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AN INTRODUCTION TO EUROMOD

Herwig Immervoll, Cathal O'Donoghue
and Holly Sutherland

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Herwig Immervoll, Cathal O'Donoghue and Holly Sutherland¹

EUROMOD is a tax-benefit microsimulation model covering all 15 European Union countries. It is currently being constructed by a team from 18 institutions, co-ordinated by the Microsimulation Unit in the Department of Applied Economics at the University of Cambridge, with the financial support of the European Commission programme of *Targeted Socio-Economic Research* (TSER).² This project is due to finish at the end of the year 2000. However, the objective is to build a model that is flexible and durable and that will be of use in a range of contexts and for many years to come. The purpose of this paper is twofold: to provide an introduction to the model and its potential uses; and to give information about the current construction project, its activities, organisation and participants.

Section 1 explains what a tax-benefit model is, and explores some of the issues raised by building a multi-country model for the European Union. Section 2 describes the current model construction project, explaining how it is organised and the separate tasks that are involved. This section also outlines some of the ways in which - by focusing on comparability across countries - EUROMOD is necessarily more flexible and potentially more capable than many national models. EUROMOD is being built by a large team, involving representatives from all 15 countries, and Section 3 explains the organisation of such a large group. Section 4 goes on to explore possibilities for EUROMOD in the future. The key components of the model are the micro-data that it depends on, and Section 5 describes how we chose the sources of underlying data and how we are making use these data. The project recognises its debt to the providers of these data, and this section explains the importance of our relationship with them.

The logo that appears on the front of EUROMOD publications is based on a graphic showing the national proportions of populations with incomes below an estimated European (EU15) poverty line. Section 6 explains how these figures were calculated and goes on to explore how such estimates of poverty relate to the new information that EUROMOD will provide. Finally, Section 7 lists EUROMOD project papers and publications to date and explains how to obtain more information.

1 What is EUROMOD?

EUROMOD is a **tax-benefit model** that estimates the effects of changes in social and fiscal policies on measures of personal income and household welfare. It is an integrated model covering all 15 European Union countries. It is an entirely unique tool that provides:

- **a Europe-wide perspective on social and economic integration policies that are implemented at European, national or regional level.**

It is also designed to examine, within a consistent comparative framework:

- **the impact of national policies on national populations;**

¹ Microsimulation Unit, Department of Applied Economics, University of Cambridge. We are grateful to Tony Atkinson, François Bourguignon and Klaas de Vos for helpful comments on an earlier draft. The usual disclaimer applies.

² Under the heading "Area III.5 Social Exclusion and Social Integration in Europe: Horizontal activities and development of research infrastructures" (DGXII contract CT97-3060).

- **the differential impact of coordinated European policy on individual Member States.**

EUROMOD is developing an existing methodology, already in use in many individual countries. The project is innovative in extending the method to cover 15 countries together in a consistent and integrated manner. Tax-benefit models incorporate household micro-data from nationally representative sources and are able to:

- (i) capture the full range of variation of family circumstance without needing to define what is "typical" or "representative",
- (ii) estimate aggregate effects on the basis of many observations from survey data that in combination are representative of the national population,
- (iii) identify the effect of detailed policy measures on disposable incomes - the models offer distinct "levers to pull" and "buttons to push" so that simulated changes translate directly into changes to actual policy rules that governments or other agencies can make,
- (iv) provide a distributional analysis and focus on particular socially-defined groups of interest.

Tax-benefit models calculate household disposable income for each household in a representative set of micro-data. This calculation is made up of elements of gross income taken from the survey data³ combined with elements of income – taxes and benefits - that are simulated by the model. The calculations are performed twice (or more), once for the current (or some other default) system, and again for each policy change, specified by the user. The first round effect of the change is the arithmetic difference in the “before” and “after” calculations.

The areas of policy for which changes can be simulated in this manner include family benefits, social assistance benefits and other income-tested benefits, income taxes, social contributions, some forms of property taxes and indirect taxes. These are the components of the tax-benefit system which are most commonly covered in national models. Some changes to other elements, such as social protection benefits that depend on contributions and direct labour market policies, may also be possible to model.

The basic output from EUROMOD is micro-level change in household incomes as a result of policy changes. This provides a basis for the calculation of

- estimates of aggregate effects on government revenue
- distribution of gains and losses
- differential effects on groups classified by individual or household characteristic (such as gender, labour market status, region, household type etc)
- effective marginal tax rates and calculated replacement rates, and changes to them
- the first-round impact on measures of poverty and inequality
- between-country differences in the costs and benefits of reforms.

Each of these types of calculation can be specified in many ways. EUROMOD is being built to maximise the degree of choice over such issues as the equivalence scale, the precise income definition, and the assumptions built into the calculation of marginal tax rates. However, it will

³ Including such sources of income as employee and self-employment earnings, investment and other capital income, occupational and public pensions, unemployment benefits and other non-means-tested benefits.

also allow choice over the manner of integration of national results to form *European* output. The choice of exchange rate, and whether to use common or varying national assumptions will be open to the user of EUROMOD.⁴

EUROMOD is a *static* microsimulation model that generally does not attempt to capture individual behavioural responses to changes in policy. The model is based on theoretical considerations but is independent of any single theoretical perspective. This is to ensure that it will be of use for the evaluation of a wide range of policy proposals in many contexts over a long period of time. However, the model also has the potential to be used as a *platform* for particular analyses of behavioural change. Users of EUROMOD will not be constrained to accept particular behavioural relationships, hard-wired into the model: in principle they will be able to implement their own chosen approaches.⁵

The present project builds on an earlier preparatory study, also financed by TSER: *EUROMOD A European Benefit-Tax Model and Social Integration*. This explored the technical feasibility of the construction of a European tax-benefit model and established that there was a demand for such a model. The reports and papers from this project are listed in section 7.⁶

2. The TSER model construction project

In building EUROMOD, particular emphasis is being placed on:

- transparency of methods: it will be open to critiques of the approach as a whole, as well as criticism and suggestion on matters of detail;
- designing a model that is flexible and adaptable: the range of uses and users will be as wide as possible and the model's useful life will last for many years;
- consistency and comparability across countries: developing harmonisation of methods, assumptions and input and output concepts is a major part of building an integrated European model.

A vital ingredient of the project is the involvement of Country Respondents from each Member State. Not only are many of the Country Respondents active in building or using tax-benefit simulation models in their own countries, most are expert in their national tax and benefit systems and many are experienced users of the micro-data underlying the EUROMOD database (see section 5). All the participants on the EUROMOD project are listed in Annex 1.

The project is organised around a series of 4-monthly meetings. These co-ordinate the collection of model components from Country Respondents, provide opportunities for debate over issues of principle, and promote the sharing of expertise and of practical solutions to common problems.

There are eight main tasks involved in model construction. See Figure 1 for a representation of some of the relationships between them, as well as indication of the division of responsibilities among the teams.

For each country:

1. Creation of the input database from existing household micro-data

⁴ See Atkinson et al. (1999) for an illustration.

⁵ However, it should be clear that implementing behavioural adjustments across 15 countries is not a trivial task.

⁶ See in particular Sutherland (1997b).

2. Assembly, coding and organisation of algorithms describing current tax and benefit rules so that, when applied to the input database, simulated values for household disposable income (and its components) may be calculated.
3. Validation of the simulation of the effect of current policy and the distribution of household disposable income against national model output or other statistics; similar validation of the estimates of the effects of policy changes.

For the model as a whole:

4. Design of software to provide an *environment* in which to build the model.
5. Definition of input, policy and output concepts that may be measured adequately using the data available and the output of policy simulations, and which provide relevant and comparable tools for use across all 15 countries.
6. An interface to the model allowing the user to access these tools, together with methods of producing a range of model output.

As essential background:

7. Technical projects assessing the representativeness of the database and exploring practical solutions to lack of comparability arising from limitations in the data.
8. Documentation: the model construction process will be documented in a series of 15 Country Reports, and cross-cutting technical issues by a series of Technical Reports.

The model is being built to run on a standard modern office desk-top personal computer. It is being assembled in Cambridge. A framework or *environment* has been designed for the model by the Cambridge team. This will allow maximum flexibility in model capabilities and output, at the same time as ensuring that common programming standards are adhered to. Using a modular structure, the intention is to impose a discipline on the way in which the model is developed and used.

The tax-benefit rules themselves are being coded in C. The environment is written in Microsoft C++, the input micro-data are stored in Microsoft Access and the output will also be stored in Access, although links to standard statistical and graphical packages will also be established.

There are two alternative approaches to building a multi-country tax-benefit model. One is to build a set of parallel models, one for each country, shaping each one to the requirements and characteristics of the national tax-benefit systems and data availability. This was essentially the approach taken in the construction of a prototype model during the EUROMOD Preparatory project (Bourguignon et al, 1997). The integration of the model calculations was mainly accomplished at the output stage. However, a more challenging and ultimately more powerful approach is to build a model that concentrates on finding commonality across countries throughout the model construction process. This is the approach that we are taking with EUROMOD. In practice this involves

- identifying common structural characteristics in national policies
- identifying common data requirements
- parameterising and generalising as many aspects of the model as possible.

We generalise such important aspects as the definition of

- the definition of income used in the calculation of each income-related tax and benefit,
- the unit of assessment or entitlement for each tax and benefit,
- the definition of the output income measure,

- the unit of analysis.

This approach not only allows us to model each national system in a manner that is comparable to existing national modelling practice. It also provides the model user with a much greater range of choice and greater flexibility than is customarily available in national models or – we believe – in any other existing tax benefit model.

Model flexibility has many advantages in terms of the comparability of results, the range of uses of the model and its durability. However, it does have some cost in terms of the ease of use of the model. To run EUROMOD at all, many thousand parameters will have to be specified. To keep it manageable, defaults will be provided, specifying existing national tax-benefit policies and a series of "standard" choices regarding model and output assumptions. Given the high degree of generalisation, these parameter sets will provide, as a by-product, a summary of European tax-benefit systems in a form that is coherent and comparable.

3. The EUROMOD team

The EUROMOD project involves about 35 individuals working in 18 institutions in 15 countries. All the participants are listed in Annex 1. A large number of people are contributing to the construction of the model and will have an interest in using the model when it is built. All these people share the intellectual property embodied in the model itself and in the transformations of the data from the original national household datasets into the EUROMOD database (see section 5). Individually, and in groups, they are responsible for the quality of the uses they make of the model.

For the duration of the current project, and within its scope, the project team is bound by a consortium agreement which states, among other things, team members' rights and responsibilities regarding use of the model and of the underlying data. This agreement will be re-considered before the end of the current project and it is intended that a similar agreement will apply to the EUROMOD team outside the scope of the TSER contract.

4. EUROMOD's future

EUROMOD will only have just started to be useful by the end of the construction project. Although the model will have been tested and used, most of its potential lies in uses in 2001 and beyond. The explicit aim of the project is to build a core model that will be able to be used as a framework for many other projects. This core model not only has the capacity and scope to support numerous applications; it has the potential to form an essential component of more elaborate models. Thus the model under construction is being designed as the basis for a wide range of research projects over many years. It represents investment in research infrastructure.

Applications of EUROMOD could consist of three types

1. Applications that do not require major changes or additions to the model: these include
 - running options already specified as blueprint parameter sets
 - specifying policy changes by altering existing parameters
 - introducing new code describing policy structures that are not already anticipated within the model.
2. New databases (for example, an all-ECHP (European Community Household Panel) database)
3. Major experimental or speculative developments: these could include:

- Incorporation of greater sophistication in the representation of economic relationships, via the modelling of individual behavioural responses and/or macro-economic adjustments.
- Modules built on a consistent basis for countries currently outside the EU. These could include prospective EU member states or other OECD countries, in order that consistent comparisons can be made.
- Versions incorporating alternative datasets or making use of data from several sources, to enable special studies to be carried out in areas such as health, child care, housing or education.
- Linkages to other types of European model, such as macro-economic models. Those that analyse environmental aspects of policy could be of particular interest.
- Versions incorporating some elements of projection into the future, so that assessments can be made of the broad effects of demographic ageing, macro-economic convergence or other foreseeable developments on the impact of policy instruments on incomes.

However wide the range of possibilities, it is clear that the process of using EUROMOD for any purpose will not be a trivial task. It will depend on a good understanding of the present systems of taxation and social protection in all the Member States, as well as an appreciation of the advantages and limitations of static microsimulation. Thus it is likely that the EUROMOD project will need to provide training in the use of the model and in associated topics, so that users may exploit the model to the full.

Furthermore, EUROMOD will need maintenance on a continuous basis if the policy rules are to be kept up-to-date and the underlying database refreshed with recent micro-data. The EUROMOD team intends to ensure that the model is maintained and that the necessary skills to carry out these tasks are encouraged and supported.

If the investment embodied in the model is to be fully exploited then the importance of training and maintenance needs to be recognised. The EUROMOD team will be seeking financial support for these infrastructure activities as well as for projects that use the model as a research tool.

The project has an Advisory Group to advise on model construction and validation and to help ensure that the model that is built will be of use in a range of institutions and circumstances. The group consists of individuals drawn from institutions representing data providers, national modellers, the European Commission Services, international organisations such as the OECD, and a range of national organisations, such as social partners and research institutes engaged in related research. The current membership is listed in Annex 2.

5. The EUROMOD database

EUROMOD relies on good quality micro-data at the individual level, providing information on gross incomes by source, personal and household characteristics and variables describing individual circumstance, such as indicators of risk of social exclusion. The main source of micro-data for each country has been selected on the basis that it is currently the most suitable for tax-benefit modelling and is also available to the project.⁷ The chosen sources of data are listed in Annex 3.⁸

⁷ An alternative choice would be to prioritise the comparability of the data. This would suggest the use of data

Micro-level data must be available to the model at each stage of its operation, but model results will only be used at a more aggregate level. For example, households may be grouped by decile of the simulated national or European income distributions, or by certain characteristics (such as households with no earned income, or families with many children).⁹

The EUROMOD database will not be useable as a micro-dataset for any other purpose than input into the model. There will be no documentation allowing variables to be identified within the database except through the user-interface of the model. Thus from the user's point of view the database will be an integral part of EUROMOD. Deriving such a database - making use of existing national household datasets - is a major component of the project. With the exception of some basic variables (sex, age etc) nearly all the model database variables will have been transformed in some way when extracted from the original dataset (typically, gross incomes must be imputed from net; all income variables are updated to the policy year that is simulated, etc.) While the derivation of the database will involve a large proportion of the variables from the original dataset, some of the most well-used variables from household income datasets (such as household disposable income) will not be used at all, because they are simulated by the model.

The original datasets have been collected by, or on behalf of, a number of agencies including Eurostat, national statistical offices and non-governmental institutions. The project recognises its debt to the collectors, providers and owners of the copyright in these data, as well as to the respondents to the surveys. We are keen to apply a stringent code of conduct to the use of the original data and to the variables derived from them and stored in the model (at the micro-level).

Initially, the model using data for all 15 countries will only be available in Cambridge, but will be useable there by the whole team. Each of the data providers imposes different conditions. In time it is hoped to develop technical methods of distributing access to the model without compromising any of the conditions of access to the underlying data. Alternatively we may re-negotiate these conditions so that the entire model (including the database) may be accessed in the institutions of all individuals within the EUROMOD team. Access by other individuals and institutions will be negotiated separately.

The long-term nature of the project makes its use of micro-data and its relationship with data providers somewhat different in nature to most research projects. The intention is:

1. To continue developing EUROMOD and using it with the existing database beyond December 2000: the model could be useful for 20 years.
2. To re-new the database with later waves of survey data as is deemed appropriate and as resources permit: however, the project expects to maintain and use the first version of the

from the European Community Household Panel (ECHP) for all countries for which these data exist.

⁸ Expenditure data are needed for indirect tax simulation. In only two countries (France and UK) does the chosen source of data include expenditure information. In all countries, relationships between expenditure by category and variables present in the main database are being estimated at the household level. These estimates will be used to calculate approximate indirect tax liabilities.

⁹ It is recognised that individual household calculations can be a useful tool in the understanding of how tax-benefit systems work. One possibility is that EUROMOD may offer the user the option of carrying out tax-benefit calculations for a set of synthetic households, or for hypothetical households of the user's own specification (eg "typical" families, production workers, etc).

database for the duration of the lifetime of EUROMOD, whether or not databases using later data are created.¹⁰

3. To use the model as a research tool for scientific use. It will not be given to any person outside the EUROMOD team without permission from the data providers.
4. To allow access to the model by all members of the EUROMOD team. A list of current members of the team is available in Annex 1.
5. To continue to develop good working relationships with the providers of the original datasets and to keep them fully informed of all relevant changes, including changes in membership of the EUROMOD team and new projects using the model.

Acknowledgement for use of all the data sources will be given in all EUROMOD publications. However, due to shortage of space in some circumstances the full form will not be given, but will be referred to. The full form is shown in the box.

Data Acknowledgements

EUROMOD relies on micro-data sets from fifteen countries. These are the European Community Household Panel (ECHP) 1995 (second wave) made available by Eurostat; the Living in Ireland Survey made available by the Economic and Social Research Institute; the Panel Survey on Belgian Households (PSBH) made available by the University of Liège and the University of Antwerp; the Income Distribution Survey made available by Statistics Finland; for France, 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 GSOEP at the German Institute for Economic Research (DIW), Berlin; the Survey of Household Income and Wealth (SHIW95) made available by the Bank of Italy; for Luxembourg, the Socio-Economic Panel (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 Income Distribution Survey made available by Statistics Sweden; and for the UK, the Family Expenditure Survey (FES). FES data have been made available by the Office for National Statistics (ONS) through the Data Archive. Material from the FES is Crown Copyright and is used by permission. Neither the ONS nor the Data Archive bear any responsibility for the analysis or interpretation of the data reported here. An equivalent disclaimer applies for all other data sources and their respective providers cited in this acknowledgement.

6. The EUROMOD logo and EUROMOD output

The EUROMOD project has adopted as its "logo" an asymmetric 15-point star. This is intended to suggest some disparity between the countries of the European Union, and is in contrast to the symmetric 12-star circle that forms the symbol of the European Union itself.¹¹

In fact, our asymmetric star is based on a real disparity that is - in part - the reason for building EUROMOD. This is the difference in the incidence of poverty in each Member State, in particular if poverty is defined at the European level. One of the main motivations behind the EUROMOD project is the desire, first of all, to understand the role of public policy in the patterns of poverty and social exclusion in Europe, and secondly to assist in developing

¹⁰ Data from the past will have a number of uses. For example, comparing simulated policies on current and past databases will allow us to distinguish between the effects of changing policy and underlying changes in the population on trends in the patterns of household incomes.

¹¹ The twelve golden stars represent the union of the peoples of Europe. The number of stars is not related to the number of Member States. Twelve is the symbol of "perfection and entirety". See <http://europa.eu.int/en/eu/emblem.html>.

new policies with the aim of reducing the incidence of poverty and the risk of social exclusion.

In this section we explain the calculation of the numbers behind the logo, and use these calculations to make some further points about the relationship between such estimates of poverty and the new information that EUROMOD will provide.

Table 1 shows the numbers on which the logo is based. They are the proportions of national populations falling below a EU15 poverty line, where this is defined as 50% of the European mean household net income. We use household microdata from the second wave of the Eurostat European Community Household Panel (ECHP) for all countries except Sweden and Finland. Micro-data for Finland and Sweden are drawn from the respective national income distribution statistics, which are based on a combination of register and survey data.

Table 1: Percentages of national populations with household incomes below proportions of the European mean

% of population	percentages of EU15 mean		
	40%	50%	60%
Austria	6.9	10.7	16.3
Belgium	6.0	10.6	16.4
Denmark	1.8	4.2	8.1
Finland	1.7	4.2	10.6
France	5.0	10.4	18.0
Germany	7.6	10.7	16.3
Greece	26.5	38.9	51.7
Ireland	15.0	27.8	38.3
Italy	15.4	26.6	37.4
Luxembourg	2.7	3.3	4.0
The Netherlands	5.1	7.8	15.0
Portugal	34.8	46.9	59.6
Spain	21.7	34.9	47.8
Sweden	5.6	8.4	14.1
United Kingdom	7.6	15.7	24.7
EU15	10.8	18.0	26.5

Our choice of the mean as the central measure of income (rather than the median, which is favoured by Eurostat) is designed to minimise the effort involved in integrating information for Finland and Sweden.¹² Household incomes are measured after taxes and benefits, on an annual basis for 1994 and are converted to a common currency using 1994 PPP-adjusted exchange rates. They are equalised using the modified OECD scale. In calculating the means and performing the headcount calculations, each household is weighted by the number

¹² We are very grateful to the EUROMOD project participants from Finland (Esko Mustonen and Heikki Viitamäki) and Sweden (Bengt Eklind) for taking part in the two-stage process to include their countries in the calculations. They first provided us with estimates of mean income and population for their countries, and then calculated the numbers in Finland and Sweden below the EU15 poverty line. Note that the equivalent procedure to integrate Swedish and Finnish *median* incomes would have been much more elaborate.

of people in it.¹³ The EU15 mean is calculated by weighting the national means by the national population and dividing by the EU15 population.¹⁴

Figure 2 shows the radar diagram on which the logo is based. The proportions of national populations below 50% of the European mean are plotted (black line), and contrasted with the all-EU proportion (18%), shown in grey. Five countries have proportions that are very low - less than half of the all-EU figure (Luxembourg, Denmark, Finland, the Netherlands and Sweden). A further five have proportions lower than the EU average (France, Belgium, Austria, Germany and the UK). The remaining five vary from 50% larger than the all-EU figure (Italy and Ireland), to double the EU figure (Spain and Greece), with the highest proportion (47% of the population) in Portugal.

The impression given by the diagram is influenced by the order in which the countries are placed around the circle. The area of the shapes outside and inside the all-EU "circle" is not independent of the order of the countries. Figure 2 orders countries alphabetically using their English names (as in Table 1). Figure 3, in contrast, uses an order used in some recent European publications (starting with Germany and ending with Austria (13), Sweden (14) and Finland (15)). To minimise the effect of ordering, Figure 4 shows the radar diagram with each country's position re-based at the EU mean. The *impression* that is given about the extent of European disparities still depends to some extent on the order of the countries. We choose to order them as in Figure 4 and Figure 5 shows a stylised version of this: the EUROMOD logo.

EUROMOD will be able to produce poverty estimates in a similar form. It will also be able to show the *change* in poverty resulting from the first round effects on incomes of policy changes. One can imagine a second pair of lines on Figure 3, showing the new level of European poverty following the policy change, and the new national proportions of the population falling below this line.

As we have emphasised, there will be many choices in the way these estimates may be calculated and presented. It is important to note however, that the output from EUROMOD will be different in some important respects to the rather familiar type of poverty estimates that were used to create the EUROMOD logo. In the first place, the original data source is different for eight of the fifteen countries (Belgium, France, Germany, Ireland, Italy, Luxembourg, the Netherlands and the UK: see section 5), and may not refer to a common time period.

Secondly, EUROMOD updates the database to a common year for policy simulation (1998 in the first instance). Generally, this date is more recent than the date of collection of most available micro-data. Whilst updating procedures can only be approximate, this does have the advantage of allowing the model to focus on entirely contemporary policy debates.

Thirdly, some elements of income - particularly taxes and benefits - are simulated rather than drawn from the original data source. They may be treated differently by the process of data

¹³ For the ECHP data, we used the UDB variable "total household net income" (HI100), including cases with imputed income components. These were weighted using the cross-sectional weight (HG004) and household size (HD001).

¹⁴ The EU15 mean is 12102 1994 PPS per equivalent adult per year. It is worth noting that the national means that we have calculated are close, but not identical, to those calculated by Eurostat (*European Community Household Panel; (ECHP): Selected indicators from the 1995 wave*, Luxembourg: Office for Official Publications for the European Communities, 1999; table C1.2).

collection and the process of policy simulation. The following three examples are illustrative:¹⁵

- Tax calculations in the model are made on an accruals basis rather than a realisations basis. However, survey data on tax usually consists of responses to questions about actual payments or deductions rather than liabilities.
- The effects of evasion of taxes and non-take-up of benefits will be to some (unknown) extent captured by survey and administrative data. However, simulation provides us with an opportunity to choose our own assumptions about these processes.
- If respondents wrongly report or confuse some items, estimates drawn directly from survey data are subject to measurement errors. On the other hand, rule simulation may be over-deterministic in that it usually assumes that all the rules are adhered to, without time delay or error by persons or institutions.

Finally, it may be possible to simulate some components of household income in the model even though they are not captured as variables in household micro-data. Indirect taxes, which will be computed by EUROMOD, are not available directly in any of our household datasets. Newly-introduced policy instruments are another example.

7. EUROMOD publications

Papers from the model construction project

Atkinson A B, F Bourguignon, C O'Donoghue, H Sutherland and F Utili, 'Microsimulation and the Formulation of Policy: A Case Study of Targeting in the European Union', mimeo, 1999

Bourguignon F, C O'Donoghue, H Sutherland and F Utili, 'The formulation of anti-poverty policy for the European Union: the role of assumptions about the equivalence of incomes across countries' paper presented at the Royal Economic Society conference, Nottingham, March 1999

Sutherland H, 'The Sensitivity of Europe-wide Microsimulation Results', Paper presented at the Statistics Sweden Conference on Methodological Issues in Official Statistics, Stockholm, October 12-13th 1998

O'Donoghue C, H Sutherland and F Utili, 'Integrating Output in EUROMOD: An Assessment of the Sensitivity of Multi-Country Microsimulation Results' paper presented at the Workshop on Microsimulation in the New Millennium: Challenges and Innovations, Cambridge, August 1998

Papers from the EUROMOD Preparatory Project (1996-1997) CT95-3009

Bourguignon F, C O'Donoghue, J Sastre-Descals A Spadaro and F Utili (1997), 'Eur3: a Prototype European Tax-Benefit Model', Microsimulation Unit Discussion Paper MU9703, Department of Applied Economics, University of Cambridge. (Also published as DELTA Working Paper 97-30, DELTA, Paris.)

¹⁵ For further discussion of these issues see Redmond G, H Sutherland and M Wilson, 1998, *The arithmetic of tax and social security reform: a user's guide to microsimulation methods and analysis*, DAE Occasional Paper No. 64, Cambridge University Press.

Bourguignon, F, C O'Donoghue, J Sastre-Descals, A Spadaro and F Utili (1997a), 'Eur3: a Prototype European Tax-Benefit Model: Issues and Initial Experiments', paper presented to the International Conference on Combinatorics, Information Theory and Statistics, Maine, July, (forthcoming in Gupta A and V Kaipur (eds.), *Microsimulation in Government Policy and Forecasting*, Amsterdam: North Holland).

Bourguignon F, C O'Donoghue, J Sastre-Descals, A Spadaro and F Utili (1998), 'Technical Description of Eur3: A Prototype European Tax-Benefit Model', Microsimulation Unit Research Note MU/RN/25, Department of Applied Economics, University of Cambridge.

Bourguignon, F, C O'Donoghue, J Sastre-Descals, A Spadaro and F Utili (1998a), 'EUROMOD: un modello di microsimulazione su scala europea', in N. Rossi (ed.) *il lavoro e la sovranita sociale 1996-1997*, Bologna: il Mulino.

Callan T and H Sutherland (1997), 'The Impact of Comparable Policies in European Countries: Microsimulation Approaches', *European Economic Review* 41:3-5, pp 627-633.

Hancock R (1997), 'Computing strategy for a European tax-benefit model', Microsimulation Unit Discussion Paper MU9704, Department of Applied Economics, University of Cambridge.

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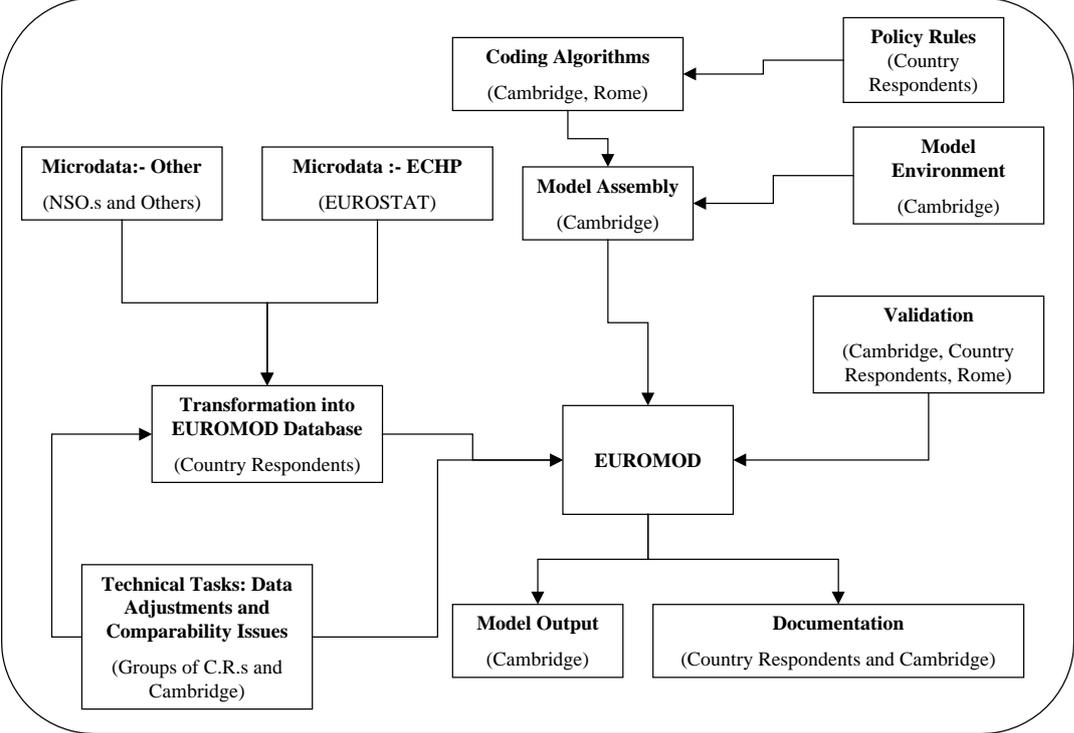
More information:

Microsimulation Unit Discussion Papers and Research Notes are available from the Microsimulation Unit, Email: mu@econ.cam.ac.uk
<http://www.econ.cam.ac.uk/dae/mu/microsim.htm>

For an up-to-date list of EUROMOD Working Papers see
<http://www.econ.cam.ac.uk/dae/mu/emod.htm>

For more information about the EUROMOD project, see the above web site, contact the EUROMOD Country Respondent for your country (see Annex 1) or the authors of this paper.

Figure 1: The process of assembling EUROMOD: tasks, responsibilities and relationships



Note: Arrows also go in the opposite direction as all parts are interdependent, and each stage is iterative.

Figure 2: Percentages of national populations with household incomes below proportions of the European mean (a)

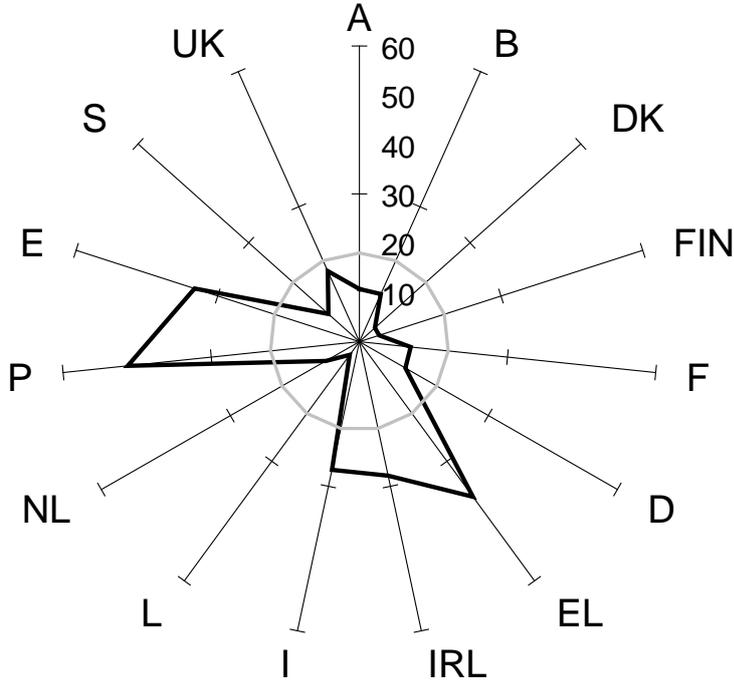


Figure 3: Percentages of national populations with household incomes below proportions of the European mean (b)

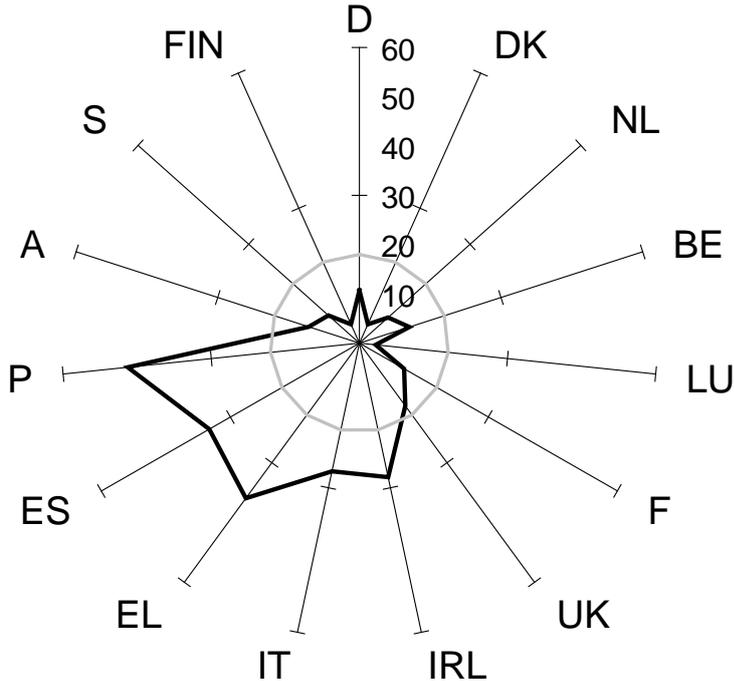


Figure 4: Percentages of national populations with household incomes below proportions of the European mean (c)

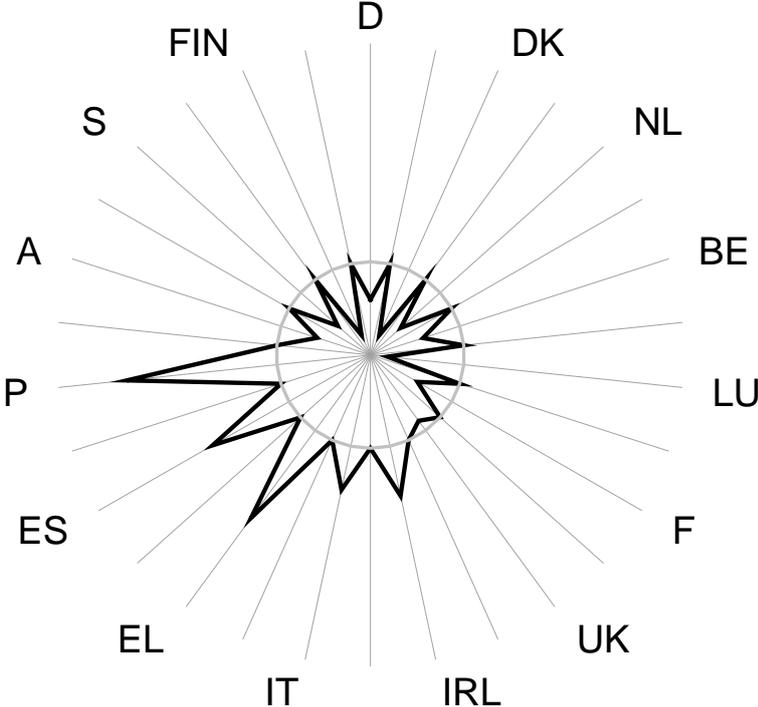
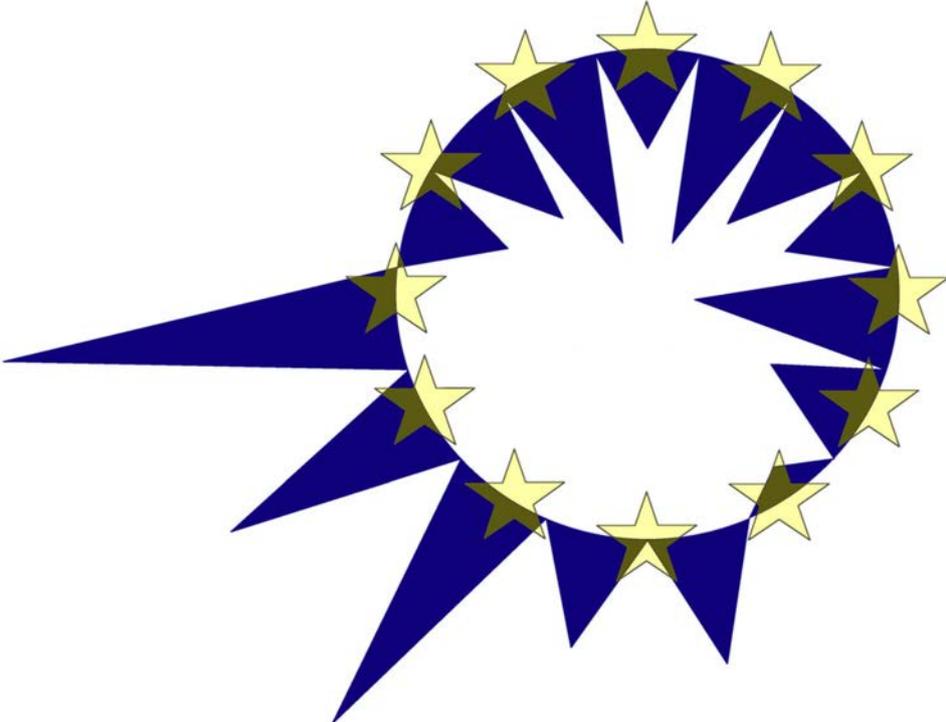


Figure 5: The EUROMOD logo



Annex 1: The EUROMOD team (* denotes people no longer involved)

Country	Country team leader	Additional team members
AUSTRIA	Hardy HANAPPI Institute of Economics, University of Technology of Vienna Argentinierstrasse 8/175 Vienna Tel: 43 158 80117555 Fax: 43 15880117599 E-mail: hanappi@pop.tuwien.ac.at	Karl Althaler
BELGIUM	Danièle MEULDERS DULBEA CP140 Université Libre de Bruxelles 50 Avenue F D Roosevelt Brussels Tel: 322 650 4112 Fax: 322 650 3825 E-mail: dmeulder@ulb.ac.be	Maria Jepsen Christophe Joyeux Robert Plasman Marc Stocker* Isabelle Terraz*
DENMARK	Hans HANSEN The Danish National Institute of Social Research Herluf Trolles Gade II DK-1052, Copenhagen Tel: 45 3348 0800 Fax: 45 3348 0833 E-mail: hah@sfi.dk	Morten Frederiksen Niels Westergaard-Nielsen Frederic Nimes*
FINLAND	Heikki VIITAMÄKI VATT PO Box 269 Haameentie 3 Helsinki 00531 Tel: 358 9703 2943 Fax: 358 9703 2968 E-mail: heikki.viitamaki@vatt.fi	Esko Mustonen Roope Uusitalo
FRANCE	François BOURGUIGNON DELTA Boulevard Jourdan 48 Paris 75014 Tel: 331 4313 6307 Fax: 331 4313 6310 E-mail: bourg@delta.ens.fr	Jose Sastre Descals Amedeo Spadaro Isabelle Terraz
	Jacques LE CACHEUX OFCE Quai d'Orsay 69 Paris 75340 Tel: 331 4418 5482 Fax: 331 455 60615 E-mail: lecacheux@ofce.sciences-po.fr	Réjane Hugouneq Alexis Dantec*
GERMANY	Gert WAGNER Deutsche Institut für Wirtschaftsforschung Konigin-Luise Strasse 5 D-14191 Berlin Tel: 49 30 8978 9290 Fax: 49 30 8978 9109 E-mail: gwagner@diw-berlin.de	Markus Grabka Johannes Schwarze
GREECE	Panos TSAKLOGLOU Dept of International and European Economic Studies Athens University of Economics and Business 76 Patission Street Athens 10434 Tel: 301 820 3195 Fax: 301 821 4122 E-mail: panos@aueb.gr	Manos Matsaganis
IRELAND	Tim CALLAN ESRI 4 Burlington Road Dublin 4 Tel: 353 1667 1525 Fax: 353 1668 6231 E-mail: tcallan@esri.ie	James McBride Richard Nestor Brian Nolan John Walsh

ITALY	Vincenzo ATELLA Facolta di Economia University of Rome "Tor Vergata" Via di Tor Vergata snc 00133 Rome Tel: 39 06 72595635 Fax: 39 06 2020687 E-mail: atella@uniroma2.it	Cristina Berliri Manuela Coromaldi Federico Dini Luigi Giamboni Valentino Parisi Nicola Rossi Francesca Utili
	Paolo BOSI Prometeia Calcolo via G. Marconi 43 40122 Bologna Tel: 39 51 6480911 Fax: 39 51 220753 E-mail: bosi@ecoalpha.unimo.it	Massimo Baldini Daniela Mantovani Stefano Toso
LUXEMBOURG	Koen VLEMINCKX Luxembourg Income Study, CEPS/INSTEAD Boîte Postale 48 L-4501Differdange Tel: 352 5858 55519 Fax: 352 58 55 87 E-mail: Koen@lissy.ceps.lu	Monique Borsenberger*
NETHERLANDS	Klaas DE VOS CentER Applied Research Warandelaan 2 NL-5037 A B Tilburg Tel: 31 13 466 8225 Fax: 31 13 466 3066 E-mail: k.devos@kub.nl	Asghar Zaidi*
PORTUGAL	Carlos Farinha RODRIGUES CISEP, Instituto Superior de Economia e Gestao Rua Miguel Lupi 20 1200 Lisboa Tel: 351 1392 5964 Fax: 351 1396 7309 E-mail: carlosfr@iseg.utl.pt	
SPAIN	Magda MERCADER PRATS Department d'Economia Aplicada Facultat de Ciencies Economicques Universitat Autonoma de Barcelona Edifici B 08193 Bellaterra Tel: 34 93 581 2290 Fax: 34 93 581 2292 E-mail: mmercader@volcano.uab.es	Horacio Levy
SWEDEN	Bengt EKLIND Income Policy, Economics Dept Ministry of Finance S-10333 Stockholm Tel: 46 8405 1704 Fax: 46 810 6399 E-mail: bengt.eklind@finance.ministry.se	Ingemar Eriksson
UK	Holly SUTHERLAND Microsimulation Unit Department of Applied Economics University of Cambridge Sidgwick Avenue Cambridge CB3 9DE Tel: (+44) 1223 335264 Fax: (+44) 1223 335299 E-mail: hs117@econ.cam.ac.uk	Herwig Immervoll Lavinia Mitton Cathal O'Donoghue Yock Fincham*
	Tony ATKINSON Nuffield College University of Oxford Oxford OXI INF Tel: (+44) 1865 278519 Fax: (+44) 1865 278676 E-mail: tony.atkinson@nuf.ox.ac.uk	

Annex 2: The EUROMOD Advisory Group

Name:	Institution:
Andrea Brandolini	Bank of Italy, Rome
Gabrielle Clotuche	European Commission Employment, Industrial Relations and Social Affairs (DGV/E), Brussels
Nicole Dewandre	European Commission Science, Research and Development (DGXII/E), Brussels
Pieter Everaers (from 9/99)	European Commission Eurostat, Luxembourg
Gordon Harris (until 7/99)	Department of Social Security, London
Christopher Heady	School of Social Sciences, University of Bath
Reiner Hoffman	European Trade Union Institute, Brussels
John Langmore	United Nations Department of Economic and Social Affairs, New York
Eric Marlier	European Commission Eurostat, Luxembourg
John Micklewright	UNICEF-International Child Development Centre, Florence
Mark Pearson	OECD, Paris
Aino Salomäki	European Commission Economic and Financial Affairs (DGII/B,1), Brussels
David Silke (until 7/99)	Combat Poverty Agency, Dublin
Geneviève Zdrojewski	European Commission Science, Research and Development (DGXII/H), Brussels

Annex 3: Sources of micro-data for EUROMOD, by type

Country	Base Dataset	Type
Austria	European Community Household Panel (ECHP)	Europe-wide Panel
Belgium	Panel Survey on Belgian Households (PSBH)	National Panel
Denmark	European Community Household Panel (ECHP)	Europe-wide Panel
Finland	Income distribution survey	Register + Survey
France	Enquête sur les Budgets Familiaux	Household Budget Survey
Germany	German Socio-Economic Panel (GSOEP)	National Panel
Greece	European Community Household Panel (ECHP)	Europe-wide Panel
Ireland	Living in Ireland Survey	National Panel
Italy	Bank of Italy Survey of Household Income and Wealth	Income Survey
Luxembourg	PSELL-2	National Panel
Netherlands	Socio-economic panel survey (SEP)	National Panel
Portugal	European Community Household Panel (ECHP)	Europe-wide Panel
Spain	European Community Household Panel (ECHP)	Europe-wide Panel
Sweden	Income distribution survey	Register + Survey
UK	Family Expenditure Survey (FES)	Household Budget Survey