes in the latter two countries.

Sir Anthony Atkinson gave the keynote speech and with 71 participants from 25 countries, including representatives of the European Commission, Eurostat, OECD, Luxembourg Income Study, governments and research institutes all over the enlarged Europe, the final conference was judged a “big success”. For more details, see: www.euro.centre.org/icueconference.

A selection of the best papers is being converted into a book to be published by Ashgate.

Implications for the future

Barriers to constructing a model included data constraints, linguistic problems, and the lack of adequate skills or knowledge of the subject. While these did not apply in all cases, the future enlargement of EUROMOD would need to be able to address these issues. The new EU-SILC data would do much to solve data constraints, if it is of good quality as expected. It would also make model development easier because there would be many common data issues across countries.

Experts in many countries found the issue of funding crucial for their future involvement. They explained that national funding tends to be uncertain and short-term, due to changing

and short-term priorities in the government and lack of significant national scientific funds. As many of the institutes have little or no core funding, their project involvement is critically dependent on funding unless they are in a position to see the construction of a EUROMOD component for their country as a strategically-important investment. (This might be the case for a PhD student on the one hand or an institution in an environment with high demand for studies using tax-benefit microsimulation on the other). Funding did not pose a problem in I-CUE, as the national contribution was adequately supported, but will be certainly an issue for the future.

Looking forward to implementing all the EU27 in EUROMOD there is now a clear blueprint for how to build a new country into EUROMOD in terms of:

- Processes for identification and motivation of the new country teams.
- Clarity in the nature and detail of the tasks that are necessary, whether carried out by the national team or the EUROMOD Developers.
- Templates, guidelines and established ways of working bilaterally.
- Well-documented and tested “building blocks” with which to construct a model for any country.

An open question, to be resolved on a country-by-country basis is the division of labour between the national team and the EUROMOD Developer team. Both are certainly necessary to some extent but experience in I-CUE (and, in parallel, with non-EU countries) suggests that it is possible for well-motivated national teams to construct their own country component with some guidance and support from the Developer team. It is also possible for the Developer team to do most of the work with the national role being limited to supplying information and helping to validate results. Thus the division of labour can be tailored to the particular situation in terms of (a) motivation and skills of the national team, (b) capacity of the Developer team and (c) the funding situation of each of them.

5. Impact on European scientific research

The timing of the I-CUE project coincided with a decision to make EUROMOD generally available to researchers rather than limiting its use to the individuals involved in the consortium that built the original version, plus some close associates. Thus it started with a relatively small user base. I-CUE did not contain provision for supporting users or promoting the use of EUROMOD by researchers. This was originally considered as the next stage, once the design had been improved and the model was easier to use. Nevertheless it was important to test out the new facilities on both novice and experienced users and in addition to motivate the teams joining from the NMS. The following activities were undertaken (in the most part not being directly financed by the I-CUE budget):

- i. Training courses for new users including week-long courses as part of the Essex Summer School in 2006 and 2007
- ii. Inclusion of EUROMOD in the social science infrastructure support provided to visitors to ISER at the University of Essex under the ECASS programme. This has supported 11

visitors from 8 countries (Belgium, Bulgaria, Germany, Greece, Italy, Lithuania, Netherlands, Turkey) so far.

- iii. Provision of a web page inviting prospective users to enquire about access to EUROMOD; clarification of access conditions to underlying input data; support using email.
- iv. Research applications of the I-CUE version of EUROMOD by the project team and associates, demonstrating the usefulness of the improved and extended model to other researchers and policy analysts.
- v. An international conference to mark the integration of four NMS into EUROMOD in Vienna in April 2008 not only provided an opportunity for the I-CUE collaborators to network with each other, but also with a wider group of researchers using national microsimulation models, researchers and policy makers with an interest in using EUROMOD. There were lively exchanges involving 71 people from 25 countries.

Together with the extensions and improvements in the model itself these activities have greatly increased interest in using EUROMOD by academic social scientists, now that access to it is no longer restricted (beyond access to the underlying data which has to comply with the regulations that are set by data providers). A training course planned for summer 2008 was very quickly oversubscribed soon after it was first advertised; experienced users are training colleagues; some users have trained themselves using our online training materials and documentation. In the medium term it is to be expected that “analysis using EUROMOD” will become a frequently-observed and well-established phrase in scientific publications in relevant fields within empirical economics, sociology, social policy and other disciplines. Nevertheless, for this to be sustained over time, resources are needed to support EUROMOD’s maintenance and development in the following ways:

- Regular updating of policy years to take account of reforms in each country;
- Regular updating of the input database so that it describes the characteristics of current populations as far as possible (not all social science research needs to be completely up to date but some does, and most policy-relevant research needs to take current conditions into account);
- Implementation of I-CUE methods for the “old” EU15 country components (improving significantly the transparency of EUROMOD and helping both users and developers to work effectively);
- Extension to cover some or all of the EU27 countries currently not covered in order to extend the range of diversity of countries that can be included in analysis and to make possible analysis at the level of the EU as a whole.
- Use of EU-SILC data as the input database for all countries which will aid comparability with other cross-EU comparative analysis (and also simplify the process of gaining access to the input data by requiring a single data contract with Eurostat rather than many with many data providers);

- Carrying forward some further technical developments identified during I-CUE that will aid transparency for users and add to the capacity of EUROMOD in terms of the range of calculations it can carry out.
- Networking among users and dialogue between users and developers so that EUROMOD evolves along a path most useful for leading edge research, and also so that it benefits from developments carried out by users themselves.

As well as improving EUROMOD and demonstrating how to proceed in developing it further as a powerful tool for social science researchers, work done in I-CUE has had other actual (and potential) impacts as follows:

1. It has demonstrated that policy-relevant EUROMOD analysis, as an input into evidence-based policy-making is of great interest to international organisations such as OECD and DG-EMPL and DG-ECFIN of the European Commission as well as some national agencies.
2. The work in constructing EUROMOD components for Estonia, Hungary, Poland and Slovenia has had an encouraging and structuring effect on the use of microsimulation in these four countries for policy and research purposes. Similarly in the other six countries that took part in I-CUE and wrote Feasibility Studies (Czech Republic, Cyprus, Latvia, Lithuania, Malta, Slovakia) there is not only a clear agenda for what needs to be done to construct a EUROMOD component for that country but also the networking activities that were carried out in the course of I-CUE (e.g. the final conference) provided the initiative to consider developing national models and using microsimulation for research.
3. The technology developed in I-CUE can be adopted to help build models like EUROMOD for other countries. This is much more cost-effective than starting from scratch and has the added benefit of offering the potential of comparative analysis with the corresponding countries and those in EUROMOD. This technology transfer has been successfully achieved for South Africa and is in progress for Turkey and five Latin American countries (LATINMOD). These spin off models make use of the generic tax-benefit modelling “language” (or set of building blocks) that has been developed in I-CUE. There is plenty of potential to do more of this and thereby spread the state of the art developed in I-CUE around the world. In each case the provenance of the new model (i.e. its use of the EUROMOD framework and language) and the European Commission support for EUROMOD through I-CUE is intended to be acknowledged in each model and its applications.
4. More generally, the EUROMOD “language” is of interest to the international community of builders of microsimulation models and this aspect, among others, will be disseminated at the International Microsimulation Association conference in Canada in 2009.
5. Potentially, a EUROMOD based on the Eurostat EU-SILC would naturally develop strong links with other activities using the EU-SILC data, both at the national and EU level. On the one hand EUROMOD would add value to a research resource like the EU-SILC. On the other hand collaboration with other experts in the data (including Eurostat) would improve the quality of the work done with EUROMOD.

6. How to find out more

More information about the I-CUE project can be found at <http://www.euro.centre.org/icue> or <http://www.iser.essex.ac.uk/msu/emod/i-cue/>

The Feasibility Studies carried out for the NMS during the I-CUE project can be downloaded from

http://www.euro.centre.org/detail.php?xml_id=699
and <http://www.iser.essex.ac.uk/msu/emod/i-cue/deliverables/>

Country Reports for the four countries implemented in EUROMOD as part of I-CUE (as well as the other 15) can be downloaded from

<http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>

All I-CUE deliverables in document form can be downloaded from

<http://www.iser.essex.ac.uk/msu/emod/i-cue/deliverables/>

The EUROMOD home page, which includes information on other past and current EUROMOD-related projects, is at

<http://www.iser.essex.ac.uk/msu/emod/>

Statistics on the redistribution of income, using the EU19 version of EUROMOD can be accessed here

<http://www.iser.essex.ac.uk/msu/emod/statistics/>

The EUROMOD Working Paper series, in which refereed papers using EUROMOD are published, can be viewed at

<http://www.iser.essex.ac.uk/msu/emod/workingpapers/>

For information about how to download EUROMOD^{‡‡} and what to do about access to the input database follow instructions at

<http://www.iser.essex.ac.uk/msu/emod/download.php>

Any questions about EUROMOD can be sent to euromod@essex.ac.uk

^{‡‡} The version of EUROMOD made available at the time of writing is not the version containing all the I-CUE developments. This will be made available shortly, after a final round of checks has been carried out. For up-to-date information send an email to euromod@essex.ac.uk