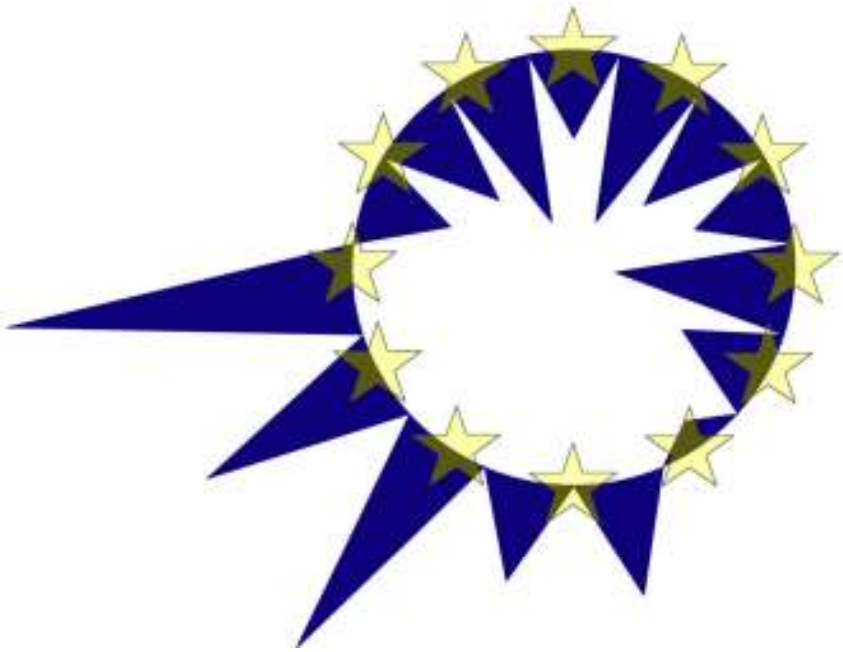
EUROMOD

WORKING PAPER SERIES



EUROMOD Working Paper No. EM1/07

USING THE EU-SILC FOR POLICY SIMULATION: PROSPECTS, SOME LIMITATIONS AND SUGGESTIONS

Francesco Figari, Horacio Levy and Holly Sutherland

January 2007

USING THE EU-SILC FOR POLICY SIMULATION: PROSPECTS, SOME LIMITATIONS AND SUGGESTIONS

Francesco Figari

ISER, University of Essex

Horacio Levy

ISER, University of Essex

Holly Sutherland

ISER, University of Essex

EUROMOD is the result of a collaboration of many researchers over a number of years. It is continually being improved and updated and the results presented here represent the best available at the time of writing. EUROMOD relies on micro-data from twelve different sources for fifteen countries. This paper uses data from the European Union Statistics on Income and Living Conditions (EU-SILC) User Data Base made available by Eurostat. Eurostat does not bear any responsibility for the analysis or interpretation of the data reported here. All interpretations of results and views expressed, as well as any errors in the use of EUROMOD are the responsibilities of the authors.

USING THE EU-SILC FOR POLICY SIMULATION: PROSPECTS, SOME LIMITATIONS AND SUGGESTIONS

Francesco Figari

Horacio Levy

Holly Sutherland

Abstract

We explore the prospects for using the EU-SILC as the underlying micro-database for policy simulation across the EU. In particular we consider the issues to be addressed, and the advantages arising, from building a database from the EU-SILC for the EU tax-benefit model, EUROMOD. In order to identify the issues and illustrate their importance a trial database for Spain is constructed. It is used within EUROMOD to calculate some selected social indicators as well as indicators of work incentives and the effects of fiscal drag in Spain between 2003 and 2006. We conclude that, although transforming the EU-SILC into a database for EUROMOD would require a significant amount of effort, this is likely to be worthwhile because of the consequential improvements in comparability across countries, efficiency in developing and maintaining the model for many countries and simplification of access arrangements. We therefore offer some suggestions for how to improve the User Database for this purpose.

JEL Classification: C81, C88, I32

Keywords: EU-SILC, European Union; Microsimulation

Acknowledgments

This paper was first presented at the conference on "Comparative EU-Statistics on Income and Living Conditions: Issues and Challenges"Helsinki 6-8 November 2006. We are grateful to participants and particularly to Joachim Frick for helpful comments. The errors that remain are the authors' responsibility. A version of this paper is forthcoming in an issue of the Eurostat series "Monograph in Official Statistics".

Corresponding author:

Holly Sutherland
Institute for Social and Economic Research
University of Essex, Colchester, CO4 3SQ
United Kingdom

E-mail: hollys@essex.ac.uk

Introduction

In this paper, we explore the prospects for using the EU-SILC as the underlying micro-database for policy simulation across the EU. In particular we consider the issues to be addressed, and the advantages arising, from building a database from the EU-SILC for the EU tax-benefit model, EUROMOD. Many of the issues are also relevant for policy simulation models covering single nations. However, the great advantage of the EU-SILC for EUROMOD is that it potentially supplies the micro-data foundations for a model for the whole EU-25, thereby reducing the amount of effort that must be made in harmonising data from diverse national sources, in understanding the impact of remaining cross-country differences on model results, as well as in negotiating access to many datasets and ensuring that diverse access conditions are met.

Nevertheless, the case for adopting the EU-SILC as the database for EUROMOD is not entirely clearcut as the model has particular requirements for data input that are distinct from those that usually apply to policy-related analysis using the EU-SILC (or other sources of household micro-data) directly. These are discussed in section 2 of this paper. This is followed by a short summary of the perceived advantages of the EU-SILC over the existing database (section 3). In order to place our interest in exploiting the EU-SILC into context, these discussions are preceded, in section 1, by a summary of the added value from connecting a policy simulation facility such as EUROMOD to the EU-SILC. This is done by providing examples of the types of statistics, indicators and analysis that it can generate, which would not be possible with the EU-SILC alone.

The best way to establish the suitability of the EU-SILC as a EUROMOD database is to construct a trial database, compare its performance with existing data and take note of

advantages and drawbacks that are encountered in practice. This is what we have done, using Spain as a case study. The EUROMOD database has particular requirements and the amount of transformation necessary from the original data is considerable. Section 4 first describes what was done for Spain. It then compares some social indicators calculated using incomes simulated by EUROMOD using EU-SILC with other sources. A further step simulates income under 2006 tax and benefit policies, providing estimates of risk-of-poverty, income inequality and incentives to work in the current year.[1] Finally, we discuss an illustration of what would have happened to income in 2006 in Spain under an alternative policy regime.

Section 5 then sets out in concrete terms the problems and challenges encountered in building the database from the EU-SILC, offering some suggestions for improvements and speculating on the issues to be addressed if EUROMOD (eventually) uses EU-SILC for all EU Member States. The final section concludes by summarising some specific recommendations for improvements to the EU-SILC that would aid its adoption as a policy simulation database, as well as outlining a plan for building on the present case study.

1. What does policy simulation add?

The role of policy simulation methods in complementing social indicators calculated directly from data such as the EU-SILC, particularly in the social inclusion process, has been described in Sutherland (2002) and discussed extensively in Atkinson et al. (2005) where the establishment of a "common analytical framework" to complement the common social indicators is advocated. This framework would encompass analysis using the model family approach such as carried out by the OECD (OECD, 2004) as well as microsimulation approaches based on representative micro-data such as the EU-SILC. Here we summarise how

[1] 2006 was the current year when the first draft of this paper was written!

EUROMOD can add value by providing illustrations of the sorts of calculations that might contribute to this framework. While many of them do not depend on the adoption of the EU-SILC as the source of a database for EUROMOD, their coherence and compatibility with many of the indicators calculated by Eurostat and others for the EU would be enhanced if this were the chosen data source. The list is intended to be suggestive, not exhaustive.

Understanding and measuring the redistributive roles of tax-benefit policies

The re-distributive role of taxes and contributions as well as cash benefits can be examined using EUROMOD. This is often difficult directly from survey data because information about taxes and contributions is often not collected directly.[2] For examples of such analysis using EUROMOD see Immervoll et al. (2006) who examine the equalising properties of the 1998 tax-benefit systems of the EU-15, Verbist (2004) who explores the distributional effects of components of the income tax systems and Verbist (2005) who estimates the specific distributional effects of taxes levied on benefits. Dang et al. (2006) map the varying effects of tax and benefit systems by age.

Understanding the evolution of poverty or inequality indicators between two periods can be aided by using information on the redistributive effects of different systems on the same population, or the same systems on samples taken at different times. Tax-benefit calculations allow for the decomposition of the direct effects of policy changes from the other changes (eg in demographic composition) happening at the same time.[3]

[2] Although it is planned to collect information of taxes paid in the EU-SILC from 2007, it will still require policy simulation methods to isolate the redistributive effects of components of the tax structure (such as particular credits or allowances).

[3] Callan and Walsh (2006) examine the distributional implications of uprating the tax-benefit system from one year to another.

The impact of income-based policy changes on income-based social indicators and related statistics

EUROMOD can re-calculate household incomes following changes to tax and benefit policies and hence assess the impact of a change on risk-of-poverty rates, indicators of income inequality and other income-based social indicators. It can also estimate the budgetary effect of the policy change. The policy changes in question might be

- Actual or proposed policy reforms
- Policy ideas "borrowed" from other countries[4]
- Whole systems used in other countries, as a way of distinguishing the effects *level* of spending, the *structure* of policy instruments and the *national context*.[5]
- Alternative potential policy reforms, with the aim of designing reform packages with particular budgetary and distributional effects.[6]

Typically the policies might apply at the national (or sub-national) level but may also be modelled at the level of the EU, to establish the national effects of hypothetical common policies.[7]

The impact of other factors on social indicators

EUROMOD has been used to quantify the impact of certain macro-economic changes on risk-of-poverty rates (Immervoll et al., 2006a) and to calculate the value of net benefits and tax

[4] See for example Bargain and Orsini (2006) who investigate the effects of the UK Working Families Tax Credit in other EU countries.
[5] See for example, Levy et al. (2007a) who compare the effects of a revenue-neutral implementation of the systems of child support in UK, Austria and Spain in each of the other two countries.
[6] See for example Mantovani et al. (2006) who explore revenue-neutral changes to pension systems.
[7] See for example Levy et al (2007b) who examine the within- and between- country effects of an EU guaranteed income for all children.

concessions received by households by virtue of the presence of children, and the impact of this on child risk-of-poverty rates (Corak et al., 2005)

The impact of policy changes on other relevant outcomes

As well as telling us how much a particular reform reduces the risk-of-poverty for in aggregate and on average for groups in the population, EUROMOD can also tell us about the proportions and characteristics of those affected who gain and lose from the reform. This can be important in establishing the political acceptability of a reform, as well as helping to understand its net aggregate effect.

The impact of policy changes on work incentives

Taxes and benefits do not only have an impact on disposable incomes, they also affect the incentive to earn income (as well as the incentive to save, have children, retire and so on). A benefit system that targets the poor may have an adverse effect on poor people's incentive to take up paid work, especially if this is low paid or they have dependents. EUROMOD can be used to calculate indicators of the incentive to work at all (replacement rates) or to work more (marginal effective tax rates) either under existing tax and benefit systems or under policy reforms. Such calculations can also be done using stylised or "model" families. In this case they provide valuable insights into the effects of complex tax and benefit systems on the net gain from paid work or additional paid work (see for example, the Technical Annex to the Joint Report on Social Protection and Social Inclusion for 2006 (Commission of the European Communities, 2006)). However, in order to find out <u>how many</u> people actually face high

withdrawal or replacement rates calculations of the sort done by EUROMOD based on representative data, such as the EU-SILC are required.[8]

It is also possible to use EUROMOD as the basis for estimating whether people actually do change their labour supply behaviour when work incentives change. EUROMOD does not itself estimate such effects but once this has been done econometrically in some way, EUROMOD can be used to generate incomes received under a range of counter-factual labour supply scenarios to show the combined direct and behavioural effects of policy reform.

Extending the scope of income measurement through policy simulation

EUROMOD simulates employer liability for contributions to social insurance schemes for employees in its database. This information is not routinely included in primary incomes nor deducted from disposable income in analysis using EUROMOD, although either or both are possible when appropriate to the research question. Thus information on these liabilities is generated using the existing database and would also be available based on EU-SILC.

In addition, while not part of the income that is simulated showing the impact of policy change, current development work on EUROMOD is aiming to include estimates of the value of important sources of non-cash incomes imputed into the database. These will include imputed rent, public health and education spending, home production, and employer-provided fringe benefits. Extended definitions of household income, incorporating these components, will eventually be available for the assessment of the distributional effects of policy reforms.[9]

[8] See Immervoll and Sutherland (2006) and Immervoll and O'Donoghue (2003)
[9] This work is being done by the AIM-AP (Accurate Income Measurement for the Assessment of Public Policies) project, funded by the European Commission's Framework Programme 6 (CIT5-2005-028412).

2. The data requirements of EU policy simulation

The standard output from EUROMOD is currently measures of household disposable income under alternative scenarios: original (or "primary") incomes with cash benefits added and direct taxes and social contributions deducted. In order to generate such output, the database input by the model must fulfil some essential requirements:

1. It must be a recent, representative sample of households, large enough to support the analysis of small groups and with weights to apply to population level and correct for non-response
2. It must contain information on primary gross incomes by source and at the individual level, with the reference period being relevant to the assessment periods for taxes and benefits. In some circumstances certain benefits cannot be simulated. In these cases information on the amount these benefits, gross of taxes, is required for each recipient.
3. It must contain information about individual characteristics and within-household family relationships
4. It must contain information on housing costs and other expenditures that may affect tax liabilities or benefit entitlements
5. Specific other information on characteristics affecting tax liabilities or benefit entitlements (examples include weekly hours of work, disability status, civil servant status, private pension contributions) is usually also necessary.
6. The same reference period(s) should apply to personal characteristics (e.g. employment status) and income information (e.g. earnings) corresponding to it. In principle this implies the recording of status variables for each period within the year.

7. There should be no missing information from individual records or for individuals within households. Where imputations have been necessary; detailed information about how they were done is necessary.

All these criteria are rarely, if ever, met in one data source and typically a significant amount of work must be done to transform available data into the required database. In particular, with regard to requirement 2, there are a number of important adjustments that often have to be made.

First, incomes are often collected and recorded net of income taxes and social contributions. The starting points for tax-benefit calculations are primary incomes gross of personal direct taxes and contributions so conversion of net-to-gross income must be performed such that each income source can be identified gross.

Secondly, incomes are often measured with a year as the reference period. This is appropriate for assessment of the income tax base, but typically not for social contributions or income-assessed benefits when a shorter reference period is usually required. In this case it is helpful to have information on the number of months of receipt of each income source within the reference year. Then, it is possible at least to estimate the average amount of each income source in each month it is received, rather than averaging over the year.

Thirdly, the level of aggregation is critical in two ways. First, income received by individuals should be attributable to individuals, not aggregated over the household. Only income paid on a household basis (such as housing benefits or some social assistance benefits) should be attributed at the household level. Second,, incomes should not be aggregated across income types and in particular benefits should be recorded separately, even if they have a similar function. There are several reasons for this. In some countries certain types of benefits

cannot be fully simulated (e.g. contributory benefits depending on contributions made before the survey reference period) so these must be separated from benefits that can be simulated. Furthermore, benefits may be treated differently by the rest of the tax-benefit system (e.g. taxed or not). Finally, identification of each benefit is essential to analyse the take-up behaviour of social benefits. So in cases where benefits are aggregated, some imputation must be carried out to split them appropriately.

Typically too, in relation to requirements 4 and 5, there are some areas where no adjustments are possible and whatever is available must be used or the specific feature of the tax-benefit system must be ignored in the simulations.

Where information is missing, survey datasets often provide imputations of one kind or another. Given the need for individual, disaggregated information for EUROMOD these imputations need to be at the level of each relevant variable rather than be in the form of a single, household-level adjustment factor. Moreover, the imputations need to provide consistent results across variables. For example, the value of imputed housing benefit should not exceed the value of rent (imputed or otherwise).

A many-country model such as EUROMOD has some data requirements that are common across countries and others that are specific to particular national tax-benefit systems. Thus a fully harmonised data source is not necessarily the ideal database for EUROMOD. For example, the aggregation of different income sources (in particular benefits) into one single variable harmonises the decomposition of disposable income across countries into common income categories (for example, the ESSPROS benefit function). However, the interaction of each of these sources with the tax-benefit system may be different. For example, in Spain some family/children related allowances (EU-SILC variable HY050G/HY050N) are

taxable while others are tax exempt. Therefore, as explained above, for the purposes of simulation it is necessary to identify, separately, each source of income. However, the precise requirement differs across countries because not only are the benefits themselves nation-specific (the motivation for the harmonisation in the first place) but their treatment by the tax-benefit systems differs too. Generally, aiming for comparable outputs may require inputs that are somewhat different across countries.

The current EUROMOD database (for EU-15) makes use of micro-datasets from a number of sources including waves the ECHP UDB (4 countries) the national ECHP PDB (1 country), national panel surveys (5 countries), an income and wealth survey (1 country), register data (2 countries) and household budget survey data (2 countries).[10] The reason for this diversity is that in some countries there are a number of alternative data sources. The choice among them was made by national experts on the basis that the selected dataset was the most appropriate for the purpose while at the same time being available for scientific use. The decision was made NOT to adopt the ECHP in all EU-15 countries because in some there were alternatives that were considered preferable on scientific or statistical grounds. One might argue that this diversity reduced the level of comparability across countries while increasing quality of outputs in some. As will be discussed in the next section, it is now clear that there are significant advantages in adopting a database from a common source (to the extent that the EU-SILC can be described as such). As EUROMOD has matured it has become obvious that a *choice* of datasets can be offered to the user: either the EU-SILC or, in some cases, some national alternative. There will be differing advantages and limitations and these will need to be made clear to the user.

[10] See Appendix 1.

However, in assessing the merits of the EU-SILC, relative to the currently-used dataset it is evident that the advantages and disadvantages will not be the same in all countries: both because the underlying data requirements are different, depending on the tax-benefit systems, and because the currently-used dataset has particular merits and limitations. Thus our case study for Spain, described in section 4, cannot be expected to illuminate all the issues that would arise for the EU-15 (or EU-25). The data currently used for Spain are the ECHP (2000 and 1999 data in combination). Thus our exercise is particularly relevant to the other countries using ECHP (Greece, Portugal, Denmark, Austria).

3. The promise of the EU-SILC for EUROMOD

In advance of a detailed assessment of the EU-SILC's suitability as a EUROMOD database it is worthwhile to rehearse the likely advantages at a more general level of using EU-SILC (for the 25 MS) as the future database of EUROMOD-25.[11] These advantages include:

Homogeneity and comparability

While it is the case that EU-SILC is not fully harmonised, its purpose in providing the basis for measuring the value of social indicators in a comparable manner also provides *some* assurance that *some* of the relevant variables are collected in a way that will enhance comparability across countries. EUROMOD will not use aggregate measures of household disposable income that are the basis of some of the headline (and other) indicators. Instead it requires data on some components which may well be problematic to measure precisely with the EU-SILC. However, in practical terms, creation of databases in 25 countries will have

[11] Currently EUROMOD covers the EU-15. Work is underway under the FP6 RIDS project "Improving the Capacity and Usability of EUROMOD" to explore the feasibility of adding the 10 NMS to the model and to construct prototype models for four of the NMS (Poland, Hungary, Estonia and Slovenia). This project will be

significant tasks in common, reducing the risk of accidental non-comparable treatment of some variables and increasing *some* economies of scale in data transformation processing.

Relevance

Some of the areas in which the EU-SILC is extending the scope of income measurement are also areas of interest for the types of analysis conducted by EUROMOD. We have not yet carried out a full review of the possibilities offered by the new information but two examples can be given which indicate the potential.

- Imputed rent will be measured from 2007 and this has potential both to extend the income concept used in poverty and inequality measurement and also as a potential component of taxable income or indeed a factor influencing housing-related support. Even if these are not major components of tax-benefit systems in many or any countries, they may be of interest to explore as part of policy reforms.
- The value of company cars is already included in the EU-SILC and this not only has potential for inclusion in a wider income concept, but is also an appropriate, and potentially rather interesting, subject for exploration in tax simulations. The EU-SILC includes the net value of the car(s) and associated costs met by employers but in some countries the taxation treatment of this form of non-cash income is much less stringent than if the corresponding income were given in cash rather than kind. The distributional effect of such tax concessions and its difference across countries is a subject worthy of study in its own right, as well as an aspect of income tax that could

completed in 2008 and, subject to securing suitable funding, it is planned to follow this up with full implementation of all NMS in EUROMOD.

be included in standard redistribution calculations. It would require that the gross value of the in-kind benefit, rather than the net, be collected or imputed.

In addition, the use of EU-SILC as the EUROMOD database will narrow the gap between analysis using EUROMOD and complementary analysis using the EU-SILC directly. It will permit, among other things, the possibility of evaluating the impact of a policy change on those shown to be deprived or poor on the basis of non-monetary indicators as defined by Eurostat and derived from EU-SILC variables. More generally, the use of a common database will make integrating policy simulations into policy analysis less difficult than it would otherwise be. It also has the potential to encourage the use of EUROMOD within the Commission, and by those engaged in the policy monitoring processes at the European level.

Regularity and Timeliness

Collection of the EU-SILC on an annual basis means that EUROMOD could have a database using the same year of collection in every country which could, in principle, be updated each year. This represents a significant improvement over the current situation. Some of the datasets in the existing database are not collected each year and there is no mechanism to ensure that a common data year is, or can be, adopted in any particular analysis. While adjustments are made to partially correct for this, it would be greatly preferable to use a common year database. Furthermore, being able to anticipate the availability of successive waves of data for all countries would facilitate planning of the comprehensive updating of EUROMOD.

Longitudinal effects

Incorporation of each wave of the EU-SILC into the database would – with some additional adaptations to EUROMOD – permit the exploitation of the panel element of the data to

measure the effects of policy changes on (for example) persistent risk-of-poverty. In addition it would make possible studies of how policies and policy changes might moderate or exacerbate the effects on income of changes in individual circumstance on a year-to-year basis. While the existing EUROMOD database does use single waves or pairs of waves from panel surveys for some countries, this is not uniformly so and any potential for longitudinal or year-to-year analysis has not been exploited.[12]

In addition, the potential for fully simulating short-term contributory benefits (such as those associated with unemployment or sickness) using several waves of the panel element should be explored. The possibility of simulating (short term) contribution histories comprehensively across the EU using the EU-SILC offers the opportunity of extending the scope of simulations, and hence the applicability of EUROMOD.

Data access permission

Currently the use of the EUROMOD database and hence EUROMOD itself for EU-15 is governed by 12 different contracts, all with different requirements and restrictions. It will greatly facilitate access to EUROMOD to enable one contract to be negotiated by users, and for the EUROMOD developers to have to monitor the access terms and conditions set by one contract rather then many. This has the potential to substantially enlarge the number of EUROMOD users.

[12] In some countries two waves of panel data are used together in order to construct a database containing income and characteristics variables applying to the same reference period.

4. A Case Study: an EU-SILC database for Spain

4.1 Building the database

This section summarises the most important transformations and adjustments carried out on the original EU-SILC UDB to construct a trial database for Spain in order to carry out tax-benefit calculations using EUROMOD.[13] First we consider the sample, some exclusions due to missing information, and the weights. This is followed by descriptions of preliminary attempts to (a) impute necessary information for the units missing within responding households, (b) impute information supplied at the household level to individuals, (c) impute gross incomes from net and (d) disaggregate some specific income variables into the more detailed categories required. The variables that are missing altogether are noted and the way in which the 2003 income data are updated to 2006 for EUROMOD analysis is described.

Sample selection and weighting

The 2004 Spanish EU-SILC sample consists of 44,647 individuals in 15,355 households. The individual non-response rate is 14.7 % (Eurostat, 2006). The way that these missing individuals are dealt with involves using the "non-response inflation factor" provided with the data. In a few cases this information is missing and the household as a whole is excluded from the EUROMOD input database. The final sample size consists of 42,107 individuals in 14,640 households.

[13] Further information about the transformation of EU-SILC variables into EUROMOD database variables can be found in the latest edition of the Spanish EUROMOD Data Requirements Document (DRD), available from the authors on request.

The household cross-sectional weights have been scaled-up to offset these exclusions from the original sample, grossing up to population level (42.2 million people in 2004). Table 1 presents some basic descriptive statistics of the grossing-up weights.

Table 1 Descriptive Statistics of the Grossing-up weights

Observations	Mean	Median	Minimum	Maximum
42,107	1001.75	922.53	15.99	7257.59

Imputation of data for missing individuals

As a consequence of the very high individual non-response rate, 20.3% of households have at least one non-respondent adult individual. Response rates are lower amongst persons aged 17-29, with lower levels of education, who are employees, living in Madrid or, in general, in densely populated areas. The EU-SILC database provides a single household level "non-response inflation factor", with which to adjust household income to account for the missing person(s). EUROMOD requires income to be specified at the individual level and by source. The adjustment income has been split equally among non-respondent adult individuals within households but attribution by source is less straightforward. The information provided in the EU-SILC is less useful than that provided in the ECHP. In the latter most sources of income were provided at both individual and household level. Therefore, deductive imputation of individual income by income source for non respondents was possible. In the EU-SILC the non-response factor applies only to total household income. So assumptions about how to split "non-respondent income" across income sources are needed. We assume that non-respondent income all comes from whatever is the main income source in the particular household. Clearly, this is a rather arbitrary way of attributing income.

Furthermore, the EU-SILC "non-respondent income" refers both to individual non-response and item non-response in a single variable and there is no way to distinguish between them. If there are non-responding adults in the household we assume that all the non-respondent income is attributed to them (in equal shares if there is more than one) and in cases where there are no non-respondent individuals in the household, the income is allocated among respondent adult individuals, again according to the main household income source.

We then proceed using the demographic characteristics reported in the personal register file for the non-respondent and the attributed income, to impute all other EUROMOD-relevant characteristics of the non-respondent using several stages of deductive and rule-based imputation. Whenever this is not possible, a mean imputation within classes has been implemented. Obviously, this preliminary process could be improved upon.

Adjustments to variables

Except in the case of variables that apply naturally to the whole household, such as those relating to housing, EUROMOD input data must be at the individual level. In particular, this applies to personal and labour market information, incomes, taxes, benefits, certain expenditures and some assets.[14]

Where the EU-SILC aggregates personal-level information on income into household variables, we have generally attributed this to the adults (people aged 16 or more) in the households in equal shares. The main variables to which this applies are:

- income from rental of a property or land;

[14] For a complete list of EUROMOD variables for Spain, see Appendix 2.

- capital income from interest, dividends, and profit from capital investments in unincorporated business;
- social exclusion allowances;
- housing allowances;
- regular inter-household cash transfers.

In the cases of "family / children related allowances", attribution is to those adults potentially entitled to receive them. This includes, by assumption, parents of children and other adults if their parent(s) are not present in the household.[15]

Income received by people aged under 16 has been attributed equally to children between 14 and 16 years old if present in the household, otherwise to all children.

The income reference period is the previous calendar year (i.e. 2003) and the lag between the end of this period and the time of data collection ranges from 2 to 5 months. At the moment no adjustments have been carried out to take account of changes that may have happened during this period or within 2003.

Net-to-gross conversion

Income variables in the original EU-SILC dataset are net of Spanish withholding tax and, where applicable, social insurance contributions. In order to obtain gross figures, self-employment incomes and income from net capital have been imputed according to the legislation of the income tax withholdings for the year 2003. In the case of employment incomes, this conversion is not a trivial matter. For this reason, a fixed-point algorithm has been developed taking into account the legislation concerning income tax withholdings and

social insurance contributions (Levy and Mercader-Prats, 1999). An adaption of this method has been used in this exercise.[16]

Splitting of Social Benefits

Social benefit variables in the original EU-SILC dataset contain more than one benefit (for example, variable PY090 contains all unemployment-related benefits: insurance and assistance). This aggregation is a limitation for the purpose of analysing the benefit system in detail, and a serious problem if only one part of the aggregation of benefits is to be simulated by the model. To overcome this drawback some imputation methods have been used to split the aggregated variables into the benefits needed (Levy and Mercader-Prats, 2003). A detailed exploration based on the information provided in the survey and legislation has been done to identify the type of pension or benefit that the individual in fact receives. Once identified, the value of the benefit has been imputed to the recipient. This procedure has been applied to 4 different EU-SILC variables as described below and as result of this 10 EUROMOD variables have been created.

Unemployment benefits (PY090)

In Spain, unemployment insurance benefit cannot be lower than 75% of the minimum wage. On the other hand, the amount of the unemployment assistance benefit is 75% of the minimum wage. Therefore, unemployment benefits recorderd in the EU-SILC dataset can be

[15] This definition is distinct from all adults in that it excludes grown up children without their own children who are, by assumption, unlikely to be in receipt of family benefits.

[16] A practical alternative, which uses a similar methodology, would have been to use EUROMOD itself to generate gross incomes by source and individual. This requires that the income data year rules are implemented in EUROMOD (which is the case for 2003 in Spain). See Immervoll and O'Donoghue (2001) for a description of how this was done, using the case of Luxembourg as an illustration.

easily split into the two benefits using 75% of minimum wage as the cut-off to distinguish them.

Some beneficiaries of unemployment benefits report, in the EU-SILC, an amount that is lower than 75% of minimum wage per month.[17] According to the rules, no one can receive less than this amount. For this reason, we assume that these individuals have underreported their benefit and we impute the benefit as equal to 75% of the minimum wage.

Old-age benefits (PY100)

Old age insurance pensions in Spain cannot be lower than a minimum amount ("Minimum old age social insurance pension"). If the pensioner is eligible for an insurance pension that is lower than this minimum amount and fulfils some further eligibility conditions then she/he receives the difference as a supplement. Moreover, in Spain there is also an income-tested old-age assistance benefit. Given that the amount of this assistance benefit is lower than minimum insurance pension and that the eligibility conditions are much more restrictive, there is no overlap between old-age assistance and pension supplement.

Therefore, identifying beneficiaries of 'pure' insurance pensions, insurance pensions supplements and old-age assistance is possible. All that is done is to check the amount of the old-age benefit and the fulfilment of each benefit's eligibility condition. For those individuals identified as recipients of 'pure' old-age insurance pension or old-age assistance the imputation is automatic: the whole amount is classified as the identified benefit. However, in the case of supplement recipients the imputation is more complex. One part of the benefit is paid as insurance pension and the other as supplement. Since there is no information in the

database to know which part is which, we impute these amounts according to the average share of the supplement on total old-age insurance pension of supplement recipients.[18]

Survivors' benefits (PY110)

The procedure to split survivors' benefits into widow insurance pension, widow insurance pension supplement and orphan pensions is similar to the one used on old-age benefits. The only difference, beside differences in policy rules, is the identification of orphans. Instead of using policy rules, these individuals were identified according to personal characteristics such as age, marital status and number of children.[19]

Family / Children related allowances (HY050)

As noted above *Family / Children related allowances* have been attributed to the adults potentially entitled to receive them. However, the resulting weighted number of individual recipients of such allowances is well below the number of beneficiaries reported by official sources. The most important component of these allowances is the means-tested child benefit. Our hypothesis is that since the amount of this benefit is so low (291 euro per year) and it is paid only every six months most families forget to report the benefit during the survey interview. For this reason we impute the amount of this benefit to all families that are eligible. We also include a new variable in the EUROMOD database: "Other Family benefits" which includes any positive difference between original EU-SILC data *Family / Children related allowances* and imputed *Child benefit*.

[17] The annual amount reported was compared with each of the 12 possible amounts (i.e., 75% * #months) taking into account the number of months the person reports being unemployed during the year.
[18] This share is estimated as the overall expenditure on old-age supplements, which is published by the Ministry of Labour and Social Affairs, divided by the overall expenditure on old-age benefits among the individuals that are identified as supplement recipients in the data. In 2003, this share is estimated as 24.1 percent.

There are also some non-benefit aggregations of income that reduce the precision of the EUROMOD calculations. One example is the inclusion of irregular lump sum earnings in the same variable as regular earnings. In some instances this is non-problematic but when the lump sum income is to compensate for redundancy then this should be distinguished as (a) the tax treatment may be different and (b) we may wish to exclude large one-off payments from our measure of disposable income.

Lack of data

Due to limitations in the original EU-SILC dataset, some EUROMOD variables have not been derived. In particular it was not possible to identify:

- civil servants and apprentices who are subject to specific social security regimes in Spain,
- value of financial capital, main residence and other property (these may be relevant for the simulation of social assistance means tests and for certain property taxes; necessary in 1998 in Spain but not in 2003 or 2006),
- child care costs and medical insurance premia (these expenditures are potentially tax-deductible; relevant in 1998 in Spain but not in 2003 or 2006),
- mortgage payments[20]
- housing costs without including compulsory service charges.

It is worthwhile to explain what has been done in constructing the EUROMOD database for Spain in view of these deficiencies, to indicate how the simulation results might be affected.

---

[19] For 2003, the share of supplements in widow's insurance pension is estimated as 36.1 percent

[20] From 2007 mortgage payments will be covered but will only include interest, not the principal re-payments.

- Civil servants and apprentices are assumed to be subject to the main employee social security regime in calculating liability for contributions.
- Financial capital, value of main residence and other property all assumed to be zero.[21] This does not affect Spanish tax-benefit calculations for 2003 or 2006. It could have a major effect in other countries.
- Child care costs and medical insurance premia are assumed to be zero. This does not affect the tax-benefit calculations for Spain in 2003 and 2006. It could have a major effect in other countries.
- The assumption of zero mortgage payments results in tax that is higher than it should be for those who actually have a mortgage, due to the relevant tax credit not being simulated. This is obviously an important omission.[22]
- Housing costs are used, where relevant, inclusive of service charges.

Updating

The monetary variables recorded in the EU-SILC dataset and used as input in the tax-benefit calculations or as components of household disposable income (if they cannot be simulated) have been updated to the common base year 2006 by using updating indexes derived from various appropriate sources. For example, earnings are uprated using the growth in "compensation of the resident employed" from National Accounts; rent is updated using the

[21] An alternative would be to impute, rather approximately, the value of capital from information on income and current interest rates.
[22] Using EUROMOD with the existing ECHP database which includes information on mortgages, indicates that ignoring this tax credit reduces the Gini coefficient by 0.1 percentage points, the headcount poverty rate by 0.2 percentage points (from 18.5% to 18.3%), and increases revenue from income tax by 4%.

rent component of the CPI and social benefits are updated according to the actual change in the nominal value of the benefit in the period concerned.[23]

4.2 Some social indicators for 2003 and 2006 using simulated incomes

Having constructed a preliminary EUROMOD database using 2004 EU-SILC (2003 incomes) for Spain, EUROMOD can be used to calculate disposable incomes, not only for 2003 but also for 2006, using 2006 policy rules. In each case household disposable income is made up of elements taken from the EU-SILC (with imputations, as described above) together with elements that are calculated by EUROMOD (taxes and benefits) based on either the 2003 or 2006 policy rules. Table 2 contrasts a few selected indicators based on 2003 incomes calculated using the previous version of EUROMOD for Spain (using ECHP, updated) with those calculated from our experimental EU-SILC database (first and second columns).

The EU-SILC version of EUROMOD shows a slightly higher risk of poverty rate overall than the ECHP version. The poverty threshold is significantly lower suggesting that the updating procedures applied to the ECHP may be over-estimating income growth, at least at the median.

[23] The data have not been re-weighted to take into account socio-demographic changes between 2003 and 2006. To do this appropriately would require more information on the construction of the survey weights than is currently available.

Table 2 EUROMOD estimates of selected indicators in 2003 and 2006 for Spain

		EUROMOD		Eurostat[2]	EUROMOD
	ECHP[1] 2003	EU-SILC 2003	EU-SILC* 2003	EU-SILC 2003	EU-SILC[3] 2006
Risk of poverty	18.5%	19.6%	20.7%	20.0%	19.2%
Risk of poverty age 65+	21.1%	27.7%	29.4%	30.0%	nc
Poverty threshold (single person) Euro/month[4]	562	517	479	528	588
Gini coefficient	0.31	0.30	0.32	0.31	0.30

Notes: Risk of poverty is measured as living in a household with equivalised income below 60% of the median (using the modified OECD equivalence scale).

* restricted to households without individuals for whom income information is missing; nc – not calculated

1. EUROMOD results based on ECHP use data from 2000 updated to 2003
2. Commission of the European Communities (2006, table 5)
3. EUROMOD results based on 2003 EU-SILC incomes updated to 2006.
4. Not adjusted for purchasing power differences

Another possibility is that our EU-SILC-based simulations somehow under-estimate incomes, although the same indicator calculated directly from the EU-SILC (column 4) shows a threshold that is only slightly higher than the threshold based on simulated incomes. This also shows a higher risk of poverty rate for the elderly than previously shown by the ECHP simulation, but this is similar to that shown by the EUROMOD simulation in column 2. Generally income distributions based on simulated incomes tend to be slightly less unequal (typically with lower relative poverty headcounts) than those taken directly from recorded information in surveys. See Mantovani and Sutherland (2003) for a discussion.

The third column of the table shows the indicators calculated from simulated household incomes excluding those households where information on one or more individuals is missing and their information has been imputed, rather roughly, based on the non-response inflation factor provided with the data. These estimates show higher poverty risk and inequality (as measured by the Gini coefficient) as well as a much lower median (poverty threshold). Thus these households make a difference, although it is unclear whether it is preferable to include the problematic households or not. Our rough and ready imputations bring the results close to those obtained directly from the data, but this does not necessarily mean that the households should be included, nor that the imputations could not be improved upon. Further investigation is required.

We now turn to illustrating the ways in which EUROMOD can be used to add to the information that can be extracted directly from the EU-SILC. First of all, as shown in the final column of Table 2, it is possible to project incomes to a date later than the income reference year. Here, we simulate incomes under the 2006 tax-benefit system in Spain which results in the poverty threshold being 14% higher than in 2003. This is due to inflation, income growth and changes in the tax-benefit system since we are holding population characteristics constant

at those indicated by the 2004 EU-SILC. To the extent that demographic and employment (and other) changes in characteristics influence household incomes, risk of poverty rates might actually move differently than the modest reduction (19.5% to 19.2%) shown by comparing the two shaded columns of Table 2. Nevertheless, the capacity to calculate the direct effects of changes in policies under assumptions about the level of average change in other incomes, does provide a first indication of how indicators might look when the EU-SILC for 2007 (with 2006 incomes) is available. If the indicators move differently, then this is due to changes in household characteristics and their interactions with the tax-benefit system.

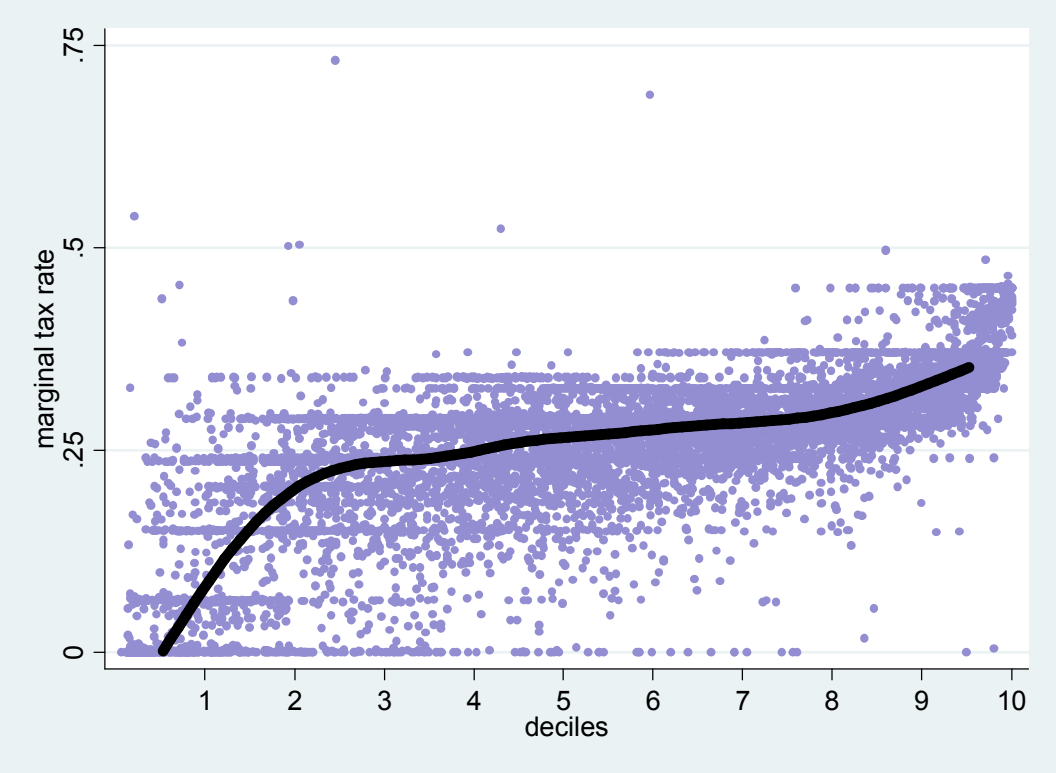
4.3 Work incentive indicators

The second illustration is to show how EUROMOD can be used to calculate indicators of work incentives, given the particular systems of taxation of work income and withdrawal of benefit incomes for those in work. Our particular illustration for Spain under the 2006 tax-benefit system is the calculation of effective marginal tax rates (EMTR) for all households with some employment income. We ask what would be the proportion of an extra small amount of earned income that would be deducted as income tax and social insurance contribution or withdrawn from benefit income? Figure 1 shows the average EMTR by quantile of the household income distribution, plotted as a solid line. On average, the higher the income the higher the EMTR, but the scatter plot shows that there is also substantial variation in EMTR within income groups. The effects of the tax and benefit system depends on the mix of sources of income within the household, as well as who receives them and the characteristics of the household.

Assessment of the work incentive effects of tax-benefit systems using model family calculations involves choosing particular characteristics. This may be misleading because the

result may not correspond to the average effect at that income level. Furthermore, any manageable selection of model family calculations would fail to capture the diversity of effects as shown in Figure 1.

Figure 1 Effective marginal tax rates by quantile of equivalised household disposable income in Spain under the 2006 tax-benefit system



Source: EUROMOD using EU-SILC 2004

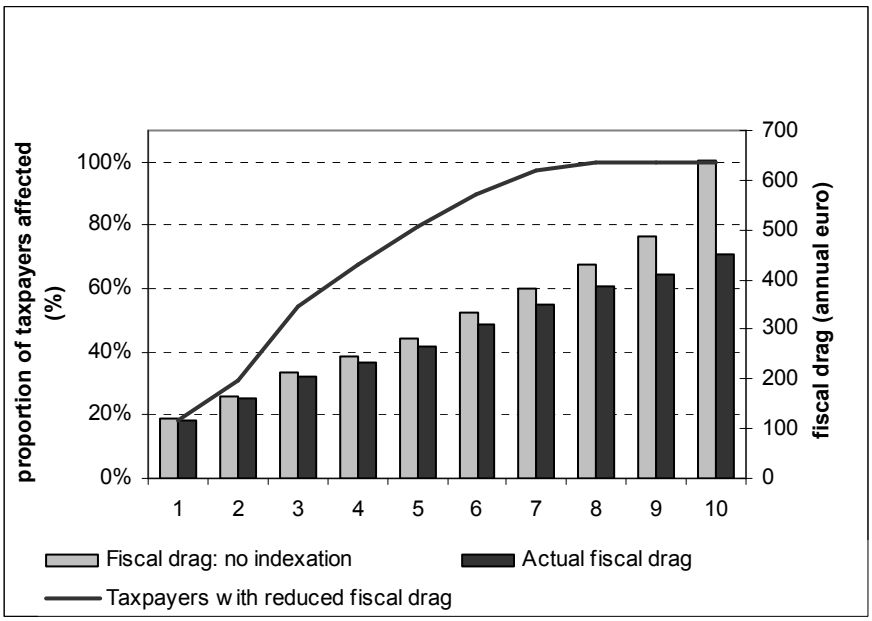
4.4 An illustrative alternative policy scenario for 2006: the effect of fiscal drag

This final illustration shows how EUROMOD can be used to look at alternative policy scenarios. According to the Spanish National Statistics Institute (INE) the Harmonised Consumer Price Index increased by about 10% between January 2003 and January 2006. Therefore, in order to keep pace with the rise of prices some indexation needed to be applied to benefit rates and tax thresholds. In general (with the exception of contributory and non contributory pensions) there is no formal indexation rule in Spain. Up to 2005 no regular

indexation was applied within income tax. Tax bands and other monetary elements were revised as part of occasional income tax "reforms" every few years (the last of these reforms was carried out in 2003). Since 2005, tax bands have been indexed in line with "expected" price inflation (assumed to be 2%). However, outturn inflation has been significantly higher than 2% and, in addition, key elements of the income tax (including the personal and family tax allowances that determine the threshold for paying tax) have not been indexed at all. As a result, there is a general shift of taxpayers from lower to higher rate bands. This "fiscal drag" has distributional consequences that have implications for social indicators and movements in them (Callan and Walsh, 2006).

Focusing on the period 2003-6, we analyse what has been the effect of the current tax band indexation in the Spanish income tax in contrast to a "full" income tax indexation using real consumer price indexes. This is done by comparing three alternative policy scenarios: (a) no indexation (i.e., 2003 income tax rules are applied to 2006 incomes), (b) actual indexation (i.e., 2006 income tax rules are applied to 2006 incomes), and (c) full indexation (i.e., 2003 income tax rules with all monetary elements uprated in line with price inflation in the 2003-2006 period are applied to 2006 incomes).

Figure 2: The incidence of fiscal drag in Spain 2003-6 under current indexation and no indexation, by household income decile



Source: EUROMOD using the 2004 EU-SILC

Compared with full indexation, no indexation would tend to increase the tax burden for existing taxpayers and bring some new taxpayers into the tax net. Actual uprating practice in the period we consider lowered this increase in tax for some more than others. This is shown in Figure 2 where the grey bars show the extra tax that would have been paid had there been no indexation. It increases in amount with increased levels of (household) income (right-hand axis). Given the actual indexation that happened in practice, the extra tax due is lower at all income levels on average (black bars), but the effect is proportionately more at higher income levels: the indexation that did occur particularly benefited the better off, relative to no indexation at all. The proportion of taxpayers benefiting from the partial indexation is shown by the black line: it varies from 18% in the bottom decile group to 100% in the top three decile groups.

Given the relatively short time period and low levels of inflation the effects on social indicators are very small. Had there been full indexation the risk of poverty rate would have been 18.85% instead of 19.22%. On the other hand, given the progressivity of the Spanish income tax, the effect of fiscal drag tends to be larger at higher income levels. Therefore, EUROMOD results indicate that full indexation would mainly benefit the better off and increase income inequality. (However, the results are not statistically significant,)

5. What are the main limitations of the EU-SILC and what could be improved?

Just a few of the requirements listed in section 2 are met using the EU-SILC without any transformation at all. Thus significant effort must be deployed in transforming the EU-SILC data into the EUROMOD input micro database and it is clear that the work done so far on the Spanish database can only be regarded as preliminary. Nevertheless, this is not surprising and it is clear that the EU-SILC does represent a recent, representative and large sample of households (requirement 1), with information about individual characteristics, within-household family relationships (requirement 3) and (much) other relevant information on characteristics affecting tax liabilities or benefit entitlements (requirement 5). In what follows we list the main limitations that we have identified for Spain, suggest what might be done about them, either in the production of the UDB in the future or by the developers of the EUROMOD database, and also discuss how far our findings based on a case study for one country might apply across the whole EU.

Gross incomes

Information on gross incomes (requirement 2) will not be provided in the Spanish EU-SILC dataset (or those of Greece, France, Italy, Portugal, Latvia and Poland) until 2007. This means that for such countries is it necessary to use EUROMOD parameters to implement a net-to-

gross procedure according to the legislation for the income reference period. On the one hand, it would be better to have information on both gross and net incomes in order to either avoid the net-to-gross procedure entirely or to validate the results. On the other hand, it is not clear how the conversion from net to gross will be done for Member States that will not actually collect income data in gross form (European Commission, 2004). It may be that the detailed EUROMOD net-to-gross procedure, which produces conversion factors by income source and by individual, may still be required in place of, or as a complement to, the grossing-up information provided in the UDB.

Level of aggregation within the household

As already noted, EUROMOD input income variables must be available at the individual level but in the EU-SILC some of them are made available only at the household level. In these cases they must be assigned, sometimes in a quite arbitrary way, to individuals. This places limits on the ways in which the individual simulations can be used, for example inhibiting any investigation of non take-up of social benefits or distribution of resources within the household (including by gender). It is relevant to note that in some countries questions are in fact asked and variables collected at the individual level. In Spain, for instance, this is true for *capital income* (distinguishing between income received by an individual in his own name and with other people) and for *family and children related allowances*. For EUROMOD it would be helpful if these variables could be provided at their original level of disaggregation.

When considering other countries, similar issues will arise, although not necessarily for the same variables that are relevant in the Spanish case.

Level of aggregation of income variables

Similarly, EUROMOD needs income variables – particularly, although not exclusively, benefit incomes - to be reported by detailed income (benefit) type, not by harmonised class of income or benefit (requirement 2). Imputing the individual income components is either impossible or extremely arbitrary or, even if something plausible is possible as in the case of the Spanish benefits described in section 4.1, very prone to error in particular cases if not on average. Again, this limits the applications of EUROMOD to those where the precise source of income is not important, as well as reducing the accuracy of all the simulations. Again, the issues and their degree of importance may differ in countries other than Spain.

Where information on amounts of income is collected by individual source (e.g. benefit-by-benefit) it would be very helpful for EUROMOD to be able to make use of the original variables, rather than the harmonised aggregates.

Missing variables

As noted in section 3, some of the characteristics affecting tax liabilities or benefit entitlements (requirements 4 and 5) are either not available in the EU-SILC dataset or provided in a way that is not really useful for the purpose of EUROMOD. Among these variables, mortgage interest payments and housing costs as a whole deserve special mention.

Interest repayments on mortgage on the main residence is not provided in the Spanish EU-SILC 2004 data. It is relevant to note that in the Spanish questionnaire there are already a number of detailed questions on mortgage interest and principal payment.

In general it is important to distinguish the repayments of the principal or capital sum, and the interest payment. From 2007 interest payments will be included in the EU-SILC, but

not capital repayments. This will be appropriate for the calculation of tax relief in many countries but not in Spain because, since 1999, income tax relief has been allowed against the total payment.

Housing costs are reported with a level of aggregation that does not allow us to distinguish between mandatory services and charges, local taxes, insurance, cost of utilities, maintenance and repairs expenditures and mortgage interest payments (where applicable). Again, in the Spanish questionnaire all these expenditures are collected in a disaggregated way at household level and it would be preferable for EUROMOD to have access to the components as well as the aggregate.

Reference time period

Personal and household characteristics and income information do not refer to the same reference periods (requirement 6). In most of the countries the fieldwork operations are done within two quarters after the end of the income reference period. However in other countries (i.e. Italy, Belgium and Ireland) fieldwork operations are done within four quarters after the end of the income reference period. Imputations in order to take account of changes that may happen during this period may be either very demanding or impossible. However they could be important since some variables (e.g. hours worked per week) may be very sensitive to these lags. On the other hand, some adjustment for change within the income reference year may be possible using the EU-SILC information on changes in activity by month.

More generally, it may be possible eventually to use the longitudinal element of the EU-SILC to match the characteristics of the interview period collected in year t-1 with the

annual income for the same year, collected in year t.[24] The drawback of this, given the limits of the design and scope of the panel element of the EU-SILC, would be that either the sample size would be reduced (not all the households in the sample in year t will have been interviewed in year t-1) or that waves of EU-SILC would need to be combined.

Missing values

For most of the countries the within-household non-response rate for the personal interview (requirement 7) is really low, mostly below 1%. Table 3 shows these rates for countries which provided such information: Estonia (5.6%) and Spain (14.7%) show the highest rates.

Table 3 Individual non-response rates (%)

AT	BE	EE	FR	EL	IR	IT	LU	PT	ES
0.6	2.0	5.6	0.8	0.3	0.0	0.0	0.0	0.5	14.7

Source: Eurostat (2006)

When the within-household non-response rate is quite high, the imputation of data for the non-respondent adult individuals is not a trivial matter. However it remains a necessary step since the EUROMOD database must take account of the whole household income in detail. The way we have done it for our case study could certainly be improved upon. This does raise the question whether such imputations are best done in a "customised" way for EUROMOD or whether Eurostat itself might do more with its own expertise. This depends at least to some extent on the demand for such detailed imputations by users of the EU-SILC in general. It is also affected by the extent to which within-household non-response remains a

[24] Our experience of the ECHP indicates that this is a feasible strategy but not entirely straightforward.

problem in Spain in later waves of EU-SILC, and whether it emerges as such a serious issue in any other countries.

An alternative – perhaps most appropriate in datasets with low levels of unit missing cases - would be to exclude the households with missing individuals and recalibrate the weights. Our case study shows the effect of exclusion on results (Table 2) but we were not able to recalibrate the weights, which is important given the large number of households affected and the high probability that they are not a random sub-sample. This is because in the documentation provided with the EU-SILC dataset (European Commission, 2006a; 2006b) there is not enough detailed information about the construction of the weights to recalibrate them appropriately.

6. Recommendations and conclusions

First we summarise our main recommendations for changes to the EU-SILC UDB, to facilitate its use as the main database for EUROMOD and to improve the precision of EUROMOD calculations using it. In doing so we recognise that this first release of EU-SILC data on which our case study and experimental database are based, does not fully represent what will be available by 2007 and beyond. We must also emphasise that there may be additional issues not highlighted by Spain in 2004 that may apply in other countries or at other times.

a. Information about incomes (and assets) collected at the individual level should be made available at the individual level;

b. Information about benefits and other income sources should be made available at the most disaggregate level possible (e.g. by individual (national) benefit) as well as in harmonised aggregated form;

c. Housing costs variables should be provided in the detail in which national questionnaires collect the information: service charges should be separated from rent.

d. Mortgage payments should be included: for some countries both interest and capital repayment elements are needed, separately.

e. Households with missing information on individuals should be kept to a minimum; the household income adjustment factor for non-response should distinguish between whether it applies to the missing individual(s) only, or to missing values on some income sources for responding individuals. Ideally income variables should be provided both at individual level and as household aggregates, including and excluding adjustments for non-response.

f. Information on how the household weights were calculated should be provided, such that they can be re-calibrated.

Some of these recommendations are simply requests for more variables to be retained in the database from the national sources, or for more information. This applies to some extent to recommendations a., b., c., d. and f. If this is not possible for some reason, particularly in relation to recommendations a. and b., our imputation methods for splitting aggregate variables would need to be refined. One option that could help considerably in the development of useful EUROMOD-appropriate imputation methods would for the raw data (i.e. original variables) to be provided on a one-off basis so that the methods can be validated by comparing imputations with the original data.

In other cases we need more imputation to be done, with the needs of policy simulation in mind. These needs may be similar to those of other prospective EU-SILC users and one possibility is that Eurostat be asked to apply their expertise to an extended list of such pieces of missing information.

We wish to conclude on an optimistic note. We believe that the very significant advantages of adoption of the EU-SILC as the main database for EUROMOD outlined in section 3 of this paper outweigh the technical disadvantages highlighted by our case study. Some of them also apply to alternative data sources. There is also a potential advantage in seeking to carry out imputations, adjustments and transformations on data from a partly harmonised source. Not only will some methods and processes be common or adaptable across countries, differences in assumptions will be more transparently visible. At the same time, work on our case study for one country has demonstrated that comprehensive adoption of the EU-SILC as a EUROMOD database will represent a considerable effort in the first instance, which will need substantial resources to support it. Updating each year, not only the database but also the policy rules (necessary to maintain the results as "current"), will involve an ongoing need for support.

However, as well as laying the basis for timely estimates of the effects of policies and policy changes on incomes and income-based social indicators, incorporation of the EU-SILC into the EUROMOD database offers the promise of more: the consistent calculation of work incentive indicators, the extension of policy simulation into new areas (e.g. contributory benefits), joint analysis with other EU-SILC variables (e.g. deprivation indicators), a longitudinal perspective on the effects of policies (e.g. persistent poverty).

Finally, and perhaps most significantly, granting access by the scientific community to the EU-SILC will facilitate access to EUROMOD (once it is based on EU-SILC) by a much wider group of users than is currently possible using multiple datasets.

References[25]

Atkinson A.B., B. Cantillon, E. Marlier and B. Nolan, 2005, *Taking forward the EU Social Inclusion Process: an independent report commissioned by the Luxembourg Presidency of the Council of the European Union,* Final version: 31st July www.ceps.lu/eu2005_lu/report/final_report.pdf

Bargain O. and K. Orsini, 2006, "Beans for Breakfast? How Exportable is the British Workfare model?", in Bargain O. (ed) *Microsimulation In Action: Policy Analysis in Europe using EUROMOD,* Research in Labor Economics Vol 25, Elsevier, 165-198.

Commission of the European Communities, 2006, "Technical Annex to the Joint Report on Social protection and Social Inclusion 2006", Commission Staff Working Document SEC(2006) 523, Brussels.

Corak M., C. Lietz and H. Sutherland, 2005, "The Impact of Tax and Transfer Systems on Children in the European Union", Innocenti Working Paper No. 2005-04. Florence, UNICEF Innocenti Research Centre. http://www.unicef.org/irc

Dang, T., H. Immervoll, D. Mantovani, K. Orsini and H. Sutherland, 2006, "An Age Perspective on Economic Well-Being and Social Protection in Nine OECD Countries" OECD Social Employment and Migration Working Papers No. 34, Paris: OECD.

European Commission, 2004, "Income in EU-SILC: net/gross/net conversion. Report on common structure of the model; model description and application to the ECHP data for France, Italy and Spain". EU-SILC Documentation 133/04.

European Commission, 2006a, "EU-SILC User Database Description". Version 2004-1.

European Commission, 2006b, "Description of SILC UDB Variables: Cross-sectional and Longitudinal". Version 2004-1.

Eurostat, 2006, "EU-SILC 2004. Quality of Quality Reports".

Immervoll H., H. Levy, C. Lietz, D. Mantovani, C. O'Donoghue, H. Sutherland and G. Verbist, 2006, "Household incomes and redistribution in the European Union: quantifying the equalising properties of taxes and benefits", in Papadimitiou D.P. (ed) *The Distributional Effects of Government Spending and Taxation*, Palgrave.

Immervoll, H., H. Levy, C. Lietz, D. Mantovani and H. Sutherland, 2006a, "The sensitivity of poverty rates in the European Union to macro-level changes", *Cambridge Journal of Economics*, 30, 181-199.

Immervoll H. and C. O'Donoghue, 2001, "Imputation of Gross Amounts from Net Incomes in Household Surveys: An Application using EUROMOD", EUROMOD Working Paper No. EM1/01

[25] EUROMOD Working Papers are available from www.iser.essex.ac.uk/msu/emod/publications/emodwp.php

Immervoll H. and C. O'Donoghue, 2003, "Employment Transitions in 13 European Countries. Levels, Distributions and Determining Factors of Net Replacement Rates", EUROMOD Working Paper No. EM3/03

Immervoll H. and H. Sutherland, 2006, "EUROMOD: An integrated European tax-benefit model and indicators of work incentives", in Carone G. and A. Salomäki (eds) *Indicators and Policies to Make Work Pay* European Economy Special Report. No. 2. Office for Official Publications of the EC.

Levy H., C. Lietz and H. Sutherland, 2007a "Swapping Policies: Alternative Tax-Benefit Strategies to Support Children in Austria, Spain and the UK", *Journal of Social Policy* 36/4.

Levy H., C. Lietz and H. Sutherland, 2007b, "A guaranteed income for Europe's children?" in Jenkins S. and J. Micklewright (eds), *Inequality and Poverty Re-examined* Oxford: Oxford University Press.

Levy H. and M. Mercader-Prats, 1999, "A note on the net to gross procedure: The case of Spain", Seminar: EUROMOD Meeting, Rome, August.

Levy H. and M. Mercader-Prats, 2003, "EUROMOD Country Report SPAIN". http://www.iser.essex.ac.uk/msu/emod/countries/spain/cr01sp0903.pdf

Mantovani D., F. Papadopoulos, H. Sutherland and P. Tsakloglou, 2006, "Pension Incomes in the European Union: Policy Reform Strategies in Comparative Perspective" in Bargain O. (ed) *Microsimulation In Action: Policy Analysis in Europe using EUROMOD,* Research In Labor Economics Vol 25, Elsevier, 27-71.

Mantovani D. and H. Sutherland, 2003, "Social Indicators and other Income Statistics using the EUROMOD Baseline: a Comparison with Eurostat and National Statistics", EUROMOD Working Paper EM1/03

OECD, 2004, *Benefits and Wages*: OECD indicators, Paris:OECD.

Sutherland H., 2002, "Indicators for Social Inclusion in the European Union: the impact of policy changes and the use of microsimulation models," *Politica Economica,* 18 (1) 117-120.

Verbist G., 2004, "Redistributive effect and progressivity of taxes An International Comparison across the EU using EUROMOD", EUROMOD Working Paper No. EM5/04

Verbist G., 2005, "Replacement Incomes and Taxes: A distributional analysis for the EU-15 countries", EUROMOD Working Paper No. EM2/05

Appendix 1 EUROMOD Datasets

Country	Base Dataset for EUROMOD	Date of collection	Reference time period for incomes	Sample size households
Austria	Austrian version of European Community Household Panel	1999	annual 1998	2,672
Belgium	Panel Survey on Belgian Households	1999	annual 1998	3,653
Denmark	European Community Household Panel	1995	annual 1994	3,215
Finland	Income distribution survey	2001	annual 2001	10,736
France	Budget de Famille (HBS)	1994/5	annual 1993/4	11,291
Germany	German Socio-Economic Panel	2001	annual 2000	7,020
Greece	European Community Household Panel	1995	annual 1994	5,168
Ireland	Living in Ireland Survey	1994	month in 1994	4,048
Italy	Survey of Households Income and Wealth	1996	annual 1995	8,135
Luxembourg	PSELL-2	2001	annual 2000	2,431
Netherlands	Sociaal-economisch panelonderzoek	2000	annual 1999	4,329
Portugal	European Community Household Panel	2001	annual 2000	4,588
Spain	European Community Household Panel	2000	annual 1999	5,048
Sweden	Income distribution survey	2001	annual 2001	14,610
UK	Family Expenditure Survey (HBS)	2000/1	month in 2000/1	6,634

1 Calculated using weights.

Appendix 2 EUROMOD variables for Spain

Variables with "co" as the first two characters of the name are common across all EUROMOD country databases; those starting "sp" are Spanish-specific.

* indicates a variable that is not derived (and the value set to zero) due to limitations in the original dataset.

Variable	*Description*
Personal Information	
cohhid	Household ID
copid	Individual ID
copartnr	Partner ID
coparent	Parent ID
cogender	Gender
coage	Age
comarst	Marital status
cocured	Current education
coeduach	Highest education achieved
cocntry	Country code
spcitizn	Citizenship
Labour Market Information	
coempst	Employment status
coocc	Occupation
coindust	Industry
cofirmsz	Firm size
cocivsrv *	Civil servant
cohours	Hours worked per week
sptypcon	Type of contract
spminwrk	Number of months in employment in income reference period
spmoutwrk	Number of months out of employment in income reference period
Income, Benefits and Taxes	
coempy	Employment income
spmthemy	Number of months receiving employment income
coinvy	Capital income
coprvpen	Private pension
copropy	Income from rent
comainty	Received maintenance payments
coslfemy	Self-employment income
spmthslf	Number of months receiving self-employment income
columpy *	Lump sum income
coregy	Other regular cash payments

coedy	Student payments
cohb	Housing benefit
comatery	Maternity payments
spbe001a	Unemployment insurance benefit
spbe001b	Unemployment assistance benefit
spbe002a	Old-age insurance pension
spbe002b	Old-age insurance supplement pension
spbe002c	Old-age assistance
spbe003a	Widow insurance pension
spbe003b	Widow insurance supplement pension
spben004a	Sickness benefit
spben004b	Invalidity benefit
spben005	Social assistance
spbenfam	Family benefit
spmth001	Number of months receiving unemployment benefit

Value of Financial capital and other monetary variables

cofincap *	Value of Financial capital
coothcap *	Value of other property (jewels, car, property)
copencon	Pension Contributions
cochildc *	Child care costs
spmedins *	Medical insurance premia
comaint	Maintenance payments

Household level Information

coimprnt *	Imputed rent
spnoroom	Number of rooms in house
cotenure	Housing tenure
codate	Date of interview
coregion	Region at the NUT1 level
coweight	Grossing-up weight
spmorpri *	Mortgage principal repayment
comorint *	Mortgage interest payment
coohcost *	Other housing costs
corent	Rent
cosvchrg *	Compulsory service charges
cowtax	Regular taxes on wealth
covalres *	Market value of main residence