

Paulus, Alari et al.

Working Paper

The effects of taxes and benefits on income distribution in the enlarged EU

EUROMOD Working Paper, No. EM8/09

Provided in Cooperation with:

Institute for Social and Economic Research (ISER), University of Essex

Suggested Citation: Paulus, Alari et al. (2009) : The effects of taxes and benefits on income distribution in the enlarged EU, EUROMOD Working Paper, No. EM8/09, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:

<https://hdl.handle.net/10419/64873>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

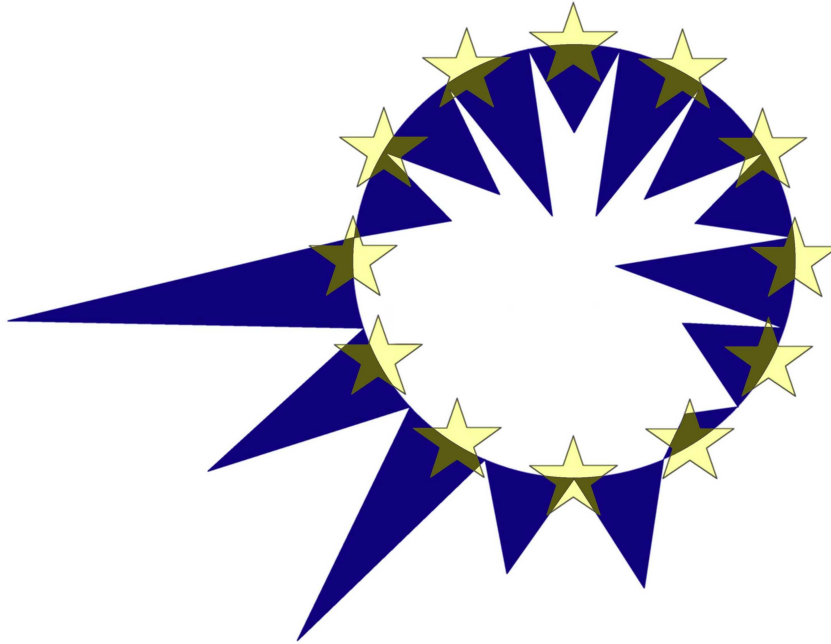
Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

EUROMOD

WORKING PAPER SERIES



EUROMOD Working Paper No. EM8/09

THE EFFECTS OF TAXES AND BENEFITS ON INCOME DISTRIBUTION IN THE ENLARGED EU

Alari Paulus*, Mitja Čok, Francesco Figari, Péter Hegedüs, Nataša Kump,
Orsolya Lelkes, Horacio Levy, Christine Lietz, Silja Lüpsik, Daniela
Mantovani, Leszek Morawski, Holly Sutherland, Péter Szivos, Andres Vörk

April 2009

THE EFFECTS OF TAXES AND BENEFITS ON INCOME DISTRIBUTION IN THE ENLARGED EU*

Alari Paulus , Mitja Čok, Francesco Figari, Péter Hegedüs, Nataša Kump,
Orsolya Lelkes, Horacio Levy, Christine Lietz, Silja Lüpsik, Daniela Mantovani,
Leszek Morawski, Holly Sutherland, Péter Szivos, Andres Vörk[†]

Abstract

Tax and benefit systems in the enlarged EU vary significantly in size and structure. We examine how taxes and benefits shape income distributions in 19 EU countries, focusing on the differences between Western European countries (EU15) and Eastern European countries (Estonia, Hungary, Poland, Slovenia). We use EUROMOD, the European tax-benefit microsimulation model, which simulates taxes and benefits for representative samples of household micro-data and through a common framework which allows the analysis of cross-country differences on a comparable basis. The analysis concentrates on the distribution and composition of incomes, and the effect of taxes and benefits on poverty and inequality.

JEL Classification: C81, D31, P50

Keywords: European Union, Estonia, Hungary, Poland, Slovenia, income distribution, taxes, benefits

Corresponding author:

Alari Paulus

Institute for Social and Economic Research

University of Essex

Colchester

Essex, CO4 3SQ

UK

Email: apaulus@essex.ac.uk

* This paper uses EUROMOD version D25. EUROMOD is continually being improved and updated and the results presented here represent the best available at the time of writing. Any remaining errors, results produced, interpretations or views presented are the authors' responsibility. This paper uses data from the European Community Household Panel (ECHP) User Data Base and the EU Statistics in Incomes and Living Conditions (SILC) made available by Eurostat; the Austrian version of the ECHP made available by the Interdisciplinary Centre for Comparative Research in the Social Sciences; the Panel Survey on Belgian Households (PSBH) made available by the University of Liège and the University of Antwerp; the Estonian Household Budget Survey (HBS) made available by Statistics Estonia; the Income Distribution Survey made available by Statistics Finland; the Enquête sur les Budgets Familiaux (EBF) made available by INSEE; the public use version of the German Socio Economic Panel Study (GSOEP) made available by the German Institute for Economic Research (DIW), Berlin; the Greek Household Budget Survey (HBS) made available by the National Statistical Service of Greece; the Living in Ireland Survey made available by the Economic and Social Research Institute; the Survey of Household Income and Wealth (SHIW95) made available by the Bank of Italy; the Socio-Economic Panel for Luxembourg (PSELL-2) made available by CEPS/INSTEAD; the Socio-Economic Panel Survey (SEP) made available by Statistics Netherlands through the mediation of the Netherlands Organisation for Scientific Research - Scientific Statistical Agency; the Polish Household Budget Survey (HBS) made available by the Polish Central Statistical Office and prepared by the Economics Department of Warsaw University; a sub-sample of the Population Census merged with Personal Income Tax database, Pension database and Social Transfers database, made available by the Statistical Office of Slovenia; the Income Distribution Survey made available by Statistics Sweden; and the Family Expenditure Survey (FES), made available by the UK Office for National Statistics (ONS) through the Data Archive. Material from the FES is Crown Copyright and is used by permission. Neither the ONS nor the Data Archive bears 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.

[†] This paper was written as part of the I-CUE (Improving the Capacity and Usability of EUROMOD) project, financed by the European Commission as a Research Infrastructure Design Study (RIDS-011859). We are indebted to all past and current members of the EUROMOD consortium for the construction and development of EUROMOD. We also wish to thank the participants of the I-CUE Final Conference in April 2008 for providing valuable comments on earlier drafts. However, any errors and the views expressed in this paper are the authors' responsibility. In particular, the paper does not represent the views of the institutions to which the authors are affiliated.

1.1 Introduction

There is much variety of tax and benefit policies across the European Union, having increased further by the accession of Eastern European countries in 2004 and in 2007. Although this marked the end of transition in some sense for these countries, many of them still face systematic reforms. However, the instruments for preparing and evaluating these reform options are often lacking and government performance tends to be monitored in terms of macro indicators (such as budget deficits) rather than in terms of their impact on individuals or households. Perhaps even less is known about the trade-offs between promoting particular goals and supporting particular social groups. Focusing on the differences between Western and Eastern European countries, our paper aims to bring novel evidence on the social impact of fiscal policies. In particular, we examine how taxes and benefits affect income distributions in the enlarged EU.

A distributional analysis of taxes and benefits requires data at the individual and household level. Most micro-data sources available are collected using surveys and typically focus on benefits, while having little or incomplete information about taxes (if any at all). Taxes are usually better recorded in administrative datasets but these tend to be not widely accessible. In addition, an international perspective raises comparability issues across national datasets. Given all these difficulties, only few international studies have considered the effect of *both* benefits and taxes on household incomes while relying on micro-data. These have primarily focused on the OECD countries and used two strategies for overcoming comparability issues. On the one hand, studies like Oxley et al. (1999), Förster and Pearson (2002), Förster and Mira d'Ercole (2005), and OECD (2008) rely on a common OECD questionnaire completed by national experts drawing on country-specific analysis of existing data sources. On the other hand, studies such as Atkinson et al. (1995) and Mahler and Jesuit (2006) directly exploit national survey datasets harmonised by the Luxembourg Income Study¹. Even so, the consistency and comparability of results across countries as well as the level of detail of the analysis have been constrained due to the differences in the underlying national datasets².

We rely on a variety of (partly harmonised) national datasets at the micro-level, but employ microsimulation techniques to calculate benefit entitlements and tax liabilities. In particular we use EUROMOD, the tax-benefit microsimulation model covering the 15 pre-2004 European Union member states plus Estonia, Hungary, Poland and Slovenia. Besides providing more comprehensive and detailed information on personal taxes and benefits, which, among else, facilitates their categorisation in a comparable way across countries, this method has other advantages over using recorded taxes and benefits. In particular it allows studying interactions between different tax-benefit instruments and the intended effects of tax-benefit policies under full compliance (i.e. complete benefit take-up and no tax evasion) in addition to their actual performance. Last but not least, applying legal tax-benefit rules across countries in a common framework provides potentially more consistent and comparable results.

Nevertheless, our approach shares a number of limitations with previous studies. First, we focus only on the direct impact of existing taxes and benefits on income distributions and

¹ See <http://www.lisproject.org/>.

² For example, the results in OECD (2008) are based on micro-data sources where information on taxes (where available) was given by respondents, taken from administrative records or imputed (with microsimulation models).

ignore possible indirect effects of government policies through changes in relative prices and household behaviour (e.g. labour supply). Second, our analysis is limited with the scope of the model which currently includes cash payments only³. Third, as the underlying datasets are cross-sectional we are primarily concerned with redistribution among people rather than across each person's life-cycle.

As such it is an updated and extended version of a paper by Immervoll et al. (2006) which, using an earlier version of the same model, analysed redistributive effects of taxes and benefits in the EU15 countries in 1998. In addition to updating these results, we extend the analysis to four Eastern European countries – Estonia, Hungary, Poland and Slovenia – and besides the effect of taxes and benefits on income composition and income inequality also discuss the effects on income poverty⁴. (A similar analysis was also carried out in Figari et al. (2008), but focusing on the changes at the EU level as whole.) We seek to answer the following questions. Does the scale of redistribution differ between Western and Eastern European countries? Is it larger in the latter given their transition from planned economy where the government had an immense role in the society? Are they providing efficient safety nets for those falling behind? Are there any systematic differences in the instruments used by the state for redistributing incomes? In particular, which countries base their welfare systems largely on means-tested, and which ones use a more universalist approach? Do these four Eastern European countries form a homogenous group in some way or another within the European Union?

The paper is structured as follows. Section 2 gives a short overview of the underlying model and its input datasets, also explaining different income concepts used in the analysis. Section 3 presents and discusses the effect of different types of tax-benefit instruments on the structure of household incomes, income inequality and poverty. The last section summarises the results.

1.2 Methodology and data

We use EUROMOD in our analysis. It is a multi-country tax-benefit microsimulation model, which includes tax-benefit systems for 19 European Union countries: EU15 and Estonia, Hungary, Poland and Slovenia, modelled in a common framework. See Box 1 for a short overview of the tax-benefit systems for latter four. All 19 countries are included in the analysis, using the latest tax-benefit policy rules available for each country. This, however, results in a combination of different policy years: 2005 for 6 countries, 2003 for 8 countries and 2001 for 5 countries. Nevertheless, by focusing on relative measures only, we expect to minimise the effect on the results from using different policy years.

The model includes direct taxes and cash benefits but does not cover indirect taxes or non-cash benefits. Most of tax and benefit instruments can be simulated, except those for which work histories are required (e.g. contributory pensions, unemployment benefits) but usually

³ The inclusion of the main private and public non cash incomes in the concept of resources available to household in order to implement a more comprehensive income definition is one the aims of the AIM-AP project. The resulting data and method enhancements will be made generally accessible and re-useable by implementing them within EUROMOD. Further information can be found at <http://www.iser.essex.ac.uk/msu/emod/aim-ap/>.

⁴ Less detailed versions of the results presented in this paper are also available as part of the EUROMOD statistics on the Distribution and Decomposition of Disposable Income. See <http://www.iser.essex.ac.uk/msu/emod/statistics/>.

not available in the cross-sectional survey datasets used as EUROMOD input data. Instruments which are not simulated are taken directly from data (if available). We focus on the full potential effect of tax-benefit policies by assuming complete benefit take-up and no tax evasion. For further information, see Sutherland (2001, 2007).

There are 17 different data sources used to construct EUROMOD input data for modelling the 19 tax-benefit systems (see Appendix B). These are mostly national household budget or income surveys but also register data and European-wide surveys like European Community Household Panel (ECHP) and EU Survey on Income and Living Conditions (EU-SILC) are used for some countries. All of these include grossing weights to make samples representative of the whole household population. In most cases the reference time period for income data matches the policy year or precedes it a few years in which case monetary values are updated according to various price and income indices. Three datasets – those for Denmark, Ireland and Italy – date back to 1994-96.

EUROMOD input databases for each country contain information on household demographic and labour market characteristics, market income generated by household members and non-simulated benefits. (Note that market income does not include lump sum one-off payments nor capital gains.) Based on that, EUROMOD calculates benefit entitlements, social insurance contributions and tax liabilities. The main output is household disposable income which is calculated as the sum of market income and social benefits less social insurance contributions and personal taxes (see Box 2 below).

Box 1: A summary of the 2005 tax-benefit system in Estonia, Hungary, Poland and Slovenia

- All four *tax-benefit systems* are effectively unified national systems. There are few taxes (mostly on property) set by the local governments in Estonia, Hungary and Poland but the share of these taxes in overall taxation is negligible. Municipalities in the same countries have also some discretion over the (national) social assistance benefits, and provide a few local benefits, such as additional family/child benefits and social assistance benefits, but again the share in overall social expenditures is small.
- In revenue terms, nearly all of personal taxes (i.e. direct taxes paid by individuals) consist of *income taxes* in all of these countries. All of them have individual income tax systems, while married couples in Estonia and Poland can opt to be jointly taxed. Estonia and Slovenia have a comprehensive income tax system where all income sources are pooled and taxed uniformly. Whereas Estonia applies a flat tax (i.e. a single marginal tax rate above a certain threshold), Slovenia has a progressive tax schedule. Hungary and Poland have a dual income tax system, where only non-capital income is consolidated and subject to a progressive tax schedule while capital income (and partly self-employment income in Hungary) is taxed separately at a flat tax rate. The system in Hungary is more complicated as the flat tax rate varies between different types of capital and self-employment income. In Poland, farmers pay separately an agricultural tax that is based on farm size and land area quality, and self employment income may be taxed in any one of the three different ways (mostly under the general progressive system).
- In all countries, the main components of *social insurance contributions* (SICs) are the same: pension, health and unemployment insurance contributions. In Slovenia, there is additionally a maternity leave contribution. However, the way contributions are shared between the employers and employees varies quite a lot – nearly all of SICs are paid by employers in Estonia, while employees pay only a part of the unemployment insurance contributions and contribute to the funded pension scheme; in Hungary, employers contribute almost 3 to 1 compared to employees; in Poland, SICs are split roughly equally between employers and employees; and in Slovenia, employees pay slightly more (about 10-20%) than employers. Self-employed pay the sum of the rates for employers and employees in all four countries.

Box 1 continued

- The structure of expenditure on *cash benefits* is rather similar across the countries, especially for Estonia, Hungary and Slovenia – see the table below. About 60% of cash benefits are related to old age, followed by disability (11.2-13.9%), family/child (5.3-16.6%) and sickness/health care benefits (4.4-7.2%). Survivors, unemployment and housing/social exclusion benefits account only for a minor share, except in Poland where the share of survivors' cash benefits is about 10 percentage points higher compared with the other countries. The share of family and child related expenditure, on the other hand, is significantly lower in Poland than in other countries. Estonia, which in relative terms provides the most generous cash support for families and children, has a lower share of expenditure on unemployment and housing and social exclusion. Estonia also differs in only *means-testing* the social assistance benefit, while means-tests also apply to some family benefits in the other countries (especially in Poland) and to an unemployment benefit in Slovenia.
- The relative differences in the structure of expenditure across countries do not change much if *in-kind benefits* are also included. Most notably, the share of old age related benefits is higher in Poland compared to the other countries, while the share of sickness/health care benefits lags further behind. Also, the share of housing/social exclusion benefits in Hungary is significantly higher when in-kind benefits are included showing that these are substitutes rather than complements to the cash benefits. Overall, in-kind benefits account for 30-37% of total expenditure, except in Poland where the share is 18%, and the share is highest for housing and sickness/health care expenditure.

Social protection expenditure by function (excluding administration costs) in 2005, %

| | Cash benefits only | | | | Cash and in-kind benefits | | | |
|--------------------------|--------------------|------------|------------|------------|---------------------------|------------|------------|------------|
| | EE | HU | PL | SI | EE | HU | PL | SI |
| Old age | 60.6 | 60.7 | 58.6 | 62.5 | 43.1 | 41.2 | 48.3 | 42.4 |
| Survivors | 1.2 | 1.9 | 13.3 | 2.7 | 0.9 | 1.3 | 11.1 | 2.0 |
| Disability | 11.8 | 13.9 | 12.8 | 11.2 | 9.4 | 9.9 | 10.7 | 8.5 |
| Sickness/health care | 7.2 | 5.1 | 4.4 | 7.0 | 31.9 | 29.9 | 19.8 | 32.3 |
| Family/children | 16.6 | 13.9 | 5.3 | 9.0 | 12.2 | 11.8 | 4.4 | 8.6 |
| Unemployment | 1.3 | 4.1 | 3.9 | 4.1 | 1.3 | 2.9 | 3.3 | 3.3 |
| Housing/social exclusion | 1.2 | 0.3 | 1.7 | 3.4 | 1.2 | 3.1 | 2.5 | 2.9 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Eurostat Database (Living conditions and welfare > Social protection > Social protection expenditure).

- Overall, *public pensions* (old age, survivors', disability) constitute a large part of the benefit systems. All four countries have introduced funded old age pension schemes in addition to the existing pay-as-you-go systems, however, the first private old age pensions will be payable earliest in 2009 in Estonia and Poland. The legal retirement age in 2005 was 63 for men and 59.5 for women in Estonia; and respectively, 62 and 60 in Hungary; 65 and 60 in Poland, and 63 and 61 in Slovenia. Both early retirement and postponement are possible (subject to, accordingly, reduced and increased accrual rates) in all countries.

Detailed information on these tax-benefit systems can be found in the EUROMOD Country Reports: see Čok et al. (2008), Hegedűs et al. (2008), Levy and Morawski (2008) and Lűpsik et al. (2008), available at <http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>

These income concepts will be used throughout the following analysis with social benefits divided into three further groups: public pensions, means-tested benefits and non means-tested benefits. With respect to public pensions we try to distinguish state enforced savings for retirement from other

benefits, as one could argue that these should be excluded from redistribution analysis and be considered along with private pensions which are included in the market income concept. In fact, to address this we provide two alternative starting points on several occasions – market income and market income including public pensions.

As the distinction between retirement and other insurance pensions is often not clear-cut and they might be designed as substitutes, we have also included in the category of public pensions (a) survivors' pensions, (b) invalidity pensions, and (c) means-tested pension top-ups while excluding separate means-tested old-age benefits (even if labelled as social pensions etc). However, to ensure these are retirement benefits, we have also imposed an age limit of 65 (67 for Denmark, since this was the Danish pension age in 2001). Incomes grouped as public pensions appear as other (non means-tested) benefits for those aged under this limit.

Box 2: Main income concepts in EUROMOD

| | |
|---|---|
| | Market Income (<i>employment and self-employment income, income from property (rent), investment income, private pensions, private transfers</i>) |
| + | Social Benefits (<i>public pensions, family benefits, health related benefits, unemployment benefits, social assistance benefits, housing benefits</i>) |
| | Grouped further as: |
| | <ul style="list-style-type: none"> • public pensions • non means-tested benefits • means-tested benefits |
| – | Social Insurance Contributions (<i>employee, self-employed</i>) |
| – | Personal Taxes (<i>national and local income taxes, other direct taxes</i>) |
| = | Disposable Income |

Other benefits are differentiated by whether there are any means-tests applied or not, i.e. whether the benefit entitlement depends on the current amount of other income or capital. These are benefits targeted specifically at those with largest needs or lowest resources and, therefore, explicitly involve redistribution. Whether they achieve more in terms of redistribution than non means-tested benefits – which are usually based on contingencies such as disability, intended for horizontal redistribution (e.g. to children) or earnings replacement (sickness, maternity/paternity or unemployment) – is one of the subjects of this paper. Detailed information on how individual benefits in each country were categorised can be found in Appendix C.

1.3 Analysis

1.3.1 Income composition

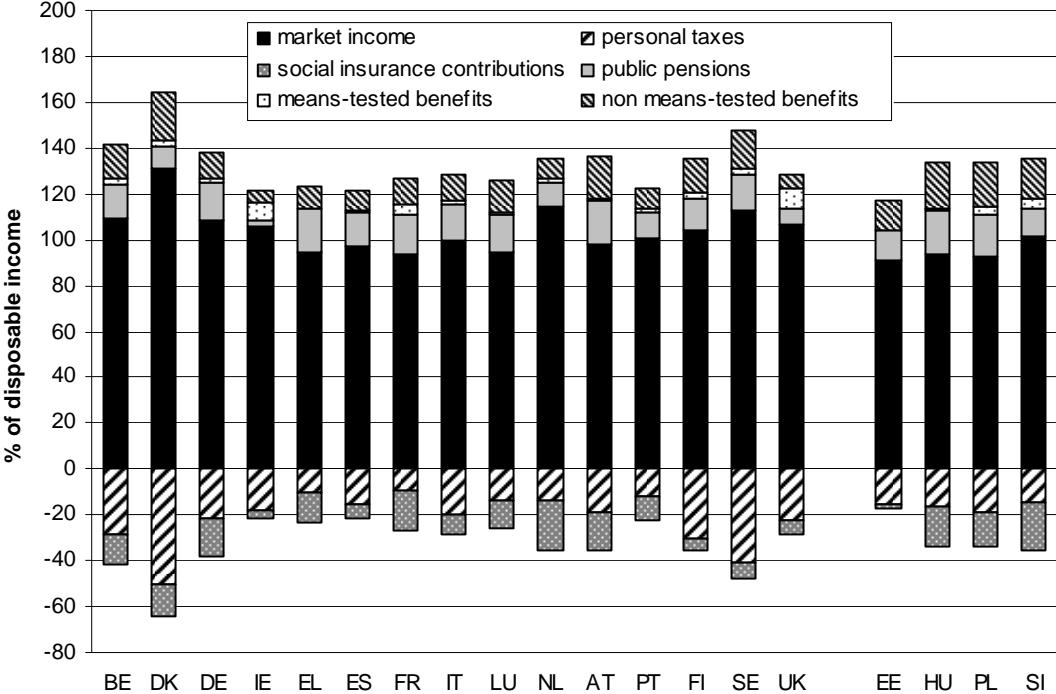
First, we examine the role of tax-benefit systems on the structure of household incomes. Figure 1 (and Table 1 in Appendix A) show the composition of disposable incomes at the household level in terms of the average size of each income component as a percentage of average household disposable income.

It is important to note that while the graph reflects the composition of incomes that households have available to spend, it does not represent the overall budgetary balance at the government level nor the balance of all the resources available to households. Other taxes (e.g. VAT, excise duties, corporate income tax) and other public expenditures (publicly provided health care, education, housing subsidies

and so on) are not included. However, it is still informative to see how much market income is necessary on average to achieve a given level of disposable income; and how much is added as (cash) benefits and deducted as (direct) taxes. Furthermore, the measure of household disposable income that is used corresponds to the income concept commonly used in the calculation of income inequality and poverty (for example, see OECD 2008). It is therefore highly relevant to understand differences in its composition across countries.

Overall, market income equal to 100% of disposable income means that direct taxes and cash benefits balance each other. While there are only few EU15 countries with average household market income below disposable income, it seems more common for the *New Member States* (NMS) – occurring in three out of four and most likely reflecting greater reliance on other taxes and less expenditure on in-kind benefits. On the deduction side, income taxes dominate social insurance contributions, except in Greece, France, the Netherlands and *Slovenia*. Denmark and Sweden tax incomes the most, while *Estonia*, Ireland, Spain, Portugal and Greece tax the least.

Figure 1: Income composition, all households



Source: EUROMOD

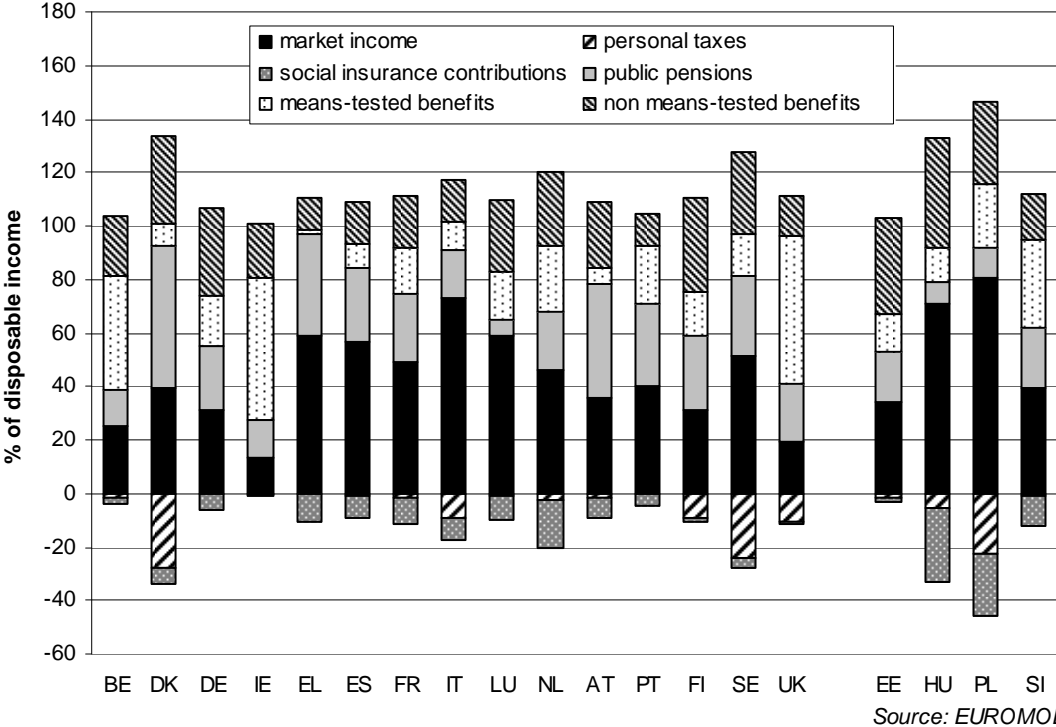
In terms of benefits, the bulk is made up of public pensions and non means-tested benefits – contributing from 85% to nearly 100% of the total expenditure on cash benefits – except in the UK and Ireland, where means-tested benefits are most important and account for, respectively, 39% and 54% of total cash benefits. Also the share of disposable income from means-tested benefits is the highest for these two countries, while they have the lowest shares of disposable income from either public pensions or non means-tested benefits. Besides the UK and Ireland, low public pensions also characterise other countries where most of pensions are flat-rate schemes (e.g. Denmark) or are provided through the private sector (e.g. the Netherlands). Other countries where non means-tested benefits contribute little are the Netherlands and most of the Southern European countries (Portugal, Spain and Greece), while Hungary, Poland, Slovenia together with the Nordic countries (Denmark, Finland and Sweden) and Austria have the largest shares. Altogether, the share of disposable income from benefits is the largest in Poland, Hungary and Austria, and the smallest in Ireland, the Netherlands, the UK and Portugal.

The low share of non-pension benefits may be due to a high level of economic activity as well as to a benefit system that has low coverage and/or small payments. Similarly, a high share may be an indicator of many people needing support, as well as of a system involving relatively generous payments.

Overall, the scale of governments’ involvement in altering incomes (as measured by the total length of the bars in Figure 1) is significantly higher in Hungary, Poland and Slovenia than in Estonia. The first three show the levels above the average and similar to that of the Netherlands, Austria and Finland, while staying behind Denmark and Sweden, countries with the highest levels. Estonia, on the other hand, demonstrates the smallest role of the state in that respect, surpassing even the Southern European countries.

As expected, the share of market income is significantly lower and that of all benefits is much higher in the bottom income decile group (see Figure 2 and Table 2) – based on household equivalised disposable income using the OECD modified scale⁵. Market income accounts for about 25-60% of disposable income in most countries, its share being lower in countries with high levels of means-tested support (e.g. Ireland, UK) and higher for *Poland*, *Italy* and *Hungary*.

Figure 2: Income composition, bottom decile by household equivalised disposable income



The results for *Poland* are partly related to an agricultural tax which is based on imputed earnings from farm land. While we do not consider the latter as part of disposable income in our calculations, the tax is taken into account and, therefore, many of those paying it end up with low disposable income⁶. High share of market incomes in *Italy* reflects the situation where most of elderly people receiving pension income are not in the first decile group and the support through other benefits is relatively small. In case of *Hungary*, the results are influenced by social insurance contributions for self-employed, which are not only relatively high on average but also rather regressive due to a fixed

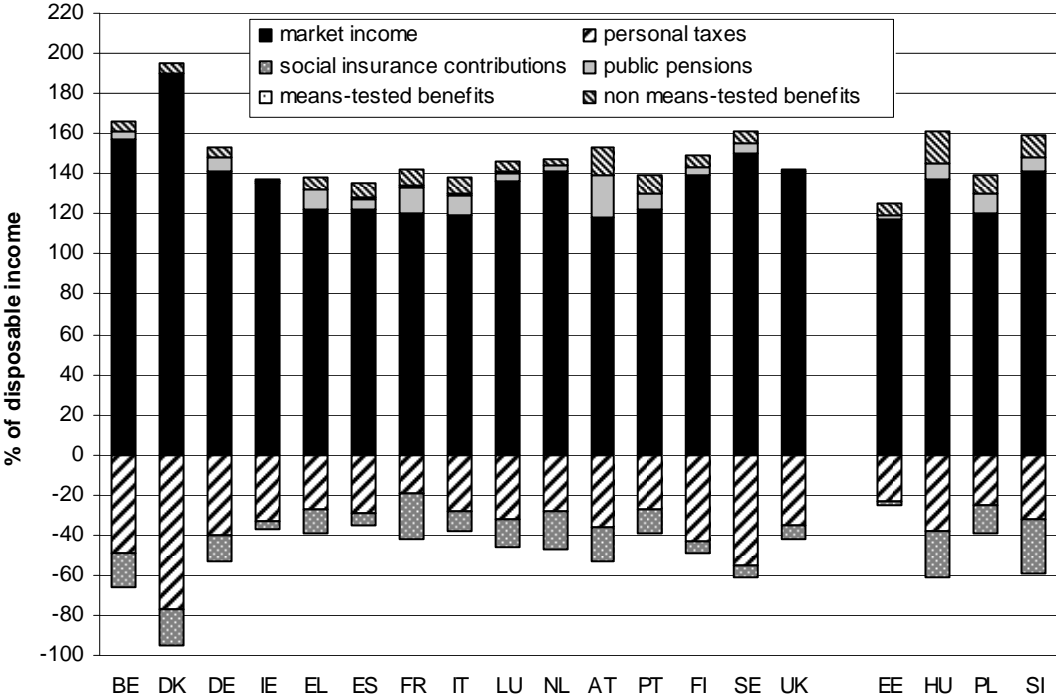
⁵ That is weighing the head of household with 1, any other adult with 0.5 and a child (younger than 14 years) with 0.3.

⁶ Agricultural tax accounts for 10% of total personal taxes and 20% of it is concentrated in the first decile. Excluding it from calculations lowers the share of market income for the bottom decile (after recalculating deciles) from 80% to 67% of disposable income, personal taxes 23% to 6% and contribution 23% to 20%.

amount component. These factors also explain why there is significant tax liability for the bottom decile group in these three countries. Apart from them, only the Nordic countries and the UK charge the lowest decile with substantial income taxes⁷. The overall tax liability is rather low and mostly comprised of social insurance contributions.

Finally, the composition of disposable income for the top decile (see Figure 3 and Table 3) shows that market income exceeds disposable income at least by 20%, meaning that rich households pay significantly more in taxes than they receive back in benefits. While all the benefits are very low, there is almost no support from means-tested benefits as expected. On the other hand, the overall tax liability is much higher compared with the average for all households, mainly due to income taxes as there are often upper limits on social insurance contributions.

Figure 3: Income composition, top decile by household equivalised disposable income



Source: EUROMOD

1.3.2 Income inequality and redistribution

The equalising effect of tax-benefit systems which varies greatly across the European Union is summarised in Figure 4 (and Table 4) depicting the Gini coefficient for market income, market income with public pensions and disposable income⁸.

Countries are ordered by the Gini of disposable income showing low income inequality in the continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) and the Nordic countries (Denmark, Finland and Sweden) – with a Gini of between 0.22 and 0.27 – and high inequality in the Southern European countries (Greece, Italy, Portugal and Spain) and the Anglo-

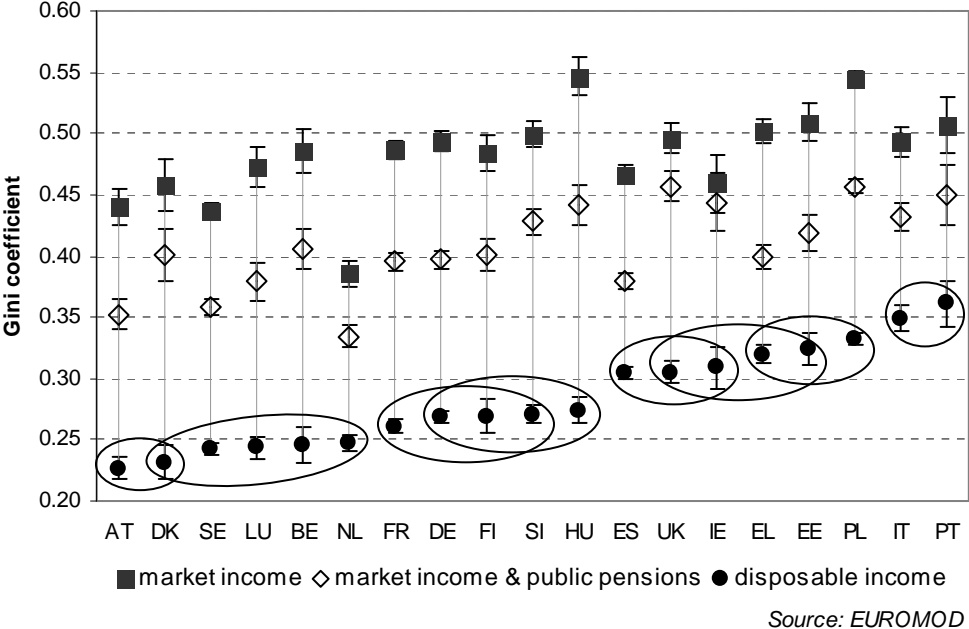
⁷ For the UK the tax mostly comprises Council Tax which is a local property-based tax. A benefit, Council Tax benefit, provides a rebate of up to 100% for those on low income. In contrast with the “static” income decomposition employed here, an “interactive” approach would take account of the net effects of taxes and benefits.

⁸ In each case, incomes are equivalised using the OECD modified scale. Observations with zero or negative incomes are also included in the calculations of the Gini coefficient.

Saxon countries (the UK and Ireland) with a Gini of between 0.30 and 0.36. *Slovenia* and *Hungary* (0.27 in each) belong to the first group while *Estonia* (0.32) and *Poland* (0.33) to the second⁹. Compared to disposable income, market income inequality seems to vary somewhat less, with the exceptions of the Netherlands which has remarkably low market income inequality and *Poland* and *Hungary* with much higher market income inequality.

Tax-benefit systems as whole reduce income inequality substantially although to different extents. Apart from the Netherlands, the Southern European countries and the Anglo-Saxon countries together with *Estonia* redistribute incomes the least, also helping to explain their high disposable income inequality. The Netherlands has low redistribution as market income inequality is already much lower than in other countries, most likely due to its labour market institutions. On the other hand, Hungary and Belgium redistribute income to the largest extent, followed by other continental and the Nordic countries. Comparing the effect of public pensions with those of other tax-benefit instruments, the latter dominate by absolute size (except in Greece and Spain). Note, however, that the equalising effect from public pensions is also important for the majority of countries except Ireland, the UK and the Netherlands where, as already said above, private pensions are more common.

Figure 4: Income inequality before and after taxes and benefits as measured by the Gini coefficient



Note: countries are ranked by the Gini coefficient of equivalised household disposable income; 95% confidence intervals shown are obtained with bootstrapping techniques using 1,000 replications; countries for which the Gini coefficients of disposable income are statistically indifferent are grouped together.

In order to see the redistributive effect by the main tax-benefit system components (aside from public pensions), we exclude each group of tax-benefit instruments in turn from the disposable income and compare how much inequality (as measured by the Gini coefficient) would change. Figure 5 shows the Gini coefficient of (baseline) disposable income on the right hand scale and the absolute change in Gini coefficient on the left hand scale when each group of tax-benefit instruments is excluded. It is important to note that this is an example of static decomposition as no interactions between instruments are taken into account. For instance, as some benefits might be taxable, excluding benefits

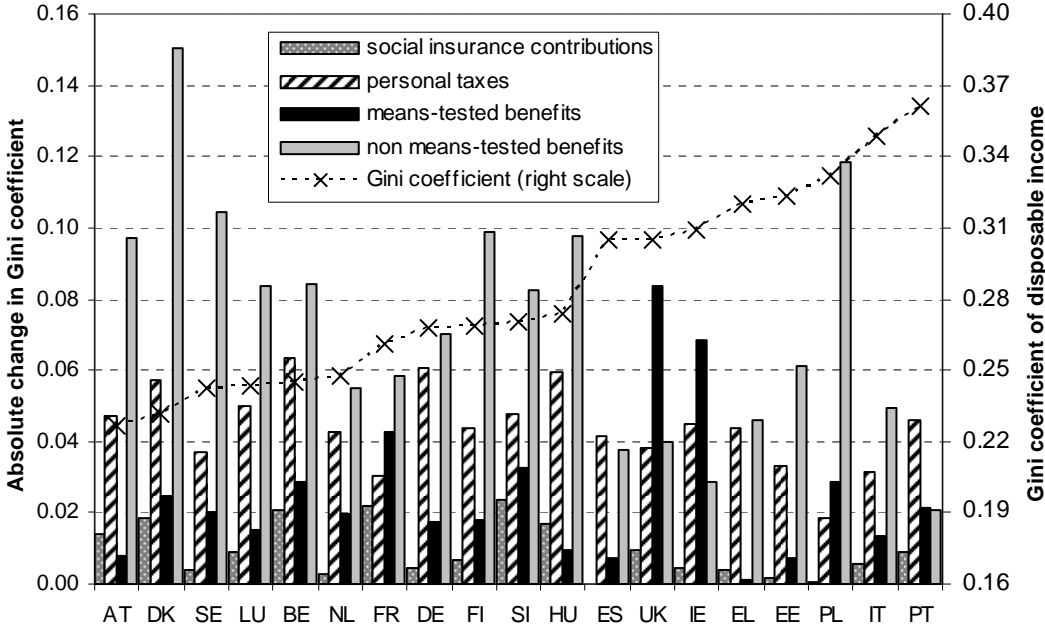
⁹ Conditional on non-overlapping confidence intervals around the Gini coefficient of disposable income, we can split each group into further two which statistically differ from each other: the first group into (a) Austria, Denmark, Sweden, Luxembourg, Belgium and the Netherlands, and (b) France, Germany, Finland, *Slovenia* and *Hungary*; the second group into (c) Spain, the UK, Ireland, Greece, *Estonia* and *Poland*, and (d) Italy and Portugal.

would also imply lower taxes, and in the absence of non means-tested benefits, support from means-tested benefits might be higher.

The results in Figure 5 (and Table 5) indicate that non means-tested benefits have the largest impact on average and that the extent of their influence varies the most across countries. Excluding these benefits increases the Gini coefficient between 0.02 (Portugal) and 0.15 points (Denmark). The effect is largest for the Nordic countries, *Poland*, and *Hungary*; and smallest in the Southern European, Ireland and the UK. The latter two, in turn, show the highest inequality reduction from means-tested benefits: by 0.07 and 0.08 points respectively, while this is at most 0.04 points for the others. Income taxes on average have larger equalising effect than means-tested benefits, from 0.02 points in Poland to 0.06 points in Belgium; however, without any clear pattern of country groupings. Finally, social insurance contributions have the smallest equalising effect (up to 0.02 points), which is not surprising given that it is not their main purpose.

It is interesting to note that *Estonia* – the only country with a flat income tax among those observed – does not show a drastically smaller equalising effect from personal taxes compared to all other countries using (more) graduated tax schedules, which is contrary to what would be generally expected. Furthermore, a large average tax ratio does not necessarily lead to large reductions in inequality through taxes. As can be seen from Figure 2, tax liabilities also exist in the bottom decile in the countries with the highest tax liabilities (see for example Sweden).

Figure 5: Redistributive effect of tax-benefit instruments, absolute change in the Gini coefficient



Source: EUROMOD

Note: countries are ranked by the Gini coefficient of equivalised household disposable income.

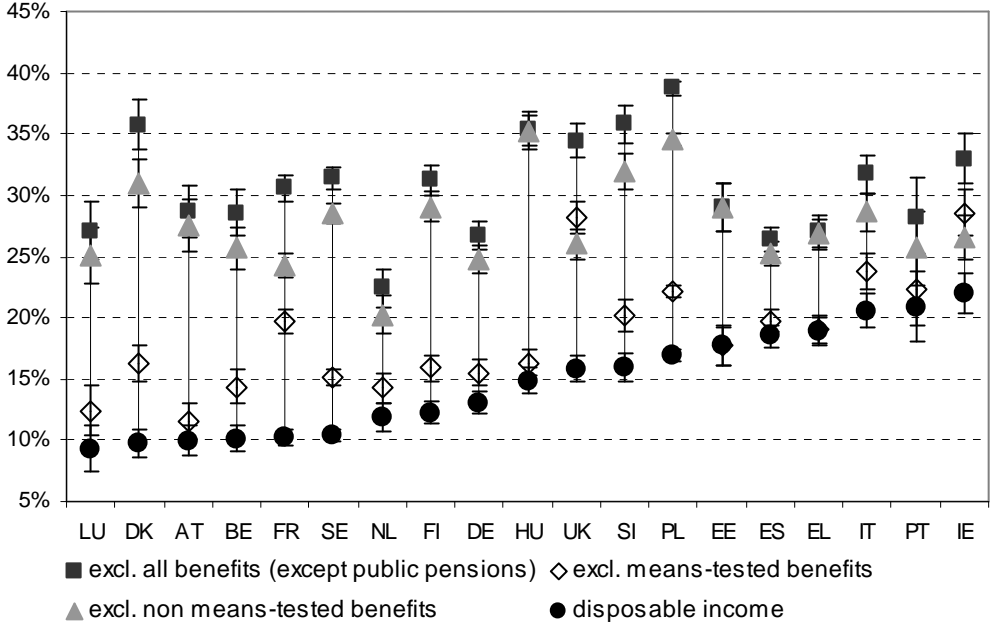
1.3.3 Poverty

Finally, we consider the effect of tax-benefit systems on poverty headcounts. Poverty rates vary from 9.3% in Luxembourg to 21.9% in Ireland, based on the national poverty lines defined as 60% of median equivalised disposable income (see Figure 6 and Table 6). Apart from these countries, the lowest poverty rates are in the Nordic and the continental countries, and the highest in Ireland and the Southern European countries, while *New Member States* are in this case all clustered between these two groups (together with the UK).

We estimate the poverty reducing effect of different instruments (means-tested benefits, non means-tested benefits and the two together, i.e. all benefits except public pensions) by excluding them from disposable income each in turn and at the same time keeping the poverty lines constant based on the initial disposable income. Similar to the methodology of the inequality decomposition the effects shown are “static” in the sense that they do not take account of any interactions between elements of the system. In practice, however, if non means-tested benefits were abolished means-tested benefit entitlements would rise to compensate for the loss to some extent.

Overall, means-tested benefits have relatively little effect on poverty rates, except in Denmark, France, the UK and Ireland. It is only in the latter two countries where the effect exceeds that of non means-tested benefits. However, relative to their size overall (see Figure 1) means-tested benefits have a larger impact on poverty than non means-tested benefits, as one might expect. While in *Poland* and *Slovenia* means-tested payments have a clear role in reducing the poverty rate, in *Hungary* and even more so in *Estonia* their role in this respect is negligible. All benefits together (without public pensions) reduce poverty rates by between 7 and 26 percentage points and 16 percentage points on average. In *Poland*, *Hungary* and *Slovenia* the size of the effect is relatively large – between 20 and 22 percentage points, commensurate with that in France or Sweden. In *Estonia*, on the other hand it is lower, equal to 11 percentage points which is similar to that in Italy and Ireland.

Figure 6: Income poverty rates before and after benefits



Source: EUROMOD

Note: countries are ranked by the poverty headcount ratio using a poverty line defined as 60% of median equivalised disposable income. 95% confidence intervals shown are obtained with bootstrapping techniques using 1,000 replications.

1.4 Summary

In sum, tax-benefit systems in all the 19 countries considered in this analysis reduce income inequality substantially although to a different extent. There are higher taxes and more support through benefits on average in the Nordic and the continental countries, while lower taxes and smaller benefits characterise the Southern and the Anglo-Saxon countries. The former group is also characterised by a higher degree of redistribution, lower income inequality and lower poverty, whereas the opposite is true for the latter. As a result, inequality of disposable incomes varies more across countries than market income inequality. The redistributive effect of the main tax-benefit system components (while

excluding public pensions and considering these together with market income) is on average larger for non means-tested benefits, followed by personal taxes and non means-tested benefits. Social insurance contributions have unsurprisingly the smallest equalising effect, given that it is not their main purpose.

The four *New Member States* are far from forming a unique group together. While *Estonia* is similar to the Southern and the Anglo-Saxon countries, *Hungary* and *Slovenia* are closer to the Nordic and the continental countries. The relative position of *Poland* is less definite with high taxes and benefits along with high inequality. Although redistribution through benefits is large in *Poland*, the effect from taxes is the smallest of that in all countries. In term of poverty, however, all four countries are clustered in the middle of the ranking of European countries. Overall, the results do not show that the role of government is necessarily larger in the former planned economies – although *Hungary*, *Poland* and *Slovenia* have the level of taxes and benefits higher than average, *Estonia* has the lowest level among all the 19 countries.

While benefits account for much higher share of income for the bottom part of the distribution in all countries, some of them also pay substantial taxes and contributions. From this perspective *Hungary* and *Poland* clearly stand out (along with the Nordic countries), showing also the highest market income inequality among the 19 countries considered. Interestingly, *Estonia* – the only country with a flat income tax among those observed – does not show a drastically smaller equalising effect from personal taxes compared to all other countries using graduated tax schedules, which is contrary to what would be generally expected.

With this paper, we aimed to demonstrate that the new infrastructure in the form of extended EUROMOD can provide further useful evidence in the future, enhancing not only policy-making but also the transfer of knowledge between the West and the East, in both directions. The analysis presented is only one of the numerous potential applications. More specific policy issues or topics in the limelight of political debates could be on the future research agenda of EUROMOD users.

References

- Atkinson, Anthony B. / Rainwater, Lee / Smeeding, Timothy M. (1995) *Income distribution in OECD countries. Evidence from the Luxembourg Income Study*, OECD Social Policy Studies, No. 18.
- Čok, Mitja / Kump, Nataša / Majcen, Boris (2008) 'EUROMOD Country Report – Slovenia 2005', EUROMOD Country Reports, <http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>
- EUROMOD statistics on Distribution and Decomposition of Disposable Income, <http://www.iser.essex.ac.uk/msu/emod/statistics/>
- Eurostat Database, Living conditions and welfare, Social protection, Social protection expenditure. Retrieved 3 November 2008 from the World Wide Web: <http://ec.europa.eu/eurostat/>
- Figari, Francesco / Paulus, Alari / Sutherland, Holly (2008) 'Income inequality and the effect of public policies in the European Union: what happens with enlargement?' for presentation at the 30th General Conference of the International Association for Research in Income and Wealth (IARIW), Portoroz, Slovenia, 24-30 August, 2008.
- Förster, Michael / Mira d'Ercole, Marco (2005) 'Income distribution and poverty in OECD countries in the second half of the 1990s'. OECD Social, Employment and Migration Working Papers, No. 22.
- Förster, Michael / Pearson, Mark (2002) 'Income distribution and poverty in the OECD area: trends and driving forces'. *OECD Economic Studies*, No. 34, pp. 7-39.
- Hegedűs, Péter / Lietz, Christine / Szivós, Péter (2008) 'EUROMOD Country Report – Hungary 2005', EUROMOD Country Reports, <http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>
- Immervoll, Herwig / Levy, Horacio / Lietz, Christine / Mantovani, Daniela / O'Donoghue, Cathal / Sutherland, Holly / Verbist, Gerlinde (2006) 'Household incomes and redistribution in the European Union: quantifying the equalizing properties of taxes and benefits', pp. 135-165 in Papadimitriou, Dimitri B. (ed.), *The Distributional Effects of Government Spending and Taxation*. Palgrave Macmillan.
- Levy, Horacio / Morawski, Leszek (2008) 'EUROMOD Country Report – Poland 2005', EUROMOD Country Reports, <http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>
- Lüpsik, Silja / Paulus, Alari / Võrk, Andres (2008) 'EUROMOD Country Report – Estonia 2005', EUROMOD Country Reports, <http://www.iser.essex.ac.uk/msu/emod/documentation/countries/>
- Mahler, Vincent A. / Jesuit, David K. (2006) 'Fiscal redistribution in the developed countries: new insights from the Luxembourg Income Study'. *Socio-Economic Review*, Vol 4 (3), pp. 483-511.
- OECD (2008) *Growing unequal? Income distribution and poverty in OECD countries*.
- Oxley, Howard / Burniaux, Jean-Marc / Dang, Thai-Thanh / Mira d'Ercole, Marco (1999) 'Income distribution and poverty in 13 OECD countries'. *OECD Economic Studies*, No. 29, pp. 55-94.
- Sutherland, Holly (2001) 'EUROMOD: An Integrated European Benefit-Tax Model, Final Report', EUROMOD Working Paper EM9/01. Microsimulation Unit, ISER, University of Essex.
- Sutherland, Holly (2007) 'EUROMOD: the tax-benefit microsimulation model for the European Union', pp 483-488 in Gupta, Anil / Harding, Ann (eds.), *Modelling Our Future: population ageing, health and aged care*, International Symposia in Economic Theory and Econometrics, Vol 16. Elsevier.

Appendix A: Statistics on income distribution

Table 1: Income composition (% of disposable income), all households

| Country | Market income | Personal taxes | Social insurance contributions | Benefits | Public pensions | Means-tested benefits | Non means-tested benefits |
|---------|---------------|----------------|--------------------------------|----------|-----------------|-----------------------|---------------------------|
| BE | 109.2 | -28.7 | -13.1 | 32.6 | 14.6 | 3.1 | 14.9 |
| DK | 130.7 | -50.3 | -13.9 | 33.5 | 10.1 | 2.9 | 20.5 |
| DE | 108.1 | -21.2 | -17.2 | 30.3 | 16.9 | 2.1 | 11.3 |
| IE | 105.7 | -17.7 | -3.5 | 15.6 | 2.3 | 8.5 | 4.8 |
| EL | 94.4 | -10.6 | -13.0 | 29.1 | 19.1 | 0.1 | 9.8 |
| ES | 96.9 | -15.1 | -6.4 | 24.6 | 15.0 | 1.1 | 8.5 |
| FR | 93.4 | -9.0 | -18.0 | 33.6 | 17.4 | 4.5 | 11.7 |
| IT | 99.7 | -19.9 | -8.9 | 29.1 | 15.9 | 1.9 | 11.4 |
| LU | 94.5 | -13.6 | -11.9 | 31.1 | 16.2 | 1.6 | 13.2 |
| NL | 114.3 | -13.6 | -21.5 | 20.8 | 10.6 | 1.9 | 8.2 |
| AT | 97.8 | -19.2 | -16.7 | 38.1 | 19.6 | 1.0 | 17.5 |
| PT | 100.4 | -12.1 | -10.1 | 21.7 | 11.2 | 2.2 | 8.3 |
| FI | 103.7 | -30.6 | -5.3 | 32.2 | 14.3 | 2.2 | 15.7 |
| SE | 112.3 | -41.1 | -6.8 | 35.5 | 16.2 | 2.2 | 17.1 |
| UK | 107.0 | -22.7 | -5.8 | 21.6 | 6.7 | 8.4 | 6.6 |
| EE | 90.9 | -15.0 | -1.9 | 26.0 | 13.0 | 0.6 | 12.5 |
| HU | 93.8 | -16.7 | -17.1 | 40.0 | 18.7 | 0.8 | 20.6 |
| PL | 92.7 | -18.6 | -14.8 | 40.7 | 18.5 | 2.8 | 19.3 |
| SI | 101.0 | -14.2 | -21.2 | 34.3 | 13.0 | 3.9 | 17.4 |

Source: own calculations with EUROMOD (version D25).

Table 2: Income composition (% of disposable income), bottom decile

| Country | Market income | Personal taxes | Social insurance contributions | Benefits | Public pensions | Means-tested benefits | Non means-tested benefits |
|---------|---------------|----------------|--------------------------------|----------|-----------------|-----------------------|---------------------------|
| BE | 25.5 | -1.5 | -2.2 | 78.1 | 13.1 | 42.5 | 22.6 |
| DK | 39.7 | -27.8 | -5.8 | 93.9 | 52.8 | 8.6 | 32.5 |
| DE | 31.1 | -0.1 | -6.2 | 75.2 | 23.8 | 18.9 | 32.6 |
| IE | 13.1 | -0.4 | -0.2 | 87.6 | 14.4 | 53.2 | 19.9 |
| EL | 58.7 | 0.3 | -10.5 | 51.5 | 38.2 | 1.0 | 12.3 |
| ES | 56.7 | -0.6 | -8.3 | 52.2 | 27.8 | 9.2 | 15.3 |
| FR | 49.0 | -1.8 | -9.3 | 62.2 | 25.8 | 17.1 | 19.3 |
| IT | 72.9 | -9.4 | -8.1 | 44.6 | 18.1 | 10.5 | 16.0 |
| LU | 58.6 | -0.8 | -9.1 | 51.3 | 6.6 | 17.9 | 26.7 |
| NL | 46.4 | -2.4 | -17.9 | 73.9 | 21.3 | 25.0 | 27.5 |
| AT | 35.9 | -2.0 | -7.2 | 73.3 | 42.2 | 6.4 | 24.6 |
| PT | 40.0 | -0.2 | -4.3 | 64.5 | 31.0 | 21.7 | 11.8 |
| FI | 30.9 | -9.3 | -1.4 | 79.9 | 28.1 | 16.1 | 35.7 |
| SE | 51.7 | -23.7 | -4.1 | 76.1 | 29.7 | 15.6 | 30.8 |
| UK | 19.3 | -11.0 | -0.3 | 92.0 | 21.8 | 55.1 | 15.1 |
| EE | 34.5 | -1.4 | -1.9 | 68.8 | 18.5 | 13.9 | 36.4 |
| HU | 70.8 | -5.5 | -27.5 | 62.2 | 8.0 | 13.1 | 41.0 |
| PL | 80.3 | -22.9 | -23.1 | 65.7 | 11.2 | 24.2 | 30.3 |
| SI | 39.1 | -0.7 | -11.1 | 72.8 | 22.7 | 32.8 | 17.3 |

Note: deciles based on household equivalised disposable income.

Source: own calculations with EUROMOD (version D25).

Table 3: Income composition (% of disposable income), top decile

| Country | Market income | Personal taxes | Social insurance contributions | Benefits | Public pensions | Means-tested benefits | Non means-tested benefits |
|---------|---------------|----------------|--------------------------------|----------|-----------------|-----------------------|---------------------------|
| BE | 157.0 | -48.9 | -17.1 | 9.0 | 3.9 | 0.2 | 5.0 |
| DK | 190.0 | -77.3 | -17.4 | 4.6 | 0.4 | 0.0 | 4.3 |
| DE | 140.9 | -40.4 | -12.4 | 11.9 | 7.2 | 0.5 | 4.2 |
| IE | 135.5 | -33.2 | -4.1 | 1.9 | 0.3 | 0.8 | 0.8 |
| EL | 122.0 | -26.9 | -11.8 | 16.8 | 10.1 | 0.0 | 6.7 |
| ES | 122.2 | -29.5 | -6.0 | 13.4 | 5.5 | 0.9 | 7.0 |
| FR | 120.7 | -19.5 | -22.9 | 21.8 | 13.1 | 0.2 | 8.5 |
| IT | 119.6 | -28.5 | -9.8 | 18.6 | 10.1 | 0.4 | 8.1 |
| LU | 135.9 | -31.9 | -14.2 | 10.1 | 4.7 | 0.2 | 5.2 |
| NL | 141.0 | -28.2 | -19.1 | 6.3 | 3.5 | 0.0 | 2.8 |
| AT | 118.5 | -35.7 | -17.4 | 34.6 | 20.8 | 0.1 | 13.7 |
| PT | 122.3 | -27.6 | -11.7 | 17.0 | 7.6 | 0.3 | 9.1 |
| FI | 139.0 | -43.6 | -5.8 | 10.4 | 4.2 | 0.4 | 5.8 |
| SE | 150.7 | -55.2 | -6.2 | 10.7 | 4.4 | 0.0 | 6.4 |
| UK | 139.9 | -35.4 | -6.8 | 2.3 | 1.0 | 0.2 | 1.0 |
| EE | 117.2 | -23.3 | -2.1 | 8.2 | 1.6 | 0.0 | 6.6 |
| HU | 137.3 | -38.6 | -22.3 | 23.6 | 8.2 | 0.0 | 15.3 |
| PL | 120.4 | -24.7 | -14.4 | 18.8 | 9.9 | 0.1 | 8.8 |
| SI | 141.4 | -32.1 | -27.4 | 18.1 | 6.6 | 0.5 | 11.0 |

Note: deciles based on household equivalised disposable income.

Source: own calculations with EUROMOD (version D25).

Table 4: Income inequality before and after taxes and benefits as measured by the Gini coefficient

| Country | Market income | | | Market income & public pensions | | | Disposable income | | |
|---------|----------------|---------------------|-------|---------------------------------|---------------------|-------|-------------------|---------------------|-------|
| | point estimate | confidence interval | | point estimate | confidence interval | | point estimate | confidence interval | |
| | | min | max | | min | max | | min | max |
| BE | 0.486 | 0.468 | 0.503 | 0.405 | 0.389 | 0.422 | 0.245 | 0.231 | 0.260 |
| DK | 0.457 | 0.436 | 0.478 | 0.401 | 0.380 | 0.422 | 0.232 | 0.218 | 0.246 |
| DE | 0.494 | 0.485 | 0.502 | 0.397 | 0.389 | 0.405 | 0.268 | 0.263 | 0.273 |
| EL | 0.502 | 0.493 | 0.512 | 0.399 | 0.390 | 0.408 | 0.320 | 0.312 | 0.327 |
| ES | 0.467 | 0.460 | 0.474 | 0.380 | 0.374 | 0.386 | 0.305 | 0.300 | 0.310 |
| FR | 0.487 | 0.479 | 0.495 | 0.396 | 0.388 | 0.403 | 0.261 | 0.256 | 0.266 |
| IE | 0.459 | 0.435 | 0.483 | 0.444 | 0.420 | 0.467 | 0.309 | 0.292 | 0.326 |
| IT | 0.494 | 0.482 | 0.506 | 0.431 | 0.420 | 0.443 | 0.349 | 0.339 | 0.359 |
| LU | 0.472 | 0.456 | 0.488 | 0.379 | 0.364 | 0.394 | 0.243 | 0.234 | 0.253 |
| NL | 0.386 | 0.375 | 0.396 | 0.335 | 0.325 | 0.344 | 0.247 | 0.241 | 0.254 |
| AT | 0.441 | 0.426 | 0.455 | 0.353 | 0.340 | 0.365 | 0.227 | 0.218 | 0.235 |
| PT | 0.507 | 0.484 | 0.530 | 0.450 | 0.425 | 0.474 | 0.361 | 0.342 | 0.380 |
| SE | 0.437 | 0.430 | 0.444 | 0.359 | 0.352 | 0.365 | 0.243 | 0.237 | 0.248 |
| FI | 0.484 | 0.470 | 0.498 | 0.401 | 0.387 | 0.415 | 0.269 | 0.255 | 0.283 |
| UK | 0.496 | 0.484 | 0.508 | 0.457 | 0.445 | 0.469 | 0.305 | 0.296 | 0.315 |
| EE | 0.509 | 0.494 | 0.524 | 0.419 | 0.404 | 0.434 | 0.324 | 0.311 | 0.337 |
| HU | 0.547 | 0.531 | 0.563 | 0.441 | 0.425 | 0.458 | 0.274 | 0.264 | 0.284 |
| PL | 0.545 | 0.540 | 0.551 | 0.457 | 0.451 | 0.463 | 0.332 | 0.327 | 0.337 |
| SI | 0.499 | 0.488 | 0.510 | 0.428 | 0.417 | 0.438 | 0.270 | 0.263 | 0.278 |

Note: 95% confidence intervals shown are obtained with bootstrapping techniques using 1,000 replications.

Source: own calculations with EUROMOD (version D25).

Table 5: Redistributive effect of tax-benefit instruments, Gini coefficient

| Country | Disposable income | Absolute change in Gini coefficient of disposable income, excluding ... | | | |
|---------|-------------------|---|----------------|-----------------------|---------------------------|
| | | social insurance contributions | personal taxes | means-tested benefits | non means-tested benefits |
| BE | 0.245 | 0.021 | 0.064 | 0.029 | 0.084 |
| DK | 0.232 | 0.019 | 0.057 | 0.025 | 0.151 |
| DE | 0.268 | 0.005 | 0.061 | 0.017 | 0.070 |
| EL | 0.320 | 0.004 | 0.044 | 0.001 | 0.046 |
| ES | 0.305 | 0.000 | 0.042 | 0.007 | 0.038 |
| FR | 0.261 | 0.022 | 0.030 | 0.043 | 0.058 |
| IE | 0.309 | 0.005 | 0.045 | 0.069 | 0.029 |
| IT | 0.349 | 0.006 | 0.031 | 0.014 | 0.050 |
| LU | 0.243 | 0.009 | 0.050 | 0.015 | 0.084 |
| NL | 0.247 | 0.003 | 0.043 | 0.020 | 0.055 |
| AT | 0.227 | 0.014 | 0.047 | 0.008 | 0.097 |
| PT | 0.361 | 0.009 | 0.046 | 0.021 | 0.021 |
| SE | 0.243 | 0.004 | 0.037 | 0.020 | 0.105 |
| FI | 0.269 | 0.007 | 0.044 | 0.018 | 0.099 |
| UK | 0.305 | 0.010 | 0.038 | 0.084 | 0.040 |
| EE | 0.324 | 0.002 | 0.033 | 0.007 | 0.061 |
| HU | 0.274 | 0.017 | 0.059 | 0.010 | 0.098 |
| PL | 0.332 | 0.001 | 0.019 | 0.029 | 0.119 |
| SI | 0.270 | 0.024 | 0.048 | 0.033 | 0.082 |

Source: own calculations with EUROMOD (version D25).

Table 6: Income poverty rates before and after benefits

| Countries | Disposable income | | | Disposable income excluding ... | | | | | | | | |
|-----------|-------------------|----------------|-------|---------------------------------|----------------|-------|---------------------------|----------------|-------|---------------------------------------|----------------|-------|
| | | | | means-tested benefits | | | non means-tested benefits | | | all benefits (except public pensions) | | |
| | Poverty rates | conf. interval | | Poverty rates | conf. interval | | Poverty rates | conf. interval | | Poverty rates | conf. interval | |
| | min | max | min | max | min | max | min | max | min | max | min | max |
| BE | 0.101 | 0.090 | 0.113 | 0.144 | 0.130 | 0.157 | 0.257 | 0.239 | 0.274 | 0.286 | 0.267 | 0.304 |
| DK | 0.098 | 0.087 | 0.109 | 0.162 | 0.148 | 0.177 | 0.310 | 0.290 | 0.330 | 0.357 | 0.337 | 0.378 |
| DE | 0.130 | 0.121 | 0.140 | 0.155 | 0.145 | 0.165 | 0.248 | 0.237 | 0.260 | 0.267 | 0.256 | 0.279 |
| EL | 0.189 | 0.177 | 0.201 | 0.191 | 0.179 | 0.203 | 0.268 | 0.256 | 0.281 | 0.270 | 0.257 | 0.283 |
| ES | 0.185 | 0.176 | 0.194 | 0.197 | 0.188 | 0.206 | 0.252 | 0.243 | 0.262 | 0.264 | 0.254 | 0.273 |
| FR | 0.102 | 0.095 | 0.109 | 0.197 | 0.187 | 0.206 | 0.243 | 0.233 | 0.253 | 0.306 | 0.295 | 0.317 |
| IE | 0.220 | 0.203 | 0.236 | 0.286 | 0.267 | 0.305 | 0.265 | 0.247 | 0.284 | 0.330 | 0.309 | 0.350 |
| IT | 0.206 | 0.191 | 0.220 | 0.238 | 0.223 | 0.253 | 0.286 | 0.271 | 0.302 | 0.317 | 0.301 | 0.333 |
| LU | 0.093 | 0.075 | 0.112 | 0.124 | 0.104 | 0.144 | 0.251 | 0.227 | 0.274 | 0.271 | 0.248 | 0.294 |
| NL | 0.119 | 0.107 | 0.130 | 0.143 | 0.131 | 0.155 | 0.203 | 0.187 | 0.218 | 0.224 | 0.208 | 0.240 |
| AT | 0.100 | 0.087 | 0.112 | 0.115 | 0.101 | 0.130 | 0.275 | 0.254 | 0.296 | 0.287 | 0.266 | 0.308 |
| PT | 0.209 | 0.180 | 0.237 | 0.223 | 0.194 | 0.253 | 0.257 | 0.227 | 0.287 | 0.282 | 0.250 | 0.314 |
| SE | 0.104 | 0.099 | 0.109 | 0.151 | 0.145 | 0.157 | 0.285 | 0.277 | 0.294 | 0.314 | 0.305 | 0.323 |
| FI | 0.122 | 0.114 | 0.131 | 0.159 | 0.149 | 0.169 | 0.291 | 0.278 | 0.303 | 0.312 | 0.300 | 0.325 |
| UK | 0.159 | 0.149 | 0.168 | 0.282 | 0.269 | 0.294 | 0.260 | 0.248 | 0.273 | 0.345 | 0.331 | 0.358 |
| EE | 0.177 | 0.161 | 0.193 | 0.178 | 0.162 | 0.194 | 0.290 | 0.270 | 0.309 | 0.290 | 0.271 | 0.309 |
| HU | 0.149 | 0.138 | 0.159 | 0.163 | 0.152 | 0.174 | 0.351 | 0.337 | 0.365 | 0.354 | 0.340 | 0.368 |
| PL | 0.169 | 0.164 | 0.173 | 0.222 | 0.216 | 0.227 | 0.346 | 0.340 | 0.351 | 0.388 | 0.382 | 0.393 |
| SI | 0.159 | 0.148 | 0.170 | 0.202 | 0.189 | 0.214 | 0.320 | 0.305 | 0.334 | 0.358 | 0.343 | 0.373 |

Note: Poverty line defined as 60% of median equivalised disposable income. 95% confidence intervals shown are obtained with bootstrapping techniques using 1,000 replications.

Source: own calculations with EUROMOD (version D25).

Appendix B: Tax-benefit systems and input datasets in EUROMOD (version D25)

| Country | | Policy year | Input dataset source | Date of collection | Reference time period for incomes |
|----------------|-------------|--------------------|--|---------------------------|--|
| BE | Belgium | 2003 | Panel Survey on Belgian Households | 2002 | annual 2001 |
| DK | Denmark | 2001 | European Community Household Panel | 1995 | annual 1994 |
| DE | Germany | 2003 | German Socio-Economic Panel Study | 2002 | annual 2001 |
| EE | Estonia | 2005 | Household Budget Survey | 2005 | monthly 2005 |
| EL | Greece | 2005 | Household Budget Survey | 2004/5 | monthly 2004 |
| ES | Spain | 2005 | EU-SILC | 2005 | annual 2004 |
| FR | France | 2001 | Enquête sur les Budgets Familiaux | 2000/1 | annual 2000/1 |
| IE | Ireland | 2001 | Living in Ireland Survey | 1994 | monthly 1994 |
| IT | Italy | 2001 | Survey of Households Income and Wealth | 1996 | annual 1995 |
| LU | Luxembourg | 2003 | Socio-Economic Panel (PSELL-2) | 2001 | annual 2000 |
| HU | Hungary | 2005 | EU-SILC | 2005 | annual 2004 |
| NL | Netherlands | 2003 | Sociaal-economisch panelonderzoek | 2000 | annual 1999 |
| AT | Austria | 2003 | Austrian version of European Community Household Panel | 1998+1999 | annual 1998 |
| PL | Poland | 2005 | Household Budget Survey | 2005 | monthly 2005 |
| PT | Portugal | 2003 | European Community Household Panel | 2001 | annual 2000 |
| SI | Slovenia | 2005 | A sub-sample of Population Census merged with administrative records | 2005 (2002) | annual 2004 |
| SE | Sweden | 2001 | Income distribution survey | 2001 | annual 2001 |
| FI | Finland | 2003 | Income distribution survey | 2001 | annual 2001 |
| UK | UK | 2003 | Family Expenditure Survey | 2000/1 | monthly 2000/1 |

Appendix C: Categorisation of income components

1) Public pensions

AUSTRIA

- civil servant's pension
- early retirement pension
- invalidity pension
- old age pension
- other old age related schemes or benefits
- survivor pension
- minimum pension
- minimum pension for civil servants
- child bonus for pensioners
- child bonus for civil service pensioners

BELGIUM

- anticipated pension
- retirement pension
- survivor pension
- other public pension income

DENMARK

- disability pension - basic amount plus supplement
- disability pension - special supplement plus incapacity amount
- disability pension - invalidity amount plus 'augmentation' plus special benefit for disabled with substantial earnings
- old age pension
- supplementary pension
- survivor pension

FINLAND

- gross state pension income
- national (basic) pension increases

FRANCE

- invalidity pension
- pension benefits
- alimony
- minimum old age pension

GERMANY

- own old age pension
- miners' own pension
- civil servants' own pension
- farmers' own pension
- accident own pension

- widow/orphan old-age pension
- miners' widow/orphan pension
- civil servants' widow/orphan pension
- farmers' widow/orphan pension
- accident widow/orphan pension

GREECE

- invalidity pension
- old age pension
- orphans' pension
- widows' benefits
- old age pension
- social solidarity benefit

IRELAND

- deserted wife contributory benefits
- occupational injury contributory pension
- old age contributory benefits
- orphan's contributory benefits retirement contributory benefits
- survivor's contributory benefits

ITALY

- public and private sector contributory old age pensions (including supplements)
- public and private sector contributory disability pensions (including supplements)
- public and private sector contributory survivor's pensions (including supplements)
- foreign pension
- other pension

LUXEMBOURG

- disability pension
- early retirement pension
- pension received from employment in private sector
- pension received from employment in public sector

- private sector reversion pension
- public sector reversion pension
- orphan allowance

NETHERLANDS

- state pension
- survivors' benefit

PORTUGAL

- old-age insurance
- survivors related benefits
- invalidity pension

SPAIN

- old-age (insurance an early retirement)
- survivors (widows or orphans, insurance)
- old age pension supplement
- widow pension supplement

SWEDEN

- non-taxable pension
- other taxable pensions

UK

- retirement pension
- state earnings related pension
- widow benefit

ESTONIA

- disability pension
- old age pension
- old age pension abroad
- survivors' pension

HUNGARY

- disability benefits
- old age income
- survivor benefits

POLAND

- disability insurance pension
- old age pension
- old age pension abroad
- orphan pension
- widow pension
- nursing supplement

SLOVENIA

- disability/invalidity pension
- old age pension
- survivors' pension

2) Means-tested benefits

AUSTRIA

- unemployment benefit
- housing benefits
- maternity allowance supplement
- provincial family bonus
- social assistance

BELGIUM

- in work benefit
- income support
- income support for the elderly

DENMARK

- housing benefits
- day care subsidy
- housing allowance
- social assistance

FINLAND

- pensioners housing benefit
- housing benefits
- home child care benefit
- social assistance benefit

FRANCE

- refundable tax credit
- disabled benefit
- young children allowance
- education related family benefits
- family complement
- housing benefits
- lone parent benefit
- minimum income

GERMANY

- housing benefits
- federal child raising benefit
- direct housing support
- provincial child raising benefit
- social assistance

GREECE

- unemployment assistance for old workers
- social pension

- housing benefit

IRELAND

- housing benefits
- blind persons non-contributory benefits
- carer's non-contributory benefits
- short term disabled contributory benefits
- long term disabled non-contributory benefits
- deserted wives non-contributory benefits
- family income supplement
- home carers tax credit
- long term invalidity contributory benefits
- lone parent non-contributory benefits
- long term unemployed non-contributory benefits
- old age non-contributory benefits
- pre-retirement non-contributory benefits
- short term unemployed non-contributory benefits
- social minimum non-contributory benefits
- widow's non-contributory benefits

ITALY

- education benefits
- housing benefits
- social assistance – national, regional, provincial, municipal, local health centre, other local public administrations and private institutions
- social pension
- family allowances for single persons with no children
- family allowances for single person with children
- family allowances for couples with no children
- family allowances for couples with children

LUXEMBOURG

- education allowance
- housing benefit
- maternity allowance
- social assistance

NETHERLANDS

- general social assistance, self-employed
- general social assistance for families with children
- general social assistance for families without children
- social assistance benefit for unemployed aged 50-64 and disabled unemployed younger than 64 with children
- social assistance benefit for unemployed aged 50-64 and disabled unemployed younger than 64 without children
- housing benefits

PORTUGAL

- social assistance
- child benefits
- income supplement to ensure minimum income
- old-age social pension

SPAIN

- housing benefit
- social assistance benefits
- child social assistance
- old age social assistance
- unemployed social assistance for those with family charges

SWEDEN

- housing benefits
- housing benefit supplement for pensioners
- social assistance

UK

- housing benefits
- council tax benefit
- child tax credit
- income support
- working tax credit (in work benefit)

ESTONIA

- social assistance benefit

HUNGARY

- regular child protection benefit
- social assistance

POLAND

- parental leave allowance

- benefit for unemployed lone parents
- child benefit
- child birth benefit
- supplement for education of disabled child
- supplement for starting school year
- supplement for lone parent (main benefit)
- nursing benefit
- housing benefits
- permanent social assistance
- temporary social assistance

SLOVENIA

- education benefits
- unemployment assistance benefit
- child benefit
- housing benefit
- social assistance

3) *Non means-tested benefits*

AUSTRIA

- caring benefit
- child care benefit
- sickness benefit
- unemployment payment
- maternity benefit (2 months after birth of child)
- education benefits
- child tax credit
- child benefit
- universal long term maternity benefit
- other lump-sum benefits

BELGIUM

- career break allocation
- allocation for handicapped persons
- learning allocation
- long sickness allocation
- professional illness allocation and work accident allocation
- allocation from a special funds
- short-sickness allocation
- unemployment benefit
- young unemployed allocation
- education benefits

- housing benefits
- maternity benefits
- child benefit
- child birth benefit

DENMARK

- education benefits
- maternity benefits
- sickness benefit
- unemployment benefit
- child benefits
- early retirement benefit
- family allowance

FINLAND

- education benefits
- maternity benefits
- basic unemployment benefit
- earnings related unemployment benefit
- labour market support
- military injury compensation
- sickness benefit
- training subsidy for unemployed
- child benefit
- lone parent child benefit
- other lump-sum benefits

FRANCE

- education benefits
- maternity benefits
- social benefit for dependent elderly adults
- social benefit for special education
- social benefit for parental education
- social benefit for lone parents
- social assistance
- war pension
- help for child guard
- unemployment compensation
- pre-retirement pension
- family allowance
- other lump-sum benefits

GERMANY

- education benefits
- unemployment payment
- unemployment benefit
- retraining payment
- old age transition payment
- war victims' own pension

- war victims' widow/orphan pension
- nursing home insurance payment received
- child benefit
- post natal benefit for non-earning mothers
- other lump-sum benefits

GREECE

- education benefits
- maternity benefits
- disability benefit (non-contributory)
- sickness benefits
- unemployment benefit
- child benefit
- large family child benefit
- many-children child benefit
- other family benefits
- third child benefit

IRELAND

- education benefits
- back to work allowance
- constant attendance allowance
- other welfare allowances
- unemployability supplement
- child benefit
- occupational injury disablement contributory benefits
- maternity contributory benefits
- unemployed contributory benefits
- other lump-sum benefits

ITALY

- maternity benefits
- social insurance unemployment compensation
- social insurance unemployment mobility benefit
- disability non contributory pension
- war pension
- other lump-sum benefits

LUXEMBOURG

- education benefits
- maternity benefits
- care benefits
- other public benefits

- permanent accident benefit
- unemployment benefit
- child benefit (family benefit)
- prenatal-, postnatal-, and child birth allowance
- handicapped child benefit
- annual beginning of school allowance
- seriously disabled persons
- other lump-sum benefits

NETHERLANDS

- education benefits
- maternity benefits
- basic disability benefit
- disability insurance (former civil servants)
- disability insurance
- unemployment benefit for civil servants
- unemployment benefit
- sickness insurance
- child benefit
- other lump-sum benefits

PORTUGAL

- education benefits
- housing benefits
- maternity benefits
- unemployment related benefits
- sickness benefits
- family benefits
- other lump-sum benefits

SPAIN

- education benefits
- maternity benefits
- unemployment insurance benefit
- sickness and invalidity benefits
- family benefits
- working mother tax credit
- other lump-sum benefits

SWEDEN

- sickness benefits
- unemployment benefits
- other tax free educational benefits
- other tax-free benefits
- university grants
- study grants for high school
- child benefits
- parental allowance
- other lump-sum benefits

UK

- education benefits
- maternity benefits
- attendance allowance
- disability living allowance
- disability working allowance
- invalid care allowance
- incapacity benefit
- industrial injury
- mobility allowance
- severe disablement allowance
- statutory sick pay
- training allowance
- war pension
- job seekers allowance
- child benefit
- pensioner's annual heating allowance
- other lump-sum benefits

ESTONIA

- sickness benefit
- scholarships and grants
- parental benefit
- parental benefit abroad
- maternity benefit
- other social assistance
- unemployment insurance benefit
- unemployment retraining benefit
- unemployment assistance benefit

- childcare allowance
- large family parent allowance
- single parent child allowance
- child allowance
- child allowance abroad
- childbirth allowance
- school allowance
- large family allowance

HUNGARY

- child care fee
- sickness benefits
- maternity allowance
- unemployment benefits
- child raising support
- child care allowance
- family allowance
- maternity grant

POLAND

- education benefits
- maternity benefits
- social pension
- early retirement pension
- unemployment benefit
- nursing allowance
- other child benefits
- other benefits

SLOVENIA

- compensation for lost income due to care for child with special needs
- attendance supplement
- childcare supplement
- maternity payments
- unemployment insurance benefit
- holiday bonus for pensioners
- disability supplement
- birth grant
- large family supplement
- parental allowance