

Effects of flat tax reforms in Europe on inequality and poverty*

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Abstract

Flat income tax has become increasingly popular recently. Besides a number of countries in Eastern Europe which have implemented flat tax systems, such proposals are being discussed in several others including some in Western Europe. However, among the latter no country except Iceland very recently has adopted a flat tax. One may argue that flat tax receives less political support in countries with well-established middle class due to its distributional effects. The aim of this paper is to provide an empirical analysis of the distributional effects of different hypothetical flat tax reforms for selected European countries. We rely on EUROMOD, a tax-benefit microsimulation model for the EU15, ensuring comparable results through a common framework.

Our considered revenue neutral flat tax reforms show increasing inequality, poverty and polarisation of the income distributions. Overall, this indeed benefits mainly those with high incomes and makes low and middle income household worse off.

JEL Codes: D31, H24

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*This paper uses EUROMOD version C13. 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. EUROMOD relies on micro-data from twelve different sources for fifteen countries. This paper uses data from the Austrian version of the European Community Household Panel (ECHP) made available by the Interdisciplinary Centre for Comparative Research in the Social Sciences and the Austrian version of the EU-SILC made available by Statistik Austria as well as for an international comparison the ECHP User Data Base made available by Eurostat; the Panel Survey on Belgian Households (PSBH) made available by the University of Liège and the University of Antwerp; the Income Distribution Survey made available by Statistics Finland; 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 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 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.

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1 Introduction

Flat income tax, referring broadly to a tax with a single (nominal) marginal rate, has become increasingly popular recently. There were only a few countries where it was applied before the 1990s, most prominently Hong Kong and the Channel Islands. Since 1994 when it was introduced in Estonia a number of countries have followed the example. In 2007 there were altogether 22 countries in the world having flat tax systems¹, of which half in Eastern Europe, and such proposals being discussed in several others including some in Western Europe. However, among the latter only Iceland has adopted a flat tax and that very recently. One may argue that flat tax receives less political support in countries with well-established middle class due to its distributional effects.

There are three main benefits usually associated with flat tax systems. First, flat taxes can enhance labour supply incentives and productivity. Although there is a trend of lowering marginal statutory tax rates (and having less tax brackets), top rates can be still rather high (around 50%). While the gain is explicit for top income range, it is not so obvious for low incomes. The results here depend on the chosen flat tax parameters and underlying income distribution. In terms of labour supply margins what can be expected to matter more is the intensive margin for high-income earners and the extensive margin for low-income earners.

Secondly, flat tax can increase tax compliance. Perhaps this argument is weaker in developed countries, but it is often central for this kind of reforms in developing countries. The best evidence is from the 2001 reform in Russia, where the compliance improved by about one third (Ivanova et al. (2005)), it is not clear though whether it can be attributed solely to the flat tax or improved law enforcement.

Thirdly, as a flat tax is often part of more fundamental tax reform, it can simplify income taxation significantly. The current systems in Europe on average have evolved to quite complex entities, therefore often violating one of the main principles of taxation since Adam Smith that taxes ought to be clear and plain to the contributor and other persons. A simpler system is not only easier to grasp from the point of view of a single taxpayer, but is also more transparent at the aggregated level. Simplification can also decrease dramatically the costs of administration and compliance.

However, flat taxes can have a serious drawback in terms of inequality which could be the main reason limiting its spread to the developed countries. Previous flat tax reforms have often lowered marginal tax rates at the high income levels but increased tax burden for middle-income ranges. The aim of this paper is to provide an empirical analysis on the distributional effects of different flat tax designs for selected European countries. We use EUROMOD, a

¹C.f. Nicodeme (2007) and Mitchell (2007).

tax-benefit microsimulation model for the EU15, to compare the results across countries in a common framework. We analyse which population subgroups gain and which loose from the introduction of flat taxes, if different combinations always have an adverse effect on the middle class and if there are indeed positive incentive effects. We concentrate on the short-term static effects, although there are possibly important long-term effects as well.

There have been several studies before, focusing on a single country and hypothetical reforms in most cases.² Only two actual reforms have been addressed earlier: Ivanova et al. (2005) analysing the 2001 Russian reform and Brook and Leibfritz (2005) dealing with the 2004 reform in the Slovak Republic. In the Russian case, the reform was followed by significant real growth in personal income tax revenue, but there was no strong evidence that this was caused by the reform itself nor any positive labour supply responses identified. The reform did not pay for itself either. The Slovakian reform was expected to be revenue neutral, to increase the level and efficiency of capital formation and enhance the incentives of unemployed workers to seek work. However, no evidence apart from revenue-neutrality has been reported yet. While it is true that most of actual reforms have been very recent, research on their effects is probably also limited due to the nature of those countries, i.e. no or little high-quality (micro-)data is available for the pre-reform period.

In addition to our comparative dimension we aim at a systematic approach for choosing flat tax parameters, i.e. flat rate and basic allowance, which seems to be rather arbitrary in the previous studies. Davies and Hoy (2002) show that in case of revenue neutral flat tax reforms there exist critical parameter values: a lower bound of flat tax rates below which inequality always increases and an upper bound above what inequality always decreases. Our aim is to identify those critical values empirically and then demonstrate how marginal tax rates respond in relation to those. Overall, this would contribute to understand the feasibility of these reforms.

Our analysis yields the following results. Revenue neutral flat tax reforms lead to increasing inequality; poverty and richness and therefore polarisation of the income distribution is increasing as well. All in all, this leads to redistribution in favour of the highest incomes in the range of our considered flat tax parameters. These distributional effects at the expense of the middle class help to explain why flat rate taxes have not been successful in the political process in Western Europe.

The reminder of the paper is organised as follows: section 2 provides a brief discussion on the flat tax design and describes our reform scenarios. Section 3 contains a short description of our model and the database. Section 4 illustrates the distributional effects in terms of inequality, polarisation, winners and losers, poverty and richness. Section 5 concludes.

²See, e.g. Kuusmanen (2000) for Finland, Fuest et al. (2007) for Germany, Jacobs et al. (2007) for the Netherlands, Adam and Browne (2006) for the UK.

2 The flat tax design

Flat tax systems and proposals have very different design. Flatness as such can be limited to income tax schedule and/or to specific income source only, but it could be indeed one single tax rate applied to a broad tax base without allowing for any allowances or deductions. OECD (2006) outlines four types of flat tax. First, a single rate without a basic allowance. Second, a single rate with a basic allowance. Third, as previous but the same flat rate is also applied to business income on cash-flow basis. Fourth, a single rate with a refundable tax credit.

In a way, only the first type is “pure” flat tax as the tax is completely proportional to the tax base. A flat income tax as such has been applied only in Georgia so far. The second type is the most common and this is what we also consider by default in this paper. The third one relates to the Hall and Rabushka (1995) proposal, essentially being a consumption tax with an allowance. The fourth one effectively combines taxes and benefits due to negative income tax at low-income levels. Depending on the generosity of the tax credit, it is either labelled as negative income tax or basic income (flat) tax.³ Most countries with a flat tax system apply different rates on personal and business income, although a common rate has become more popular among the countries recently implementing these systems. A further step towards overall flat incidence would be integrating other taxes and benefits.

In our flat tax reform simulations we aim at replacing all existing personal income tax deductions, allowances and credits with a single personal allowance (which is equivalent to wastable tax credit under flat tax rate), and graduated rate schedules with one flat rate (tax rate cut cum base broadening). We only keep refundable tax allowance and credits on the basis that these are equivalent to benefits.⁴ The same rate is also applied on capital income where it is taxed separately.

In the current paper, we do not make an attempt to harmonise tax bases across countries. We limit ourselves only to income taxes and do not modify existing social insurance contribution schemes, assuming these correspond to actuarially fair payments in the future, or integrate benefits (e.g. basic income flat tax). One could also carry out an exercise of simply flattening tax rate schedules, but this would result in higher flat tax rate due to retained exceptions, therefore, limiting gains in terms of labour incentives.

We simulate the following three flat income tax scenarios for each country:

- a flat rate and a basic allowance in the existing amount,
- 5 percentage points higher flat rate compared to the first scenario,

³See Atkinson (1995) for this example.

⁴Examples include working tax credit and child credit in the UK, working mother tax credit in Spain and lone parent tax credit in Austria.

- 10 percentage points higher flat rate compared to the first scenario.

All scenarios are revenue neutral, with the total income tax revenue within $\pm 0.1\%$ limits of its baseline value, meaning that the tax rate and the allowance are not independent of each other. In terms of Davies and Hoy (2002) observations, our first scenario should stand close the lower bound of flat tax rates below which post-reform income inequality is higher for all inequality measures satisfying the Pigou-Dalton principle of transfers. However, it is not so obvious as our case is more complicated due to the presence of other tax deduction and allowances in the baseline scenario. Not all countries considered have currently a (well-defined) basic allowance to start with and it is possible that our revenue-neutrality condition does not preserve the mean of disposable income distribution. There are often instruments which depend on net income after taxes (e.g. means-tested non-taxable benefits) and, therefore, could change when modifying tax systems. The second and the third scenario explore the effect on inequality potentially around the upper bound of flat tax rates above which post-reform income inequality is always lower. The derived flat tax rate and the level of allowance for each scenario are presented in Table 1. There is notable variation in the parameter values for the first scenario (affecting in turn other two scenarios), resulting from the combination of the underlying income distribution and average effective tax burden in the baseline case.

	S1		S2		S3	
	FTR	FTA	FTR	FTA	FTR	FTA
AT	21.7%	3,640	26.7%	7,135	31.7%	9,780
BE	31.6%	5,570	36.6%	8,140	41.6%	10,210
FI	33.9%	5,800	38.9%	7,865	43.9%	9,640
GE	27.0%	7,235	32.0%	11,284	37.0%	14,573
GR	21.4%	8,400	26.4%	10,473	31.4%	12,250
LU	16.6%	9,750	21.6%	16,580	26.6%	21,586
NL						
PT	11.6%	1,770	16.6%	4,686	21.6%	6,963
SP	17.7%	3,400	22.7%	6,665	27.7%	9,355
UK	22.5%	4,615	27.5%	7,600	32.5%	10,000

Table 1: Flat tax parameters for the scenarios

In practice, most countries have introduced a flat tax rate at or close to the level of previous lowest marginal rate, while Latvia and Lithuania have chosen the opposite (?). The Slovak Republic and Estonia opted for a rate in the middle range initially, although the latter is now moving step-by-step towards the former lowest marginal rate as well. The pattern how general allowances have been set is less clear. In most countries a fixed allowance was retained or introduced, exceptions include Russia with gradual withdrawal and Ukraine with sudden withdrawal above certain income levels. However, the level of allowance varies significantly

with most countries having it increased during the reforms (Keen et al. (2006)). For example, Georgia has no allowance at all, Russia an allowance about 12% of the average gross wage (both a year before and after the reform, i.e. 2000-01)⁵, Estonia has one which value has been 40-74% of the minimum wage (in 1996-07) and 11-21% of the average gross wage (in 1994-06) and the Slovak Republic with an allowance about 60% of the average wage and exceeding the minimum wage in 2004 after more than doubling it during the reform⁶.

3 EUROMOD: database, model and systems

We use microsimulation technique to simulate taxes, benefits and disposable incomes under different scenarios for a representative micro-data sample of households. Simulations are done with EUROMOD, a static tax-benefit model covering the EU15 countries. Our analysis is based on the 2003 tax-benefit systems, which is the most recent wave currently available in EUROMOD but limited to 10 countries, excluding Denmark, France, Ireland, Italy and Sweden. A common framework allows making comparisons between countries in a meaningful way.

Appendix A gives an overview of input datasets for EUROMOD. Their sample size varies from less than 2,500 to more than 11,000 households for different countries. All monetary variables are updated to 2003 using country-specific uprating factors as reference time period for incomes varies from 1999 to 2003 but no ageing techniques have been applied.

EUROMOD covers only monetary incomes, excluding also unrealised or irregular capital gains/losses and irregular lump sum incomes. It can simulate most of direct taxes and benefits except those based on previous contributions as this information is usually not available from cross-sectional data characterising most of EUROMOD's input datasets. The model assumes full benefit take-up and tax compliance. Although the latter is an important aspect of flat tax reforms, we do not consider it here and limit our analysis to the first-order static effects only.⁷

Considered income tax systems offer considerable variety. As of 2003, all have graduated rate schedules but the number of brackets ranges from 3 (UK) to 16 (Luxembourg) and the highest marginal tax rate from 35% (Finland) to 52% (Netherlands). All schedules are piecewise linear except that of Germany which has a unique continuous function for tax rates at some income levels. Seven countries have a general personal allowance, often integrated into the tax schedule, the Netherlands and Portugal apply general (wastable) tax credits and Austria uses both elements. About half of the countries tax capital income (and property income) together with other income and the rest tax it separately applying a flat rate (15-30%), in Belgium this is optional.

⁵See Ivanova et al. (2005).

⁶See Brook and Leibfritz (2005).

⁷For further information on EUROMOD, see e.g. Sutherland (2001) and Sutherland (2007).

Finally, the countries differ for the unit of assessment. Again, half of them allow only individual taxation, four countries apply either optional or compulsory joint taxation and Belgium provides limited income sharing for married couples. Nevertheless, even systems based on individual taxation have often elements assessed at the family level or couples (e.g. family or child allowances) or allow sharing of non-labour income or household expenditures (e.g. property income, mortgage payments). See Table 2 for an overview of the different tax systems.

	No of brackets	Lowest (pos)	Highest	0% bracket, general personal allowance or (wastable) tax credit	Tax unit	Capital taxation
AT	4	21%	50%	0% bracket, credit	individual	flat tax (25%)
BE	5	25%	50%	allowance	some sharing	optional flat tax (15%)
FI	5	12%	35%	0% bracket (state), allowance (local)	individual	flat tax (29%)
GE	4	19.9%	48.5%	0% bracket	optional joint	integrated
GR	3	15%	40%	0% bracket	individual	integrated
LU	16	8%	38%	0% bracket	joint	integrated
NL	4	1.7%	52%	credit	individual	flat tax (30%)
PT	6	12%	40%	credit	joint	flat tax (20%)
SP	5	15%	45%	allowance	optional joint	integrated
UK	3	10%	40%	allowance	individual	one bracket slightly reduced

Table 2: Tax systems 2003

Overall, although there are few countries with relatively simple income tax systems (e.g. UK), most of the systems can be characterised as rather complex with the combination of many different components and varying tax units. Different elements can be fixed amounts but also either decreasing or increasing on the level of taxable income. Additional examples of complexities include Austria and Germany with progression adjustments, Finland taxing incomes both at the state and the local level and the Netherlands where social insurance contributions and income tax are integrated into the same schedule. Therefore, our reform scenarios have a good potential to significantly simplify the systems and make them more transparent.

4 Results

In this section we present the results of our analysis.⁸ The introduction of a revenue neutral tax reform always yields winners as well as losers. Different groups of taxpayers are differently affected by tax schedule flattening and tax base broadening. To analyse the distributional

⁸Results for the Netherlands soon to be added.

effects of flat tax reform scenarios we compute different distributional measures (with regard to inequality, polarisation, poverty richness and progression) based on equivalised households disposable incomes⁹. When interpreting the results one has to be aware of the fact that revenue neutrality in terms of (overall) tax payments does not necessarily imply a constant mean disposable income. This mainly depends on mean-tested benefits which are calculated based on after-tax net income. In fact the pre- and post-reform mean disposable income varies between +0.4% and -1.4% in the revenue neutral scenarios modelled here.

4.1 Distribution of disposable income

In the first step to analyse the distributional effects for the different reform scenarios we compute the changes of mean disposable income for each household decile which are presented in Table 4 in the Appendix. These effects are visualised in Figure 1 using quintiles instead of deciles for reasons of visual clarity.

Two general patterns can be identified. First, the gains are solely concentrated in the highest quintile in most cases. Only for Finland (S2 and S3) and UK (S3) the (relative) change in mean disposable income is negative for these high income households. In contrast, the low quintiles lose disposable income in all scenarios (except FI-S2,3, UK-S3). Second, the changes in mean disposable income are increasing (decreasing) with flat tax parameters (i.e. marginal tax rate and basic allowance) for low (high) income households. I.e. the lower (higher) the flat tax parameters the higher (lower) are the gains (losses) for high (low) income households. In most countries the (relative) losses in terms of disposable income remain high (or are even highest) for middle income households. These groups, however, usually play an important role in the political process of a mature welfare state. Thus, these effects might explain why a flat tax is not as popular in Western Europe as in Eastern Europe.

These changes in mean disposable income are reflected in equivalent effects on all inequality measures presented in Table 5 in the Appendix. We compute Gini coefficient, Generalised Entropy measure with sensitivity parameters $\alpha = 0$ (Mean Log Deviation), $\alpha = 1$ (Theil index) and $\alpha = 2$ as well as a polarisation index¹⁰. These results are summarised in Figure 2 which presents the Gini coefficients for each scenario.

⁹We use the new OECD equivalence scale which weights the household head with a factor of 1, household members aged 14 and older with 0.5, and under 14 with 0.3. The households net income is divided by the sum of the individual weights of each member (=equivalence factor) to compute the equivalence weighted household income.

¹⁰Schmidt (2004) creates a polarisation index which in analogy to the Gini index (Lorenz curve) is based on a polarisation curve for better comparability of the results and their interpretations. Generally speaking, polarisation is the occurrence of two antipodes. A rising income polarisation describes the phenomenon of a declining middle class resulting in an increasing gap between rich and poor. The proportion of middle income households is declining while the shares of the poor and the rich are both rising.

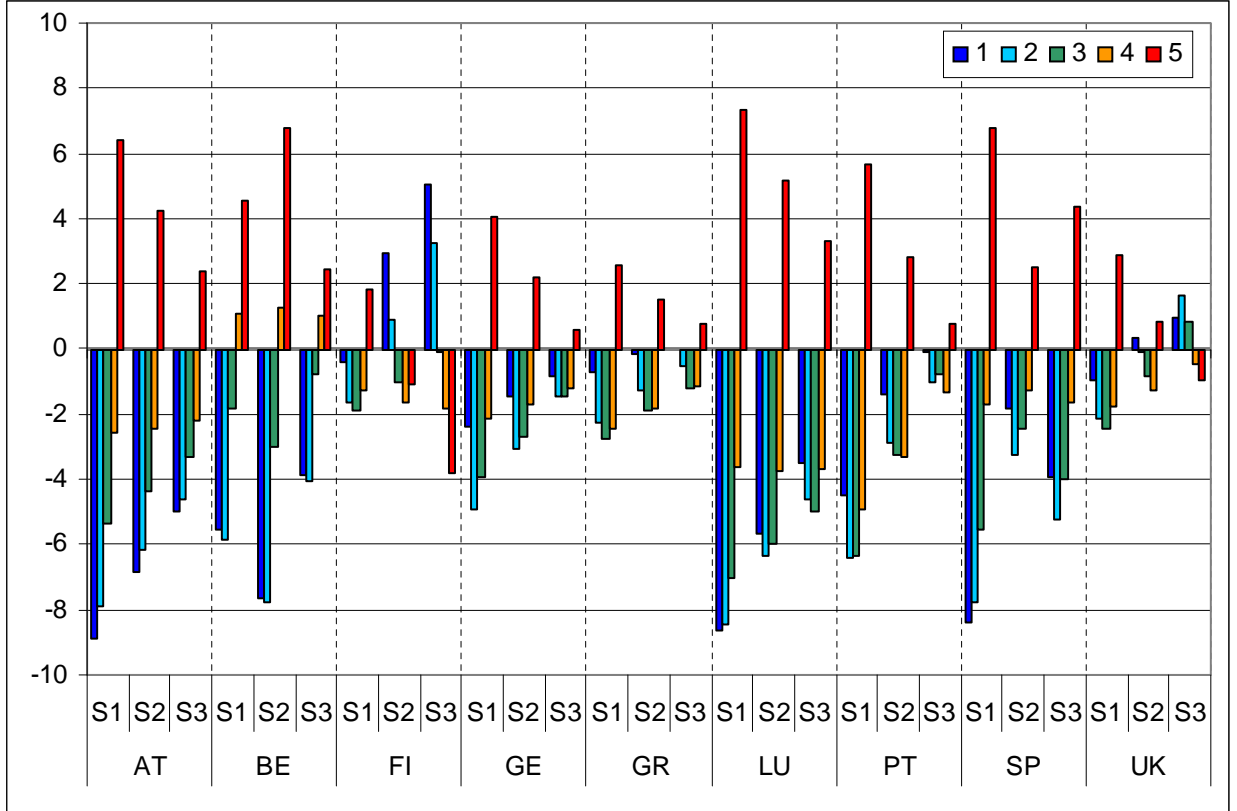


Figure 1: Changes of mean disposable income (in %) by quintiles

First of all, it is noteworthy that there are already distinct differences between the analysed countries in terms inequality for the baseline scenario. Two groups can be distinguished: Inequality is rather high in Southern European countries (Greece, Portugal and Spain) and the UK, whereas it is rather low in Continental Europe (Austria, Belgium Germany, Luxembourg) and Finland.

Introducing a revenue neutral flat tax in combination with tax simplification increases inequality for all scenarios (and measures) in all countries except Finland (S2 and S3). Inequality is increased the most in scenario S1 with low parameter values (except for BE) with regard to all measures. The scenarios can be ranked as follows with regard to inequality: $I(S1) > I(S2) > I(S3)$.¹¹ The increases in inequality, however, are similar in absolute terms for most countries (FI, GR, UK being slightly lower). The polarisation of the income distribution is increased in most countries and scenarios (except FI-S2,3 and UK-S2,3) implying a further declining middle class.

To sum up this section, a revenue neutral flat tax reform leads to increasing inequality and

¹¹This order is stable when using any inequality index presented in Table 5 (Appendix).

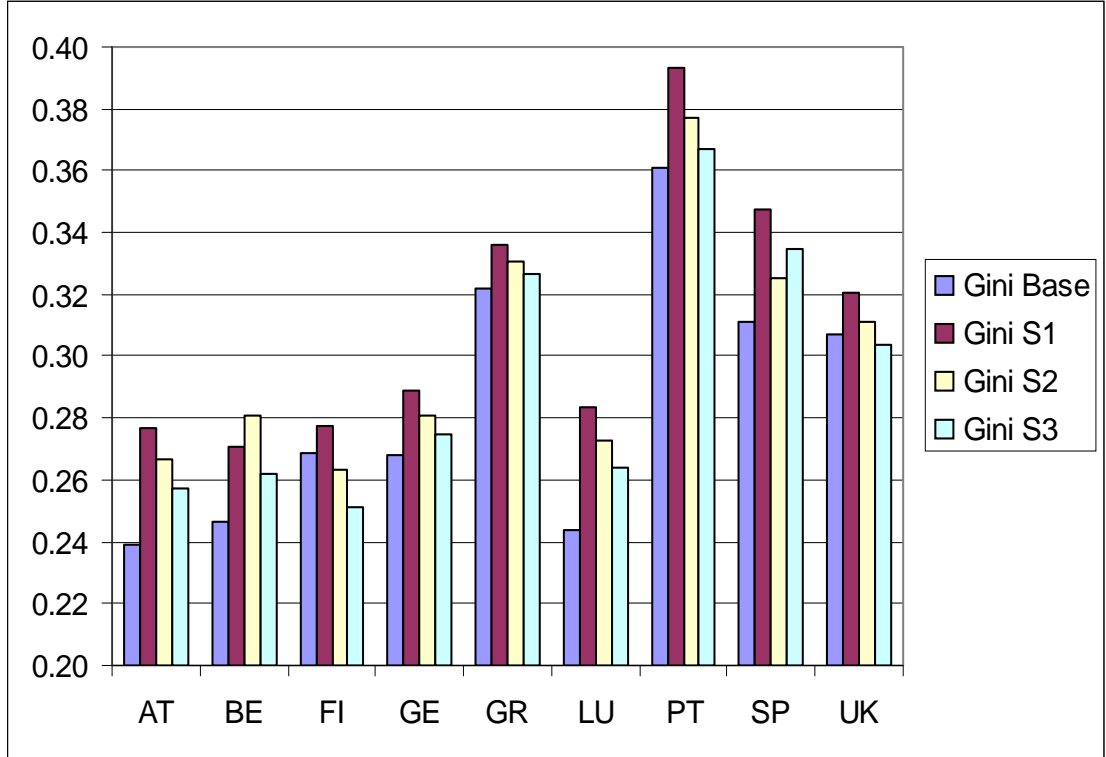


Figure 2: Gini coefficients

polarisation and therefore to redistribution in favour of the highest incomes at the expenses of low and middle income households.

4.2 Distribution of tax payments

[TO BE COMPLETED]

4.3 Winners and losers

As mentioned before, introducing a revenue neutral tax reform always yields winners as well as losers. This section analyses the fractions of households winning or losing disposable income due to the reform scenarios. The results for the scenarios are presented in Table 6 (Appendix) and Figure 3.

The fraction of people winning and losing as a consequence of the simulated flat tax reforms differs considerably between countries and scenarios. Nevertheless, there are always more losers than winners for all countries and scenarios (except for S3 in BE and UK). If one would choose the disposable income as the only criteria for an election decision, none of these flat tax scenarios

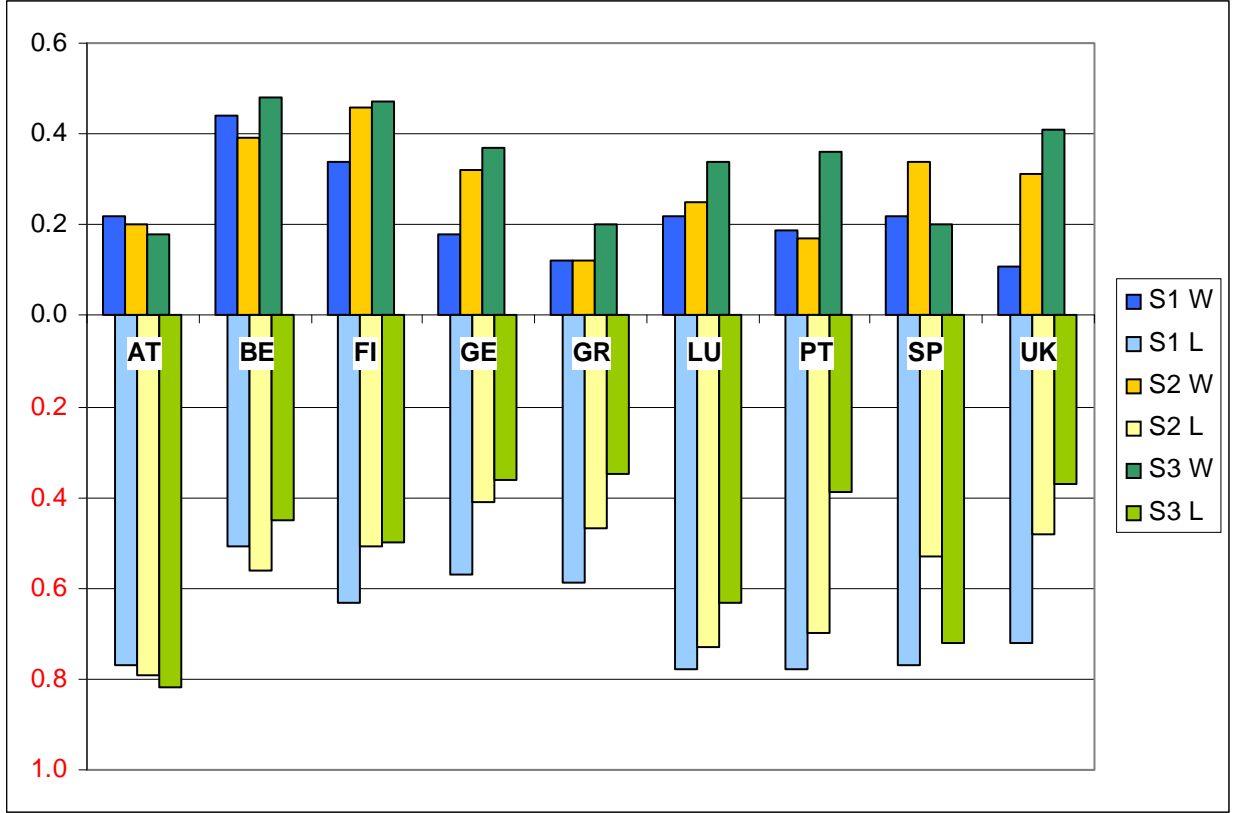


Figure 3: Fraction of winners and losers

would have a majority (in the sense of more winners than losers) in the population. The highest (lowest) fractions of winners (losers) appear in Belgium and Finland for all scenarios and in most other countries (except AT and GR) at least for scenario S3.

To sum up, the winners and losers analysis endorses results of the inequality analysis that a flat tax reform seems politically not feasible in a grown-up welfare state. The vast majority of households loses disposable income whereas a small but rich minority would be better off.

4.4 Poverty and Richness

To analyse the effects of flat taxes on poverty we compute the headcount index and the measures of Foster et al. (1984) (FGT) based on a fixed poverty line taken from the base case.¹² We compute the poverty (richness) lines as 60% (200%) of median equivalent income for each country. The results are presented in Appendix Table 7 and summarised in Figure 4. Measuring

¹²We fix the poverty and richness lines at the value of the status quo taxation to account for (possible) changes in median income. Otherwise, if we would allow for changing poverty (richness) lines an increasing measure of poverty (or a decreasing index of richness) would not necessarily indicate a worse situation for people with low (high) incomes as a result of the changing poverty (richness) line.

richness is a less considered field in the literature than poverty. We compute the headcount index and the measures of Peichl et al. (2006) which are analogously defined to the FGT indices of poverty. The results are displayed in Appendix Table 8 and visualised in Figure 5.

Again, there are already distinct differences between the analysed countries for the baseline. The same two groups of countries can be distinguished: poverty and richness (like inequality) is rather high in Southern European countries (Greece, Portugal and Spain) and the UK, whereas it is rather low in Continental and Northern Europe (Austria, Belgium Germany, Luxembourg and Finland).

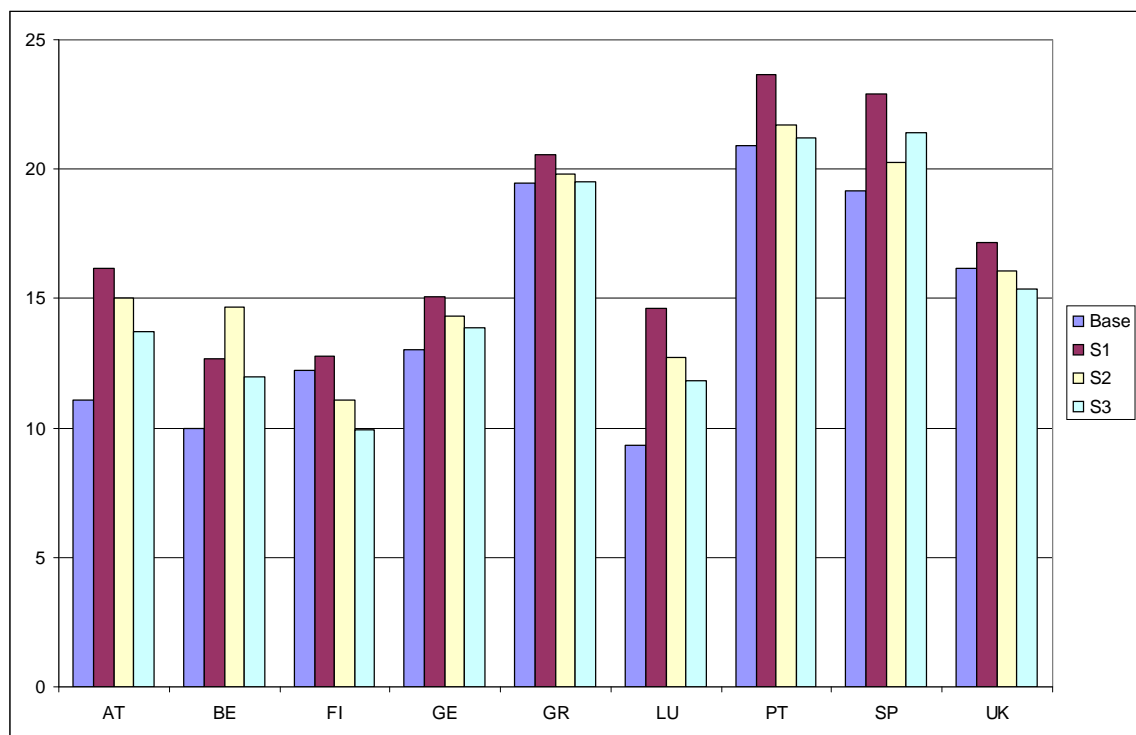


Figure 4: Head count ratio (fixed poverty line)

Poverty increases in terms of all measures in all scenarios (except FI-S2,3 and UK-S2,3). When analysing poverty, one has to take into account that the lowest deciles of the income distribution seldom pay income taxes (see Fuest et al. (2006)). Therefore, a reduction of income poverty through reduced marginal tax rates is naturally restricted. Broadening and simplification of the tax base, in contrast, leads c.p. to increasing poverty as more (low income) households have to pay income taxes after such a reform. In consequence, the increase in poverty is highest in scenario S1 with low parameter values (except for BE).

Richness increases in all scenarios (except FI-S3, PT-S3, UK-S2,3) when looking at the headcount ratio and the increase is highest in scenario S1. But these effects differ slightly when

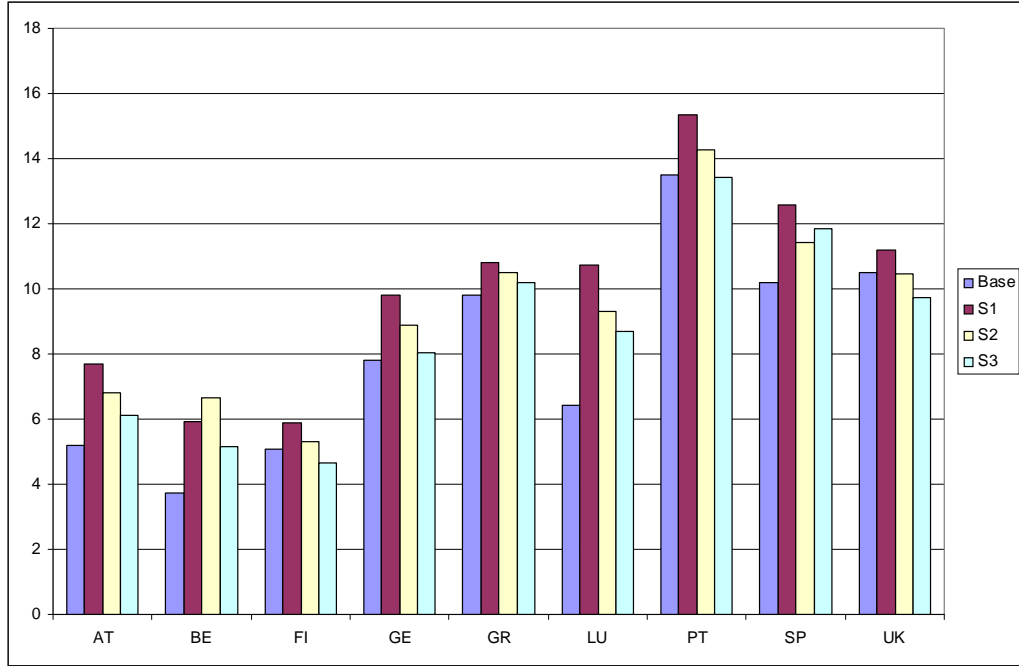


Figure 5: Head count ratio (fixed richness line)

using more sophisticated richness measures (R_α) that also account for changes in the dimension of richness and not only the number of people above a richness line.¹³ Now at least for PT-S3 and UK-S2 richness is also increasing instead of decreasing when using the headcount. This can be explained by increasing reliefs with rising taxable income (and c.p. increasing EMTRs).

4.5 Progression

[TO BE COMPLETED]

4.6 Efficiency: EMTR and EATR

There are many ways in which a tax reform affects the efficiency of the tax system. In this section, we analyse the effects on effective marginal (EMTR) and average income tax rates (EATR) faced by different groups of taxpayers. The underlying idea is that marginal income tax rates affect labour supply and savings incentives. Therefore, changes in effective marginal income tax rates may be considered as rough indicators for distortions caused by the tax system. Changes in effective average tax rates are of special interest for the extensive labour supply margin which seems to be more important for particular subgroups at the bottom of the income

¹³C.f. Peichl et al. (2006).

distribution than the intensive margin (see Heckman (1993) and Immervoll et al. (2007)).

[TO BE COMPLETED]

5 Summary and conclusion

Flat income tax has become increasingly popular recently especially in Eastern Europe. However, among Western European countries with well-established middle class only Iceland has adopted a flat tax. We use EUROMOD, a tax-benefit microsimulation model for the EU15, to provide an empirical analysis on the distributional effects of different flat tax designs for selected European countries in a common framework. In addition to our comparative dimension we aim at a systematic approach for choosing flat tax parameters. We model revenue neutral scenarios where all existing income tax deductions and allowances are replaced with a single basic allowance and the tax schedule with a flat rate, therefore significantly simplifying the systems and making them more transparent.

There are already distinct differences between the analysed countries for the base case. Two groups of countries can be distinguished: inequality, polarisation, poverty and richness are rather high in Southern European countries (Greece, Portugal and Spain) and the UK, whereas they are rather low in Continental and Northern Europe (Austria, Belgium Germany, Luxembourg and Finland).

In general, the effects of a flat tax reform differ considerably with changes in the marginal tax rate and the basic tax allowance. To sum up, revenue neutral flat tax reforms lead to increasing inequality and redistribution in favour of the highest incomes at the expenses of low and middle income households in the range of our considered flat tax parameters. Poverty and richness and therefore polarisation of the income distribution is increasing as well.

When interpreting these results, one has to be aware of the fact that we limit our analysis to static models (and so far to inequality effects). However, flat rate taxes are also supposed to have positive dynamic efficiency and growth effects.¹⁴ In combination with tax simplification, compliance and administrative costs are reduced, as well as incentives and possibilities for legal or illegal tax evasion. As a result of positive employment and growths effects increasing inequality might be acceptable. Nevertheless, the question arises whether a personal income tax reform has enough potential to increase growth and employment. The user costs of labour and capital play an important role in determining the demand for labour and investment. These user costs, however, are rather determined by social security contributions and corporate taxes than by the personal income tax.

¹⁴C.f. Stokey and Rebelo (1995) or Cassou and Lansing (2004).

Nevertheless, the immediate and short-term distributional effects analysed in this paper are most likely to be decisive for the political feasibility of a flat tax reform. The main problem of implementing a flat rate tax could be to convince a majority of the population that redistribution in favour of the highest income decile is acceptable. These distributional effects at the expense of the middle class help to explain why flat rate taxes have not been successful in the political process in Western Europe.

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A EUROMOD base datasets

Country	Base Dataset for EUROMOD	No of house- holds	Date of collection	Reference time period for incomes
Austria	Austrian version of EU-SILC	4,521	2004	annual 2003
Belgium	Panel Survey on Belgian Households	2,975	2002	annual 2001
Finland	Income distribution survey	10,736	2001	annual 2001
Germany	German Socio-Economic Panel	11,303	2002	annual 2001
Greece	Household Budget Survey	6,555	2004/5	annual 2003/4
Luxembourg	PSELL-2	2,431	2001	annual 2000
Netherlands	Sociaal-economisch panelon- derzoek	4,329	2000	annual 1999
Portugal	European Community House- hold Panel	4,588	2001	annual 2000
Spain	European Community House- hold Panel	5,048	2000	annual 1999
UK	Family Expenditure Survey	6,634	2000/1	month in 2000/1

Table 3: EUROMOD base datasets

B Distribution of disposable income

	AT			BE			FI			GE			GR		
	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
1	-8.01	-6.07	-4.44	-4.96	-7.05	-3.68	0.70	3.80	5.27	-1.18	-0.80	-0.54	-0.13	0.01	0.01
2	-9.70	-7.56	-5.51	-6.17	-8.19	-4.09	-1.47	2.13	4.80	-3.62	-2.05	-1.19	-1.29	-0.38	-0.04
3	-8.22	-6.44	-4.76	-7.05	-9.01	-5.07	-1.51	1.39	3.96	-5.14	-3.12	-1.40	-1.90	-1.03	-0.40
4	-7.51	-5.93	-4.44	-4.70	-6.48	-2.98	-1.72	0.43	2.54	-4.76	-3.04	-1.46	-2.66	-1.49	-0.66
5	-6.04	-4.75	-3.53	-2.72	-4.38	-1.19	-1.90	-0.72	0.51	-4.32	-3.07	-1.84	-2.65	-1.77	-0.95
6	-4.73	-3.93	-3.04	-0.93	-1.59	-0.30	-1.90	-1.38	-0.71	-3.49	-2.31	-1.12	-2.89	-2.06	-1.43
7	-3.42	-3.03	-2.57	0.47	0.27	0.79	-1.35	-1.46	-1.36	-2.64	-1.98	-1.27	-2.90	-2.12	-1.39
8	-1.70	-1.86	-1.85	1.75	2.26	1.31	-1.13	-1.82	-2.26	-1.59	-1.46	-1.14	-2.01	-1.51	-0.96
9	1.21	0.26	-0.45	3.17	4.24	2.28	0.07	-1.37	-2.58	0.70	-0.17	-0.88	-1.71	-1.47	-0.94
10	11.57	8.27	5.16	5.90	9.26	2.63	3.62	-0.76	-5.01	7.38	4.60	2.02	6.88	4.54	2.51
	LU			NL			PT			SP			UK		
	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
1	-8.08	-4.99	-2.64				-3.66	-0.88	0.10	-7.59	-0.82	-2.69	-0.58	0.26	0.54
2	-9.15	-6.34	-4.36				-5.38	-1.88	-0.34	-9.22	-2.89	-5.23	-1.32	0.46	1.44
3	-8.16	-5.81	-3.99				-6.42	-3.18	-1.69	-8.08	-3.05	-5.15	-1.99	-0.04	1.43
4	-8.75	-6.87	-5.23				-6.45	-2.61	-0.35	-7.51	-3.43	-5.29	-2.24	-0.12	1.80
5	-7.92	-6.54	-5.30				-6.08	-2.90	-0.69	-5.76	-2.36	-4.09	-2.45	-0.63	1.15
6	-6.10	-5.36	-4.61				-6.57	-3.64	-0.88	-5.30	-2.53	-3.90	-2.40	-0.99	0.50
7	-4.58	-4.59	-4.42				-5.82	-3.45	-1.02	-2.65	-1.34	-2.12	-2.15	-1.19	-0.07
8	-2.65	-2.95	-2.97				-4.07	-3.23	-1.60	-0.81	-1.20	-1.22	-1.42	-1.29	-0.85
9	2.63	1.36	0.45				0.06	-0.94	-1.08	1.76	-0.16	0.50	-0.48	-1.21	-1.60
10	12.05	8.95	6.16				11.24	6.56	2.59	11.79	5.19	8.25	6.23	2.84	-0.26

Table 4: Changes in disposable income in pp
Sources: own calculation using EUROMOD version C13.

	Gini			GE0			GE1			GE2			PS							
	Base	S1	S2	S3	Base	S1	S2	S3	Base	S1	S2	S3	Base	S1	S2	S3				
AT	0.239	0.277	0.267	0.257	0.095	0.127	0.118	0.110	0.102	0.143	0.132	0.122	0.131	0.211	0.191	0.172	0.228	0.259	0.250	0.242
BE	0.246	0.271	0.281	0.262	0.108	0.120	0.128	0.112	0.116	0.131	0.142	0.121	0.196	0.212	0.237	0.189	0.231	0.260	0.270	0.251
FI	0.269	0.278	0.263	0.251	0.127	0.134	0.122	0.112	0.175	0.186	0.167	0.151	0.587	0.618	0.531	0.452	0.243	0.251	0.237	0.224
GE	0.268	0.289	0.281	0.275	0.119	0.137	0.130	0.125	0.120	0.144	0.135	0.128	0.141	0.183	0.168	0.156	0.261	0.277	0.271	0.267
GR	0.322	0.336	0.330	0.326	0.191	0.205	0.199	0.195	0.175	0.198	0.190	0.183	0.209	0.258	0.242	0.228	0.305	0.310	0.308	0.306
LU	0.243	0.283	0.272	0.264	0.094	0.127	0.117	0.110	0.099	0.139	0.128	0.119	0.117	0.178	0.162	0.149	0.242	0.275	0.265	0.258
NL																				
PT	0.361	0.393	0.377	0.367	0.211	0.250	0.230	0.218	0.229	0.282	0.258	0.240	0.313	0.416	0.372	0.337	0.321	0.335	0.325	0.322
SP	0.311	0.348	0.325	0.335	0.177	0.216	0.191	0.201	0.167	0.216	0.188	0.200	0.210	0.315	0.260	0.285	0.293	0.319	0.302	0.308
UK	0.307	0.321	0.311	0.303	0.153	0.167	0.158	0.151	0.166	0.189	0.176	0.166	0.235	0.302	0.273	0.248	0.298	0.302	0.296	0.293

Table 5: Inequality measures
Sources: own calculation using EUROMOD version C13.

C Winners and losers

	S1		S2		S3	
	W	L	W	L	W	L
AT	0.22	0.77	0.20	0.79	0.18	0.82
BE	0.44	0.51	0.39	0.56	0.48	0.45
FI	0.34	0.63	0.46	0.51	0.47	0.50
GE	0.18	0.57	0.32	0.41	0.37	0.36
GR	0.12	0.59	0.12	0.47	0.20	0.35
LU	0.22	0.78	0.25	0.73	0.34	0.63
NL						
PT	0.19	0.78	0.17	0.70	0.36	0.39
SP	0.22	0.77	0.34	0.53	0.20	0.72
UK	0.11	0.72	0.31	0.48	0.41	0.37

Table 6: Winners and losers
Sources: own calculation using EUROMOD version C13.

D Poverty & Richness

	PL	FGT0 (HCR)				FGT1				FGT2			
		Base	S1	S2	S3	Base	S1	S2	S3	Base	S1	S2	S3
AT	859.22	11.06	16.19	15.03	13.70	1.93	2.97	2.67	2.45	0.58	0.87	0.78	0.73
BE	809.52	10.00	12.68	14.68	11.97	3.39	3.87	4.10	3.74	1.99	2.19	2.25	2.16
FI	838.33	12.24	12.76	11.08	9.95	2.17	2.17	1.86	1.75	0.63	0.60	0.53	0.52
GE	801.56	13.04	15.06	14.32	13.88	2.74	3.00	2.90	2.84	0.97	1.02	1.01	1.00
GR	437.40	19.48	20.54	19.80	19.51	6.36	6.50	6.40	6.37	3.34	3.37	3.35	3.34
LU	1,274.24	9.31	14.64	12.70	11.83	1.10	2.09	1.72	1.46	0.25	0.46	0.36	0.31
NL													
PT	347.43	20.89	23.65	21.70	21.22	4.75	5.59	5.00	4.78	1.40	1.71	1.48	1.40
SP	548.13	19.18	22.89	20.26	21.40	5.40	6.78	5.75	6.09	2.47	3.03	2.58	2.71
UK	575.07	16.17	17.16	16.09	15.38	3.00	3.13	2.95	2.90	1.05	1.08	1.04	1.03

Table 7: Poverty measures
Sources: own calculation using EUROMOD version C13.

	RL	HCR				R1				R2			
		Base	S1	S2	S3	Base	S1	S2	S3	Base	S1	S2	S3
AT	2,864.06	5.19	7.68	6.81	6.12	1.02	1.83	1.62	1.40	0.35	0.70	0.60	0.51
BE	2,698.39	3.72	5.94	6.67	5.17	0.78	1.16	1.37	0.97	0.32	0.44	0.51	0.37
FI	2,794.42	5.06	5.88	5.31	4.65	1.23	1.52	1.31	1.12	0.53	0.65	0.55	0.47
GE	2,671.85	7.79	9.79	8.87	8.03	1.48	2.16	1.90	1.66	0.46	0.76	0.65	0.55
GR	1,458.00	9.81	10.82	10.49	10.21	2.24	2.77	2.59	2.46	0.82	1.13	1.03	0.95
LU	4,247.46	6.41	10.72	9.30	8.71	1.22	2.37	2.07	1.86	0.38	0.86	0.73	0.63
NL													
PT	1,158.09	13.51	15.36	14.26	13.44	4.16	5.31	4.73	4.34	1.83	2.59	2.23	1.98
SP	1,827.09	10.18	12.57	11.42	11.85	2.12	3.26	2.60	2.92	0.70	1.25	0.93	1.08
UK	1,921.48	10.51	11.19	10.47	9.73	2.40	2.86	2.53	2.23	0.87	1.12	0.97	0.83

Table 8: Richness measures
Sources: own calculation using EUROMOD version C13.