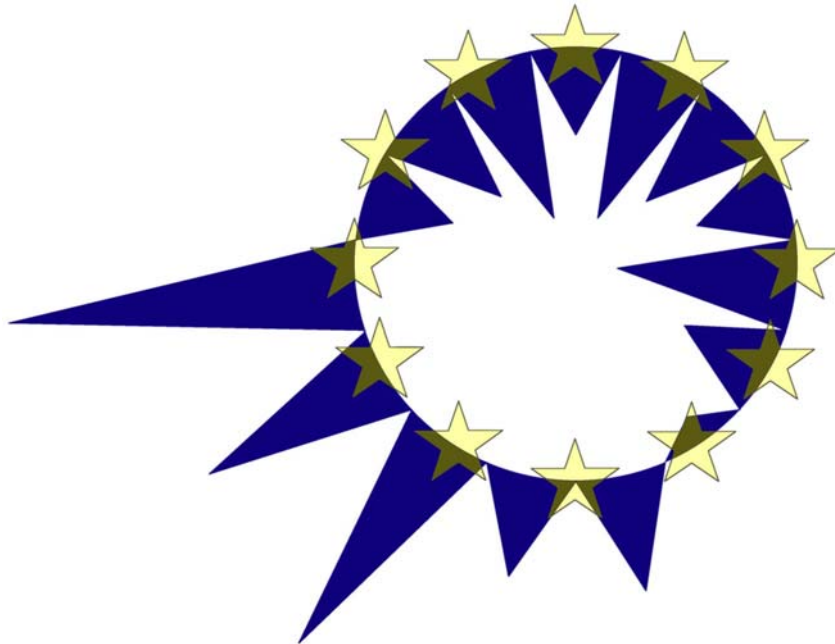


EUROMOD

WORKING PAPER SERIES



EUROMOD Working Paper No. EM2/05

REPLACEMENT INCOMES AND TAXES: A DISTRIBUTIONAL ANALYSIS FOR THE EU-15 COUNTRIES

Gerlinde Verbist

January 2005

Replacement Incomes and Taxes: A distributional analysis for the EU-15 countries

Gerlinde Verbist¹

Centre for Social Policy, University of Antwerp

Abstract

In this paper we analyse how income taxation interferes with the logic and aims of the social security system. We investigate the distributional effects of the tax treatment of social benefits, and more specifically of old age pensions and unemployment benefits. We present a brief overview of the different ways of levying taxes on replacement incomes. We measure the distributional effects of these different tax treatments by comparing gross and net replacement incomes over income deciles. By calculating Gini and Kakwani indices, we also estimate the inequality reduction and the progressivity characteristics of taxes on replacement incomes. Having summarised the link between taxes and replacement incomes, as well as their distributional effects, we then try to distinguish if there is a link between the tax treatment of replacement incomes and the type of welfare state.

JEL-classification: C81; D31; H23; H24; H55

Keywords: income redistribution; social benefits; income taxes; social insurance contributions; microsimulation; European Union

¹ Centre for Social Policy, University of Antwerp. Address for correspondence: Prinsstraat 13, B-2000 Antwerpen; e-mail: gerlinde.verbist@ua.ac.be. This study was carried out during my research visit at the Microsimulation Unit of the Department of Applied Economics, University of Cambridge. This visit was supported by funding of the Flemish Fund for Scientific Research. I also like to thank the members of the EUROMOD-team and -network for making my research possible. More in particular I am very grateful to Holly Sutherland, Christine Lietz, Daniela Mantovani, Herwig Immervoll, Frédéric Berger, Tim Callan, Klaas de Vos, Bengt Eklind, Horacio Levy, Heikki Viitamaki for support and many useful remarks in the process of writing this paper. Remaining errors are of course all mine.

EUROMOD relies on micro-data from 12 different sources for fifteen countries. These are the European Community Household Panel (ECHP) User Data Base made available by Eurostat; the Austrian version of the ECHP made available by the Interdisciplinary Centre for Comparative Research in Social Sciences; 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 Copy right and is used by permission. Neither the ONS nor the Data Archive bear any responsibility for the analysis or interpretation of the data reported here. An equivalent disclaimer applies for all other data sources and their respective providers cited in this acknowledgement.

1 Introduction

What are the differences in the way of levying taxes on replacement incomes? How does this affect the distribution of gross and net social benefits? Is there a link between the way benefits are taxed and the type of welfare state? These are the questions we try to answer empirically in this paper for the 15 countries that formed the European Union before 1st May 2004. Up until now few studies have been devoted to the effects that taxing replacement incomes may have on the income distribution; it is the scope of this paper. We limit ourselves to the tax treatment of replacement incomes, and more specifically old age pensions and unemployment benefits.

Social security and income taxes play an important role in the process of income generation of households. Despite the fact that there are increasing overlaps between social security arrangements and personal income taxes, too often both systems are still studied separately. One of the reasons for this is that both systems are guided by their own objectives and logic, as we will elaborate in section 2. Another reason is that there are few data available that allow for a study of both systems together. This has changed with the development of the European microsimulation model EUROMOD. We briefly present this model in section 3, where we also summarise the tax treatment of pensions and unemployment benefits. The next section describes the methodology used to measure inequality and progressivity on replacement incomes. In section 5 we compare taxes social contributions paid by old age individuals with those paid by workers, both in average terms, as with respect to the distributional consequences. In the following section we present similar results for unemployed individuals. In the concluding section we try to establish whether there is a pattern in our empirical results that fit in with the different types of welfare state.

2 Taxes and the Welfare State

In this paper we study empirically how personal income taxation interferes with the logic and the aims of the social security system. The relationship between taxes and benefits has been analysed extensively within the field of family policy. This becomes apparent in studies of the joint effect of child benefits and tax concessions for children (see e.g. Bradshaw & Finch (2002) and O'Donoghue & Sutherland (1999)). However, if we want to gain a more thorough understanding of the way in which the tax system influences the basic principles of the welfare state, we also need to include the others sectors of social security in the analysis, and more specifically the allowances that replace income from work that is lost due to sickness, invalidity, ageing, unemployment etc. Research has shown that the tax treatment of replacement incomes differs widely among countries (Adema et al., 1996; Adema, 1999). Consequently, the ranking of countries by expenditure level is different for gross and net social expenditures. On a micro level this is translated into a difference between gross and net benefits, which varies among countries.

2.1 'Fiscal welfare'

The tax system and the social security system each have their own logic and objectives. Taxes raise revenue and have to be levied according to the principles of horizontal (i.e. equal treatment of equals) and vertical equity (i.e. taxation according to economic strength) (Musgrave, 1959). The basic goals of social security are 1) guaranteeing a minimum level of resources for everyone, and 2) maintaining (unto a certain extent) the acquired standard of living (see a.o. Atkinson, 1987). This means that social security is based on both the insurance and the solidarity principle. However, the weight attached to one of these principles differs according to the type of welfare state: the so-called Bismarckian systems are grounded on the insurance principle, whereas the Beveridgean model is said to be based on the principle of solidarity. The emphasis on one of these principles can also vary for the different social security schemes, and can evolve over time. Within the framework of the 'Active Welfare State' these two principles have been supplemented with the goal of activation, which means that also the (re-)integration of individuals in the working process has to be considered.

As early as the 1950s Titmuss emphasised that the Welfare State is not only shaped by social services and benefits, but also by the tax system. The total of social services and benefits was labelled by him as '*social welfare*', while the tax revenue lost in meeting needs or objectives similar to public welfare received the term '*fiscal welfare*': "Allowances and reliefs from income tax, though providing similar benefits and expressing a similar social purpose in the recognition of dependencies, are not, however, treated as social service expenditures. While one is 'a cash transaction', the other is 'an accounting convenience'. Despite this difference in administrative method, the tax saving that accrues to the individual is, in effect, a transfer" (Titmuss, 1955, publication of 1969). Titmuss wanted to make clear that in many countries the tax system can to some extent serve as an alternative for the social security system. This was translated by Adema et al. (1996) into the concept of "social-fiscal measures", which are defined as "those reductions, exemptions, deductions or postponements of taxes, which (a) perform the same policy function as cash transfers

which, were they to exist, would be classified as social expenditures; or (b) are aimed at stimulating private provisions of benefits”. This also corresponds to what Kvist and Sinfield (1997) call ‘tax benefits’, analogous to social benefits.

Such a social-fiscal measure can be applied in different forms. We mainly follow the division of different categories of tax reliefs proposed by the OECD (1984, 1996a):

- 1) *tax allowance*: in the case of a tax allowance a tax unit can deduct a fixed amount of its taxable income. As most tax systems are progressive, the amount of the advantage increases with income, and as such it favours the higher income groups;
- 2) *income-related tax deduction*: when an amount is subtracted from taxable income that is not fixed but that depends on the level of the income, then we call this an income-related tax deduction;
- 3) *tax credit*: this is a (fixed) amount that is subtracted from the tax liability. Sometimes the tax credit exceeds tax liability, in which case two possibilities arise: either the amount of the excess of the tax credit over the tax liability is paid to the taxpayer, in which case it is a ‘non-wastable tax credit’, or this does not happen, and then the tax credit is ‘wastable’, providing no or a minor advantage to the lowest income groups;
- 4) *tax exemption*: part of income or specific sources of income are tax exempt. If exemptions are applied at the bottom of the tax scale, then the effect is analogous to that of a tax credit. If a certain source of income is not included in taxable income, then the effect is similar to that of a tax allowance;
- 5) *preferential tax rate*: some incomes or sources of income are taxed at a lower rate than others are. This can be done a.o. by dividing taxable income in different parts, such that each part is taxed at a lower marginal rate. This technique is often used when treating married couples.

Thus, there are many links between the tax and the benefit system. Both social security benefits and personal income taxes affect disposable income of households, as well as the distribution of these incomes. Both play a prominent role in the redistribution process. Moreover, there is an increasing overlap between taxpayers and the recipients of benefits. Both systems are also technically linked; we have already discussed the subject of “social-fiscal” measures, but there are also links through the fact that both social contributions and social benefits can be part of taxable income.

2.2 Taxes and Welfare State types

As there are important relations between the tax and the benefit system, we can assume that the variations in these links depend on the type of social security system. In a more insurance-based system, it would be logical for the taxman to treat replacement incomes in the same way as labour incomes. A solidarity-based system on the contrary aims to guarantee a minimum income for everyone, which would imply that allowances would not be taxed, or not by much.

A finer typology of welfare regimes is the one presented by Esping-Andersen (1990).² In this typology, hardly account is taken of the tax system. We assume that the

² We do not discuss into detail on the different types of welfare state. There is a vast flow of literature on this topic (see e.g. Arts & Gelissen (2002) for an overview).

national tax systems have characteristics that are compatible with their type of welfare state. The effect of taxes on inequality is probably relatively low in the *liberal welfare states* (i.e. most Anglo-Saxon countries). We also assume that taxes on replacement incomes are limited in these countries, as they are part of a solidarity-based system. If taxes on replacement incomes are levied in these countries, we expect them to be far more progressive than taxes on income from work, as the lowest benefits will be little taxed (in order to guarantee a minimum income for all), whereas such an advantage should not be granted to beneficiaries of a high replacement income. We expect to find rather the reverse for those countries that belong to the *social-democratic welfare regime* (i.e. the Scandinavians): on the one hand a high tax burden, both in general and on pensions and unemployment benefits; on the other hand a relatively low degree of progressivity on these social allowances, quite similar to progressivity of taxes on earnings. For the so-called *conservative welfare states*, we assume that the tax burden on replacement incomes will be higher than in the liberal welfare states, but lower than in the social-democratic. Social contributions, however, will probably also be levied on this type of income. As this social system, which is found in most continental European countries, is largely build on the insurance principle, we expect that progressivity on replacement incomes will mirror that of earnings.

To investigate these hypotheses we will calculate taxes on replacement incomes for the 15 countries of the EU that are included in EUROMOD, and their effects on income inequality. The methodology is briefly explained in the next two sections.

3 EUROMOD and the calculation of taxes on replacement incomes

3.1 EUROMOD

EUROMOD is a tax-benefit model for 15 countries of the European Union (for more information, see Immervoll et al., 1999; Sutherland 2001). EUROMOD is a static empirical microsimulation model. The model covers a major part of the different national personal income tax and social benefits systems of the EU-15. It calculates taxes and benefits for a representative set of micro-data. These national datasets are collected at various points in time between 1993 and 1998, but have all been adjusted to 1998 prices and incomes (for an overview of the various data sources, see appendix 1a). Policy measures in the model used here also refer to 1998.

Gross income components are taken directly from the dataset or, where necessary, are imputed from net income (see Immervoll and O'Donoghue, 2001). For the exact composition of gross income in each country we refer to Verbist (2004). To arrive at disposable or net income we subtract personal taxes and social insurance contributions from gross income. Personal taxes (PT) include taxes both at the national and the local level. Social insurance contributions (SIC) do not include employer contributions, following customary practice of most distributional studies.

3.2 Defining the elderly, unemployed and workers and their income

We compare the income position of old age and unemployed individuals with that of workers. In this section we describe how these categories of the population are defined.

Workers are either civil servants or employees and have a strictly positive value for income from employment. This implies that the self-employed have been excluded. Also those individuals with an income that does not originate from work, i.e. unemployment benefits, pensions, invalidity allowances have been excluded. There is also an age limit: only individuals who are 18 and older and who have not yet reached the age of 60 are classified here as workers.

Old age individuals are all individuals older than 65. The age of 65 is the most common state pension age in EU countries; recent increases in pension age indicate a convergence on this level in the future (Disney and Whitehouse, 1999). The samples used in EUROMOD all refer to private households; this means that the elderly living in an institution are not represented in the study. The proportion of old age individuals in institutional households varies widely among countries (for figures see e.g. OECD, 1996b).

Unemployed are those individuals which either have a strictly positive value for unemployment benefits or have 'Unemployed' as their employment status. The same age limits apply as for workers. For Luxembourg the absolute number of unemployed in the sample is too small to have a reliable analysis; therefore the results for this country are not included for this part of the analysis.

For these three categories of individuals we will investigate the impact of taxes on their overall income, but also on the income components that are specific for their category, namely income from work for workers, pension income for the elderly and unemployment benefits for the unemployed (see appendix 3 for further details). **Income from work** (or earnings) equals gross income from employment and includes also 13th / 14th monthly salaries, as well as other employment incomes, such as bonuses, extra holiday pay, occasional pay etc. **Pensions** include both public and private pensions, as we are interested in the effects of taxes on income that is old age specific. **Unemployment benefits** are those benefits that are aimed specifically at unemployed and include both insurance-related and social assistance allowances.

Table 1: Earnings, pensions and unemployment benefits of workers, old age individuals and unemployed as a % of their gross individual income

	Workers Gross earnings	Old age individuals Gross pension	Unemployed Gross unemployment benefits
Austria	96.5	91.3	23.1
Belgium	93.7	84.4	38.4
Denmark	96.4	65.7	39.6
Finland	92.8	83.7	26.1
France	93.1	79.1	29.5
Germany	96.4	88.7	33.2
Greece	96.4	74.5	4.0
Ireland	96.9	66.6	62.9
Italy	92.9	67.4	21.2
Luxembourg	93.8	80.5	32.6
Netherlands	95.6	90.9	27.9
Portugal	97.3	71.3	51.4
Spain	98.9	85.2	31.6
Sweden	91.0	78.7	34.0
UK	95.8	69.1	6.5

Source: EUROMOD

Income from work for workers makes up almost their entire gross income (more than 90%, see table 1), and this applies for all the EU-15 countries. This is not the case for the elderly and unemployed. On average gross pensions make up between 66% and 91% of gross income of old age individuals (the highest proportions are found in Austria and the Netherlands, which have also the highest proportion of private supplementary pension provisions). This variation is a.o. due to differences in regulations of

- level and coverage of the public pension system
- what old age individuals can and cannot earn as income from work,
- possible combinations with other benefits.

The variety is even bigger for the unemployed (between 4% in Greece and 63% in Ireland). This is also mainly due to variations in regulation of the benefits (level and coverage of the benefits, possible combinations with other income sources etc.).

3.3 Social insurance contributions on replacement incomes

As is shown in table 2, replacement incomes are not treated in the same way as income from work with respect to social insurance contributions. In all countries mandatory social insurance contributions (SIC) are levied on income from work. In

four countries no SIC are levied on either pensions or unemployment allowances (Ireland, Italy, Portugal and UK). In all other countries recipients of either pensions or unemployment allowances also pay contributions, though in most cases the rate is lower than on income from work (see also Verbist, 2004).

Table 2: Basis for levying social insurance contributions in the EU-15, EUROMOD, 1998

SIC on	Income from work	Pensions	Unemployment benefits
Austria	x	x	
Belgium	x	x	
Denmark	x		x
Finland	x	x	x
France	x	x	x
Germany	x	x	
Greece	x	x	
Ireland	x		
Italy	x		
Luxembourg	x	x	x
Netherlands	x	x	x
Portugal	x		
Spain	x		x
Sweden	x		x
UK	x		

3.4 Tax treatment of older people and unemployed

In most countries pensions and unemployment allowances are subject to personal taxes. But quite often the tax treatment is distinct from that of income from work. Table 3 presents an overview of the special provisions in the personal income tax system for old age, pensions and unemployment benefits.

Pensions are in almost all countries part of taxable income, though often provisions for old age or for pension income have been made (see also Fenge & Werding, 2004; Keenay & Whitehouse, 2003a & 2003b). Part of pension income is tax exempt in Belgium, Finland, France, Germany, Italy, Luxembourg, Portugal and Sweden. In Belgium, France and Italy pensions that can be characterised as a guaranteed social minimum are not taxable. In Finland, Sweden and Luxembourg older people are entitled to a special deduction that depends on the level of pension income. Germany has made the most extensive favourable tax treatment for pension income: the share of public pensions that is taxable depends on age (e.g. 38% of public pensions are taxable when the individual is aged 55, 27% is taxable at age 65 and 21% at age 70).

Ireland, the Netherlands and the UK have a tax allowance for old age, which means that for individuals older than 65 a fixed amount can be deducted from taxable income. A tax credit, which is the subtraction from tax liability, is granted in Austria, Belgium and Spain; in Austria and Belgium the tax credit depends on the level of pension income, whereas in Spain the tax advantage is granted to inactive persons older than 65.

Table 3: Special provisions in the personal income tax system for old age and unemployment in the EU-15, EUROMOD, 1998.

	<i>Concessions for old age or for pension income</i>	<i>Concessions for unemployment benefits</i>
Austria	Tax credit for pensioners	Unemployment benefits are tax exempt
Belgium	Tax credit for pension incomes Guaranteed minimum income for old persons is tax exempt	Tax credit for unemployment benefits
Denmark	-	-
Finland	Deduction for pensions	-
France	Minimum pension and social benefit for dependent elderly are tax exempt Deduction for pensions	-
Germany	Deduction for old age, for the civil servant pensions, for the non-earnings part of non-civil servant pensions	Unemployment benefits are tax exempt
Greece	-	-
Ireland	Tax allowance for old age	Unemployment benefits are tax exempt
Italy	Social pension is tax exempt Tax credit for pensioners	-
Luxembourg	Deduction for pensioners	-
Netherlands	Tax allowance for old age	
Portugal	Deduction for pension income	Unemployment benefits are tax exempt
Spain	Tax credit for elderly inactive	
Sweden	Part of pensions are deducted from taxable income, and thus tax exempt	
UK	Tax allowance for old age and for married old age couples	

In four countries unemployment benefits are partly or entirely tax exempt, namely in Austria, Germany, Ireland and Portugal. Belgium provides a tax credit for unemployment benefits, which is designed in such a way that the households whose income consists only of these benefits do not pay taxes.

3.5 Measuring taxes on replacement incomes in EUROMOD

It is not obvious how to calculate the exact amount of taxes on replacement incomes as personal income taxes are often levied on the total of taxable income, so some assumptions are required to allocate these taxes to the different income sources. There are two possible methods to calculate the tax burden on benefits: the *marginal method* and the *proportional method* (Verbist, 2002, Eklind et al., 2003). With the marginal method we compare the present system with one in which replacement incomes are tax exempt. The difference between both systems is a measure of the tax burden on benefits. This method is the most appropriate for calculating the cost of changes in a specific income component; however, it overestimates taxes paid on each income component, so that the total of taxes on the income components is larger than taxes calculated on total income. With the proportional method we attribute taxes to income components according to their respective shares in taxable income before application of allowances and deductions (for the specification of allowances and deductions, see Verbist, 2004).

We use in this paper the proportional method. This means that we have to specify for each country:

- a) taxable replacement incomes (RY)
- b) taxable income before applications of tax deductions and tax allowances (Y)
- c) taxes to be apportioned (in most cases only personal income taxes, for the Scandinavian countries these include also local taxes) (T)

Taxes on replacement income (T_{RY}) are then: $T_{RY} = T * RY / Y$

When replacement incomes are part of income liable for social insurance contributions, the same procedure is applied for these contributions.

4 Measuring of inequality and progressivity of taxes on replacement incomes

We do not only look at average income and taxes, but also at the distribution. We use two tools for this purpose. In the first place we present the results per income decile. The deciles are constructed on the basis of household equivalised income weighted for the number of individuals in the household; the equivalence scale applied is the modified OECD equivalence scale (see below).

Secondly, we analyse inequality of the income components with the Gini coefficient. Taxes on replacement incomes are compared for the various countries through the degree of progressivity. In the literature progressivity is measured as the deviation of a tax system from proportionality (Kakwani, 1984). A tax system is called *progressive* when the proportion of income that is taken in tax increases with income. This means that the average tax rate t should increase with income (see a.o. Lambert, 2001). The tax system is called *proportional* when the average tax rate is constant, and it is said to be *regressive* when the average tax rate decreases with rising income. We use the Kakwani index Π_T^K to measure progressivity (Kakwani, 1977). Kakwani indices are calculated here with respect to the respective income components. This means that progressivity of taxes on income from work (T_W on Y_W) is measured as the difference between the Gini coefficient G of Y_W minus the concentration coefficient C of T_W :

$$\Pi_{T_W}^K = G_{Y_W} - C_{T_W}$$

Similarly, the progressivity of taxes on pensions P is measured as:

$$\Pi_{T_P}^K = G_{Y_P} - C_{T_P}$$

and on unemployment benefits U :

$$\Pi_{T_U}^K = G_{Y_U} - C_{T_U}$$

The unit of analysis is the individual. Income (components) are corrected for differences in household size and composition with the modified OECD-scale. According to this equivalence scale the first adult has a value 1, every other adult counts for 0.5 and each child for 0.3. We assume that household income is equally shared among all household members. Thus, we analyse inequality of equivalent household income weighted for the number of individuals.

5 Income and taxes of the elderly

In this section we compare the income position of old age individuals with that of workers, these categories being defined in section 3. Firstly, we look at the relative income position of old age individuals. Do old individuals on average fare better than the rest of the population, or than workers? Next, we compare average gross and net incomes of workers and old age individuals. By doing this we also show what the weight is of personal taxes and social security contributions in the transition from gross to net income. We then investigate the effect of taxes on income from work and from old age specifically. In the last two paragraphs we present the distributional characteristics of taxes paid by old age individuals and workers.

5.1 Relative income position of old age individuals

To get a better view on how the average income of the elderly compares with the population's living standards we express their average income as a percentage of that of workers and of that of the entire population. These ratios can be considered as replacement rates.³ A replacement rate of 100% or more indicates that the elderly are on average better off than the entire population, or than the group of workers.

Table 4: Average income of old age individuals as a % of average income of workers and average income of all individuals.

Country	income all individuals			income worker		
	gross	net	difference gross - net	gross	net	difference gross - net
Austria	96.3	109.7	13.4	55.6	65.8	10.3
Belgium	91.2	105.7	14.5	43.3	54.7	11.4
Denmark	69.3	82.8	13.4	40.7	50.6	9.9
Finland	88.9	97.8	8.9	44.7	52.6	7.9
France	110.5	120.6	10.0	58.1	66.6	8.6
Germany	88.5	112.2	23.7	46.2	66.5	20.4
Greece	79.3	88.2	8.9	35.3	40.3	5.1
Ireland	81.2	93.3	12.1	31.2	38.9	7.7
Italy	115.3	127.6	12.2	59.5	68.8	9.3
Luxembourg	110.7	119.4	8.7	58.8	64.9	6.1
Netherlands	104.1	119.9	15.8	55.2	66.0	10.8
Portugal	87.5	101.1	13.6	44.5	54.5	10.0
Spain	97.7	109.1	11.3	35.1	40.5	5.3
Sweden	96.1	105.5	9.4	55.1	65.3	10.2
UK	87.8	98.6	10.8	46.6	55.4	8.7

Source: EUROMOD

What is immediately striking from table 4 is that in all countries the net replacement rate is higher than the gross replacement rate. This is irrespective of whether the denominator is income of all individuals or income of workers only. The difference between gross and net rates is biggest for Germany (around 20%), and this according to both measures. The difference is much smaller in Finland, Greece and

³ This use of replacement rates differs from the more conventional approach of individual replacement rates, which measure the pensioners income against his pre-retirement income or average earnings (Whitehouse, 2000).

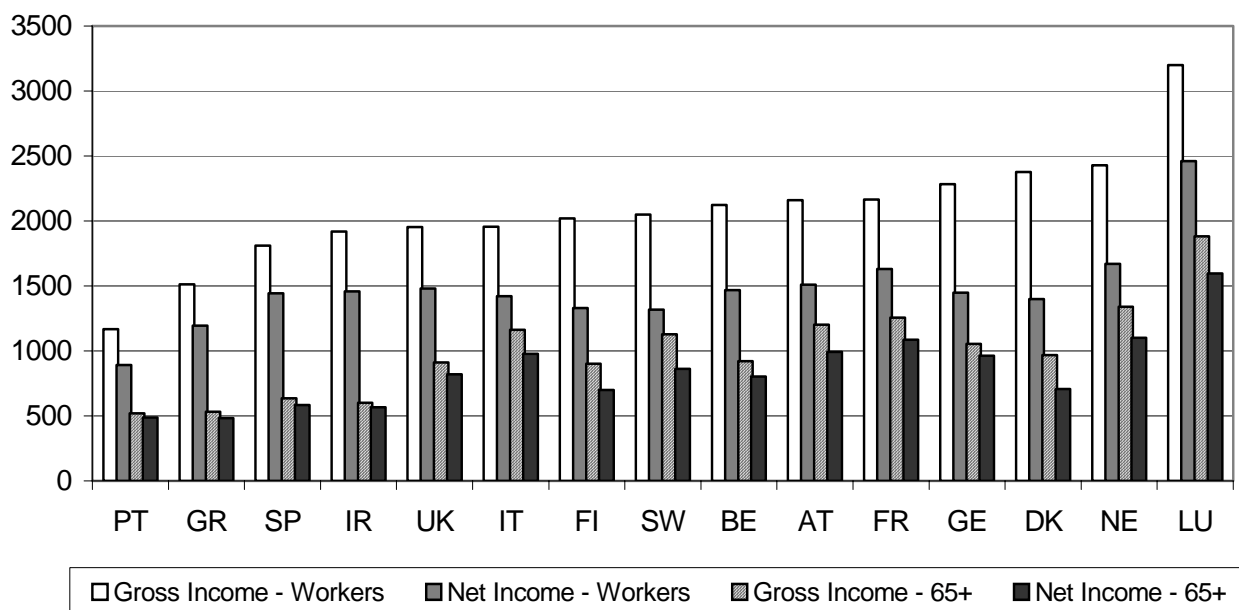
Luxembourg. This difference between gross and net replacement rates is an indicator of the influence of the tax system on the relative welfare position of the elderly.

Compared to workers, the average replacement rate is in all countries below 100% (both in gross and in net terms). Gross replacement rates vary between 31% (Greece) and almost 60% (Italy), whereas net replacements range from 40% (Greece and Spain) to 69% (Italy). If we compare the average income position of old age individuals with the entire population, then old age individuals have a gross replacement below 100% in all countries, except France, Italy, Luxembourg and the Netherlands. But in net terms, the elderly are almost everywhere better off than the average for the entire population; the exceptions are Denmark, Greece and Ireland and to a lesser extent Finland and the UK.

5.2 Gross and net incomes of old age individuals and workers

Figure 1 compares the average amounts of income from workers and pensioners; all amounts are converted to Euro purchasing power parities (see appendix 1b). Luxembourg stands out as the country with the highest average income for both workers and old age individuals, followed by the Netherlands. Portugal and Greece have the lowest average income for the two categories of individuals.

Figure 1: Average gross and net income of workers and old age individuals in the EU-15, 1998, amounts in Euro PPP.



Source: EUROMOD

For the countries in between these two extremes, the ranking for gross and net average income from workers is quite different: average gross income from workers is quite high in Denmark, Germany, France, Austria and Belgium, but the ranking based on average net income is different: average net income from workers is actually less dispersed among countries (between 1320 Euro in Sweden and 1510 Euro in Austria). The ranking of countries based on gross or on net income of the elderly, on the

contrary, is almost the same. The figure also shows quite clearly that the gap between gross and net income is different for workers and elderly.

5.3 Taxes paid by old age individuals and earners

In this section we compare the relative tax burden of old age individuals with that of workers. The difference between workers and pensioners varies considerably among countries. Another general observation is that in all countries workers pay on average more in taxes than pensioners. There are three reasons for this. Firstly, gross income of pensioners is on average lower in all countries (cf. figure 1). As most personal income tax systems are progressive, this will lead to a higher tax burden for workers. A second reason is that some countries have special provisions in their personal income tax system for old age or for pension incomes (cf. section 3.4). This also becomes apparent in a large difference for personal taxes in some countries, namely Belgium, Finland, Germany, Ireland, Portugal and the UK. A third reason is that pensioners pay less in social contributions than workers, and in some countries none at all. This is so because for certain risks pensioners do not have to pay any more insurance contributions (e.g. for unemployment) (see also Disney & Whitehouse, 2003; Keenay and Whitehouse, 2003). This also becomes apparent if we compare average SIC paid by pensioners and workers: here the gap between pensioners and workers is the widest. Another indicator is that for almost all countries average social insurance contributions paid by the elderly are smaller than their average personal income tax liability (France and Germany are the only exceptions).

Table 5: Taxes and social contributions paid by old age individuals and earners as a % of their gross income

	Earners			Pensioners		
	Total taxes	PT	SIC	Total taxes	PT	SIC
Austria	30.2	14.6	15.6	17.2	13.5	3.7
Belgium	30.9	20.0	10.9	12.7	10.3	2.4
Denmark	41.0	30.9	10.1	26.7	25.6	1.1
Finland	34.1	27.1	7.0	22.5	19.7	2.8
France	24.6	6.0	18.6	13.5	7.6	5.9
Germany	36.5	19.5	17.0	8.6	2.7	5.9
Greece	21.0	9.9	11.1	9.7	5.8	3.9
Ireland	24.0	20.2	3.8	5.3	5.0	0.3
Italy	27.3	19.0	8.3	15.9	15.3	0.6
Luxembourg	23.1	13.7	9.4	15.1	12.5	2.6
Netherlands	31.2	11.6	19.6	17.8	9.6	8.2
Portugal	23.6	12.9	10.7	6.3	5.4	0.9
Spain	20.4	16.7	3.7	8.3	8.0	0.3
Sweden	35.6	30.0	5.6	23.7	23.7	0.0
UK	24.3	17.8	6.5	10.1	10.1	0.0

Source: EUROMOD

In the next section we try to isolate taxes on the income source that is typical for each category, i.e. taxes paid on income from work by workers and on pension income for the elderly.

5.4 Taxes paid on pensions and earnings

Taxes on earnings and on pensions have been attributed to that income source on the basis of its proportion in total gross income (see section 3.5). In table 6 we present personal taxes (PT) and social contributions (SIC) on earnings and pensions as a percentage of gross earnings and gross pensions, respectively.

Table 6: PT and SIC on earnings as a % of gross earnings (only earners), and PIT and SIC on pensions as a % of gross pensions (only pensioners).

	Earnings			Pensions		
	PT	SIC	Net earnings	PT	SIC	Net pension
Austria	15.0	13.8	71.2	13.7	3.7	82.7
Belgium	20.9	11.6	67.5	9.7	2.5	87.7
Denmark	31.3	10.5	58.2	25.3	0.0	74.7
Finland	27.9	7.6	64.5	18.8	3.0	78.2
France	4.5	19.7	75.9	3.6	5.2	91.3
Germany	18.8	17.7	63.5	1.7	6.4	91.9
Greece	9.8	11.5	78.7	3.6	4.0	92.4
Ireland	20.5	4.0	75.6	3.3	0.0	96.7
Italy	19.0	8.9	72.1	14.4	0.0	85.6
Luxembourg	13.9	10.0	76.1	9.8	2.6	87.7
Netherlands	11.2	19.4	69.5	9.0	8.2	82.8
Portugal	13.0	11.0	76.0	2.6	0.0	97.4
Spain	16.7	3.7	79.6	6.9	0.0	93.1
Sweden	31.3	6.2	62.5	25.9	0.0	74.1
UK	16.0	6.7	77.3	6.3	0.0	93.7

Source: EUROMOD

There is quite some variation among countries both for earnings and for pensions. The difference between gross and net earnings varies between 20% (Spain) and 38% (Sweden); for pension we find a wider range i.e. from 3% in Portugal to 26% in Sweden.

Taxes on earnings are mainly personal taxes, except for France, Greece and the Netherlands, where SIC have the biggest weight. Also for pensions income taxes are the most important component for all countries but France and Germany. As we have seen in section 3.3, in almost half of the countries no social insurance contributions are payable on pension income; in the other countries the level of SIC on pensions is rather small due to the fact that it is levied at a reduced rate.

5.5 Decile distributions

Average figures tell us little about the distribution. If we want to have an idea of how gross and net pension incomes are distributed over the welfare distribution, we first use income deciles, based on standardised disposable income. In the next section we look at the summary measures, i.e. Gini and Kakwani indices.

The figures give one the one hand the average tax rates for the lowest and the highest income deciles, split into personal taxes (PT) and social contributions (SIC) for both pensioners and workers; on the other hand we also present average gross and net income from work per decile for all workers, and average gross and net pension income for all old age individuals (see appendix 2 for the figures over all deciles).

A general observation is that in the lowest deciles, taxes paid by low income pensioners are considerably lower than taxes paid by low income workers (see figure 2a). This is mainly due to the fact that pension incomes are in general lower than incomes from work (see figure 2b).

For the rest, there is quite some diversity among countries in the distribution of taxes paid by pensioners and workers. The average tax rate for pensioners at the bottom of the income distribution is very low in **Belgium, Ireland, Italy, Portugal, Spain** and the **UK**. An important factor here is that in the latter five countries no SIC have to be paid on pensions, while in Belgium social security contributions are only liable from a certain threshold onwards (cf. table 1). In Belgium, low income pensioners hardly pay personal taxes due to the tax credit for pension incomes. In Ireland and the UK low income pensioners hardly pay any taxes due to the tax allowances, of which the allowance for old age is an important component. In Italy and Spain the low average tax rate for pensioners is mainly due to the fact that no SIC are due on pension income, other special provisions for older people are too small to make a difference. In Portugal the tax deduction for pension income is especially important for the lowest incomes.

The average tax rate is somewhat higher for the lowest income pensioners in **Austria, France, Germany** and **Greece**, due to the fact that in these countries SIC have to be paid on pensions, also on the lower pensions. The SIC-rate, however, is considerably lower than on income from work, because pensioners only contribute for specific sectors in social security (see above).

The tax burden for low income pensioners is highest in **Luxembourg, the Netherlands, Finland, Sweden** and especially **Denmark**. In the Scandinavian countries this follows mainly from taxes (especially local taxes), whereas for Luxembourg and the Netherlands, social contributions are far more important. It is also in these countries that the gap between average gross and net pensions for low incomes is highest (figures 2b and 3b).

The situation is quite different for the higher income groups. The average tax rates in the 9th and 10th decile of pensioners are much closer to those of workers for most countries (figures 5b and 6b). Social insurance contributions paid by pensioners are still remarkably lower than those paid by workers, but for personal taxes this does not apply any more. In some countries high income pensioners pay on average even relatively more in personal taxes than workers (Austria, Belgium, Denmark, Finland, France, Luxembourg and the Netherlands). This is mainly due to the fact that any special provisions for old age or pensions are outweighed by the tax advantages granted to (high) earnings (e.g. deduction for professional expenses, see also Verbist, 2004). The most notable exception is Germany: the tax burden of high income pensioners is still remarkably lower than that of workers, due to its considerable tax deduction for pensioners.

Figure 2a: Taxes paid by pensioners and workers (left and right bar respectively for each country) as a % of individual gross income in the 1st decile, Euro PPP, EUROMOD 1998

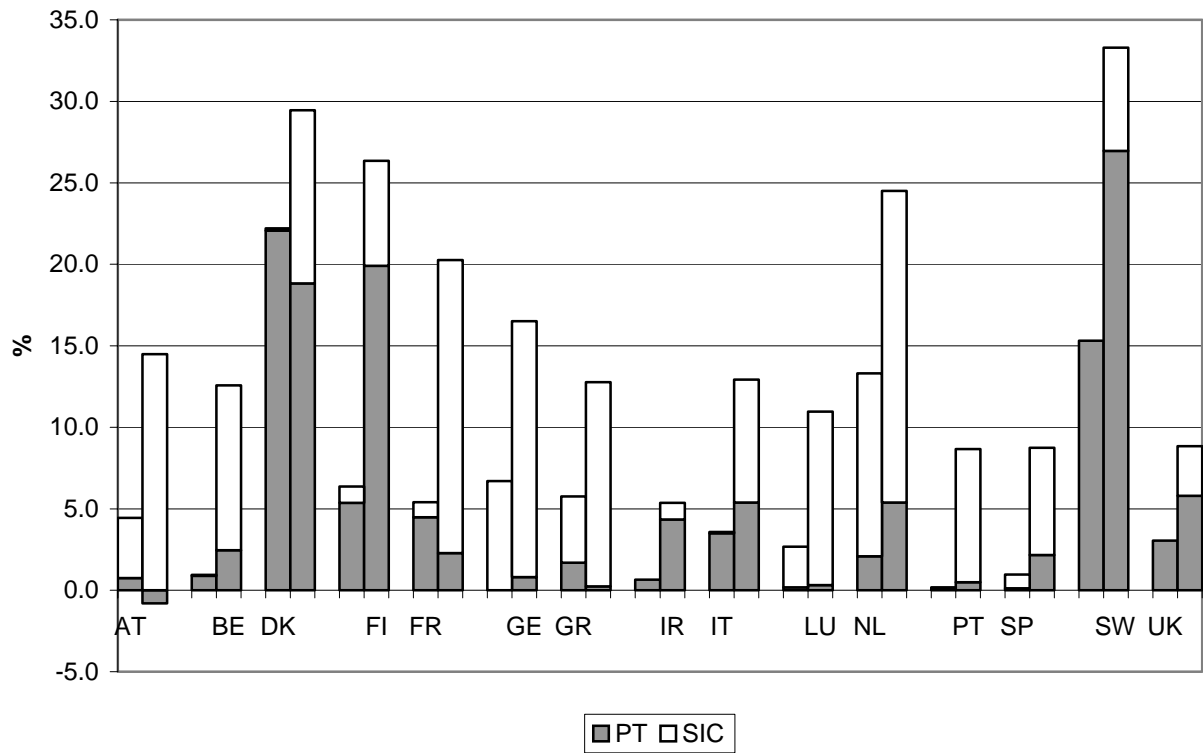


Figure 2b: Pensions and earnings ((left and right bar respectively for each country) in the 1st decile, Euro PPP, EUROMOD 1998

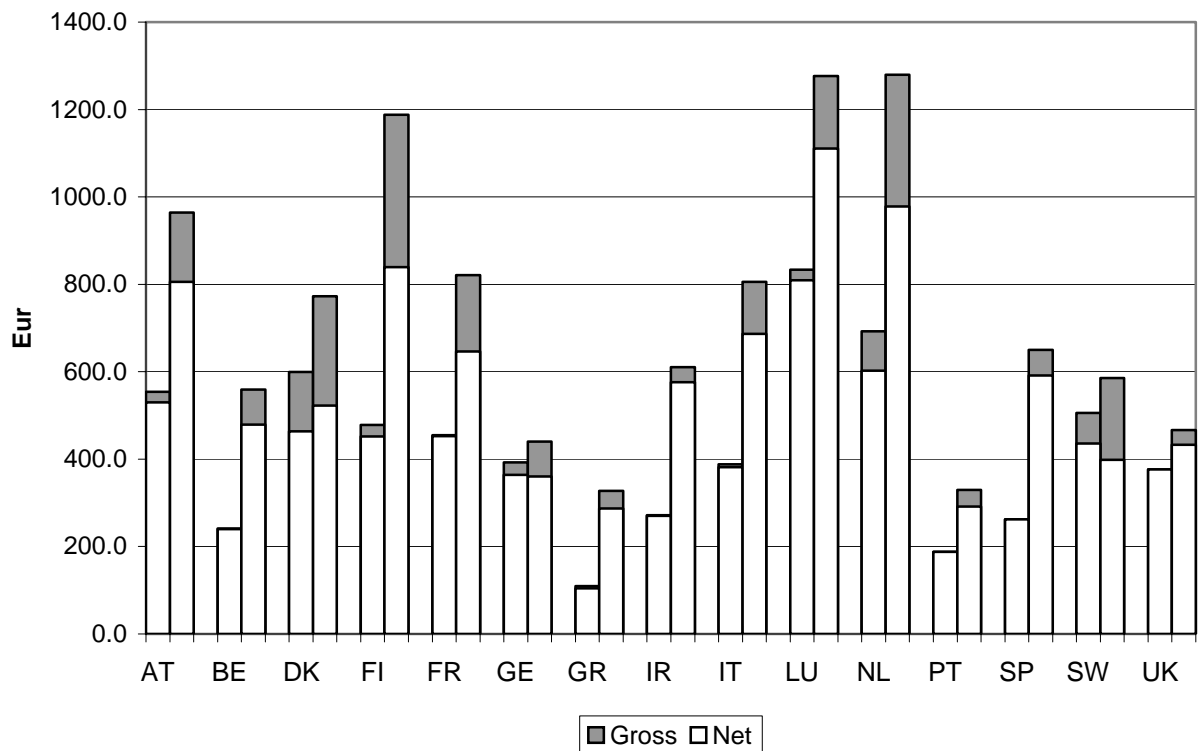


Figure 3a: Taxes paid by pensioners and workers (left and right bar respectively for each country) as a % of individual gross income in the 2nd decile, Euro PPP, EUROMOD 1998

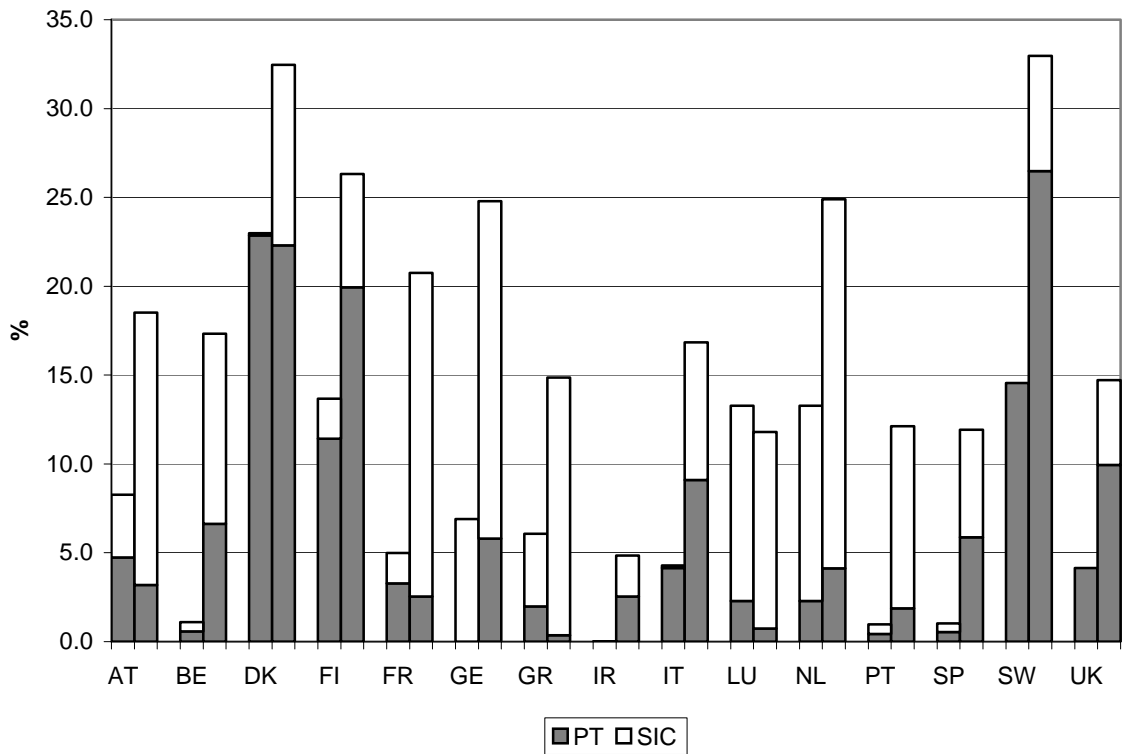


Figure 3b: Pensions and earnings (left and right bar respectively for each country) in the 2nd decile, Euro PPP, EUROMOD 1998

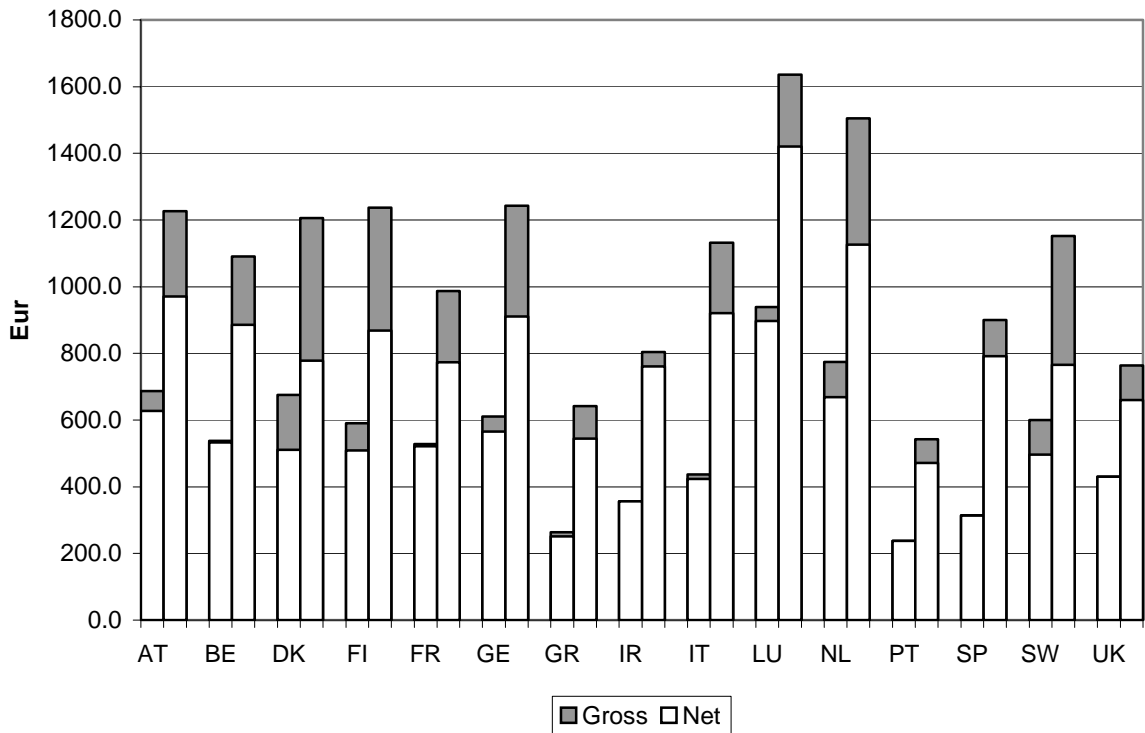


Figure 4a: Taxes paid by pensioners and workers (left and right bar respectively for each country) as a % of individual gross income in the 5th decile, Euro PPP, EUROMOD 1998

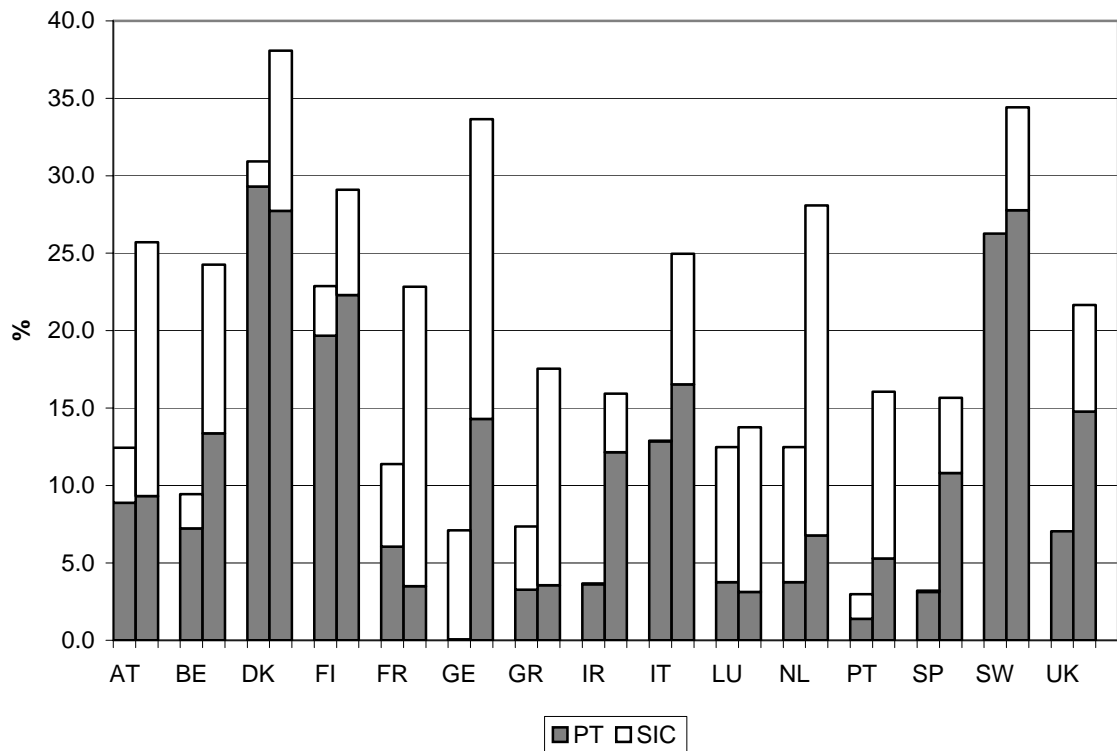


Figure 4b: Gross and net pensions and earnings (left and right bar respectively for each country) in the 5th decile, Euro PPP, EUROMOD 1998

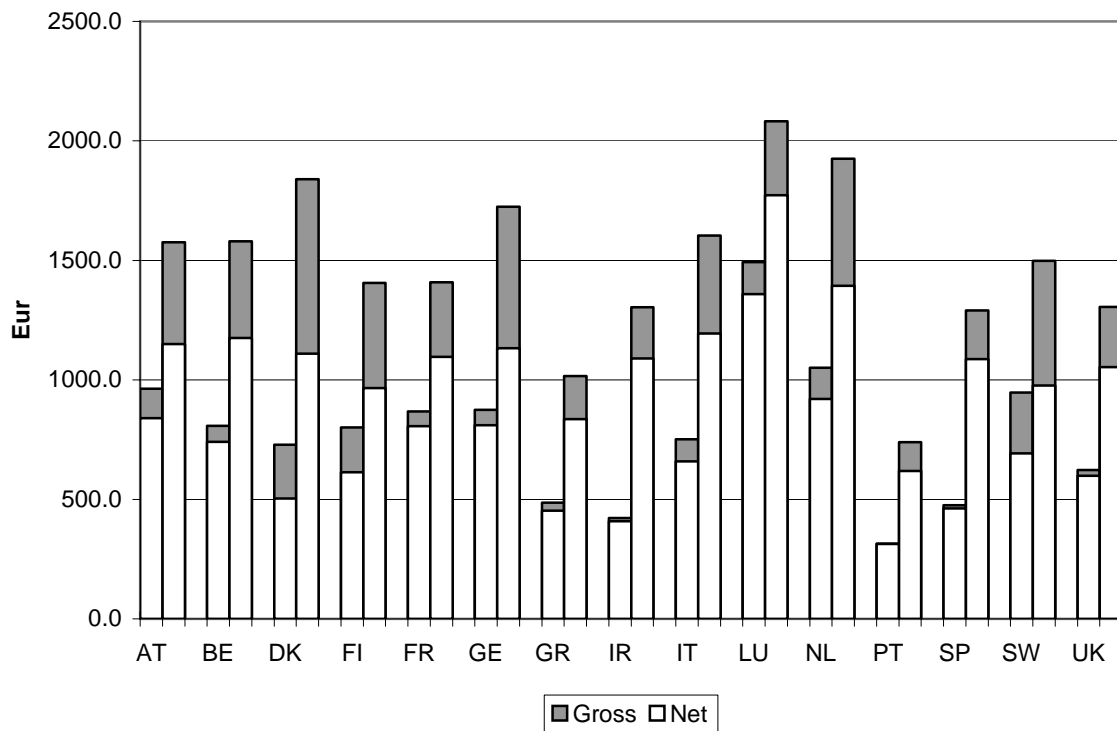


Figure 5a: Taxes paid by pensioners and workers (left and right bar respectively for each country) as a % of individual gross income in the 9th decile, Euro PPP, EUROMOD 1998

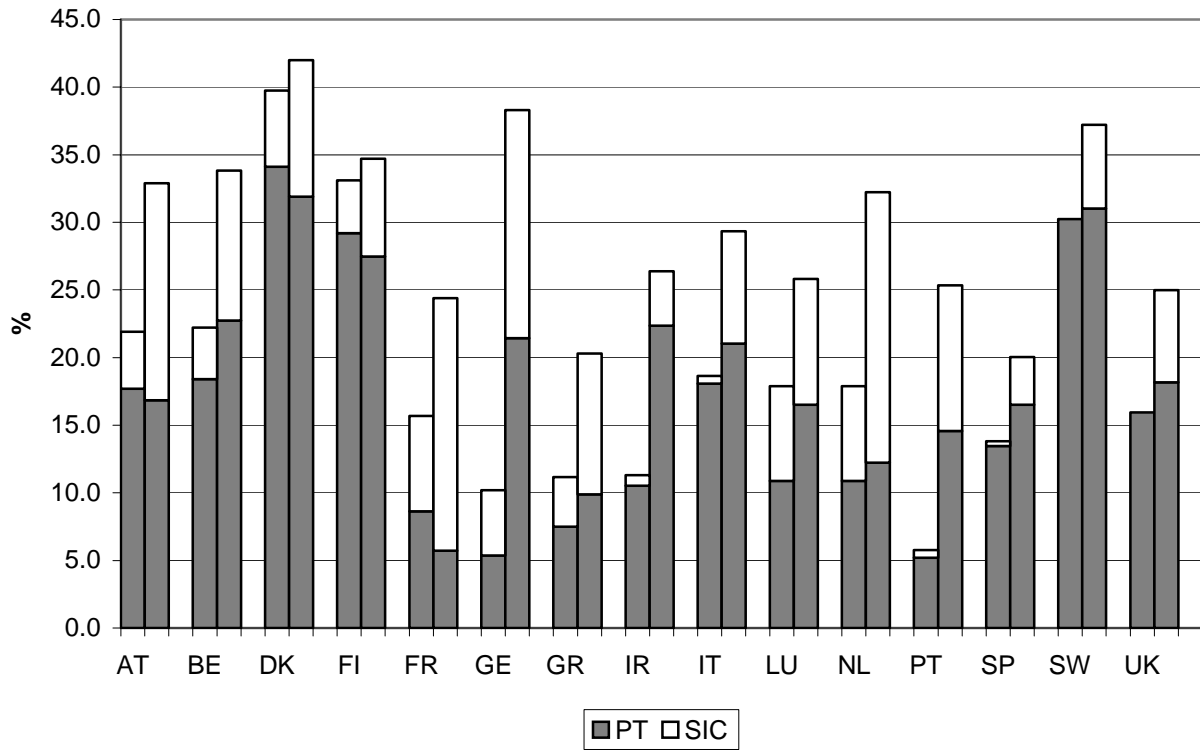


Figure 5b: Pensions and earnings (left and right bar respectively for each country) in the 9th decile, Euro PPP, EUROMOD 1998

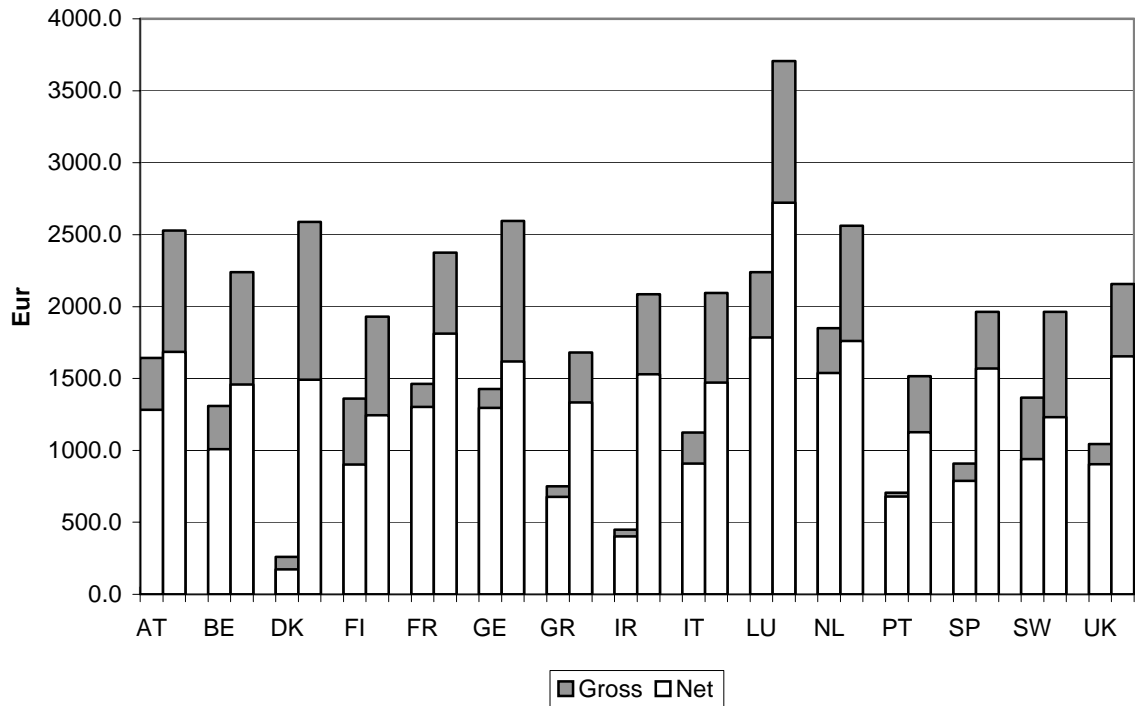


Figure 6a: Taxes paid by pensioners and workers (left and right bar respectively for each country) as a % of individual gross income in the 10th decile, Euro PPP, EUROMOD 1998

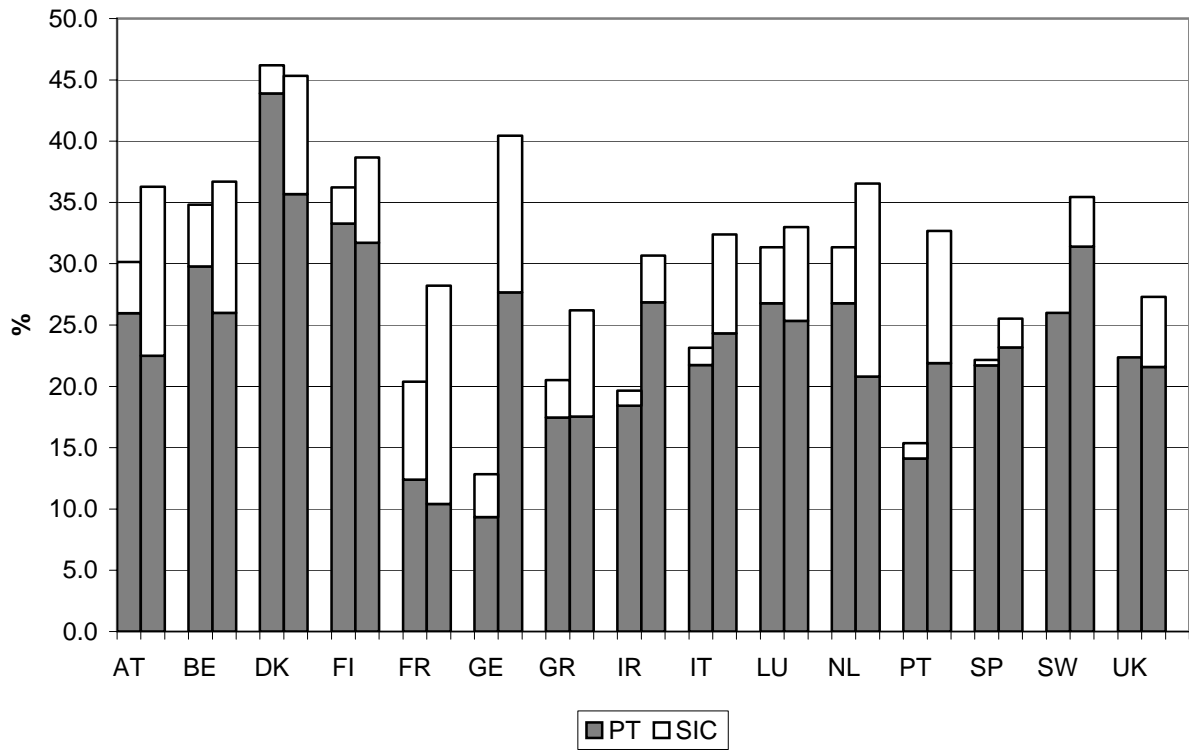
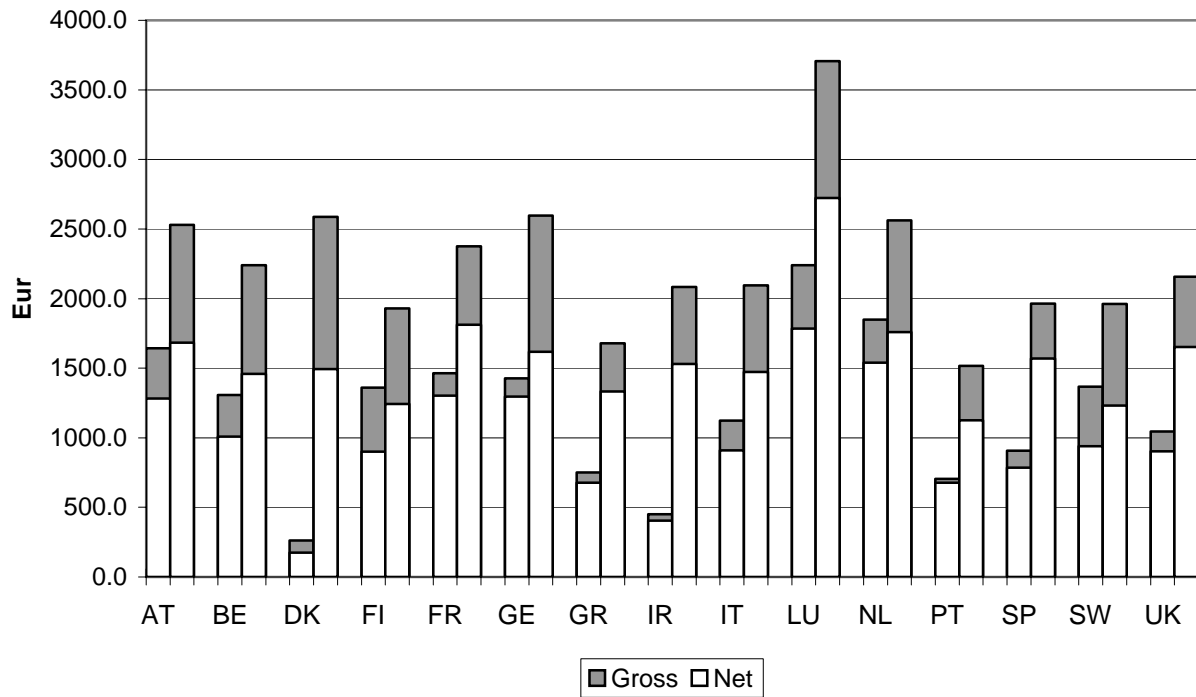


Figure 6b: Pensions and earnings (left and right bar respectively for each country) in the 10th decile, Euro PPP, EUROMOD 1998



5.6 Progressivity of taxes on pensions and earnings

In this section we compare inequality of income from work with inequality from pension income by calculating the Gini coefficient of these income categories. We also look at progressivity of taxes on these incomes by calculating the Kakwani index. Inequality of pre-tax income among workers is higher than pre-tax income inequality among pensioners in Denmark, Germany and Luxembourg (table 7). In all other countries the income distribution of workers is more compressed than that of pensioners.

Table 7: Gini of gross earnings, resp. gross pensions; and Kakwani index of personal taxes (PT) and social contributions (SIC) on earnings and pensions, EU-15, 1998.

	Earnings (W)			Pensions (P)		
	Gini Earnings	Kakwani PT on W	Kakwani SIC on W	Gini Pensions	Kakwani PT on P	Kakwani SIC on P
Austria	0.3006	0.2148	-0.0582	0.3777	0.3125	-0.0057
Belgium	0.2823	0.1501	-0.0004	0.3242	0.4365	0.3348
Denmark	0.2575	0.0532	-0.0429	0.2085	0.0511	-
Finland	0.2444	0.0706	0.0059	0.2917	0.2878	0.2232
France	0.2824	0.3436	-0.0301	0.3296	0.4078	0.2082
Germany	0.2950	0.1267	-0.0427	0.2724	0.5618	-0.0690
Greece	0.3553	0.2963	-0.0723	0.4510	0.2544	0.0000
Ireland	0.3241	0.1533	-0.0318	0.3369	0.4652	-
Italy	0.3100	0.1022	-0.0695	0.3492	0.2602	-
Luxembourg	0.3334	0.3011	-0.0644	0.2569	0.3192	-0.0053
Netherlands	0.2627	0.2609	-0.0477	0.2794	0.4330	-0.1441
Portugal	0.3993	0.2716	0.0000	0.4282	0.4365	-
Spain	0.3570	0.1869	-0.1672	0.3702	0.4017	-
Sweden	0.2413	0.0640	-0.0669	0.2778	0.1435	-
UK	0.3145	0.1113	-0.0423	0.3226	0.4498	-

Source: EUROMOD

Personal taxes on earnings are most progressive in France (Kakwani of 0.3436) and least progressive, rather proportional in Denmark (Kakwani of 0.0532). This conforms to the general progressivity indices calculated for all individuals (see Verbist, 2004). Social insurance contributions on earnings are more or less proportional in all countries. Only Spain has a more pronounced regressive effect, mainly due to its upper bound for SIC liability. Personal taxes on pensions are most progressive in Germany, and they are far more progressive than taxes on work, mainly because of the extensive tax relief granted to pensioners. Also for old age individuals, taxes are the least progressive, i.e. proportional in Denmark. Social insurance contributions on pensions are progressive in Belgium, Finland and France, whereas in the Netherlands they are regressive.

In section 5.3 we have presented the average tax rate on the separate income components; here we have calculated the resp. Kakwani indices. In Verbist (2004) we found a negative relationship between the average tax rate and progressivity of taxes. This also applies, and even stronger, for personal taxes on these separate income components. The correlation coefficient between average tax rate and progressivity of taxes on income from work is -0.90 (significant at 0.001 level), whereas for pensions it is -0.84 (significant at 0.001 level). There is no significant relationship between the average SIC rate and progressivity for either of the income components.

6 Taxes and unemployment benefits

In this section we compare the income position of the unemployed with that of workers. We first look at the relative income position of the unemployed. Next, we compare their average gross and net incomes with that of workers, as well as the weight of personal taxes and social security contributions in the transition from gross to net income. We then investigate the effect of taxes on income from work and unemployment benefits specifically. In the last two sections we present the distributional characteristics of taxes paid by workers and the unemployed. As we have already said in section 3, Luxembourg is excluded from the analysis due to a too small number of unemployed in the sample.

6.1 Relative income position of unemployed

Analogously to our analysis of old age individuals, we present the replacement rates of the unemployed with respect to the entire population and workers (table 8). The pattern is quite similar. Also for the unemployed the net replacement rate is higher than the gross replacement rate in all countries. This is irrespective of the fact of the denominator is income of all individuals or income of workers only. The difference between gross and net rates is biggest for Germany (around 14%), and this according to both measures. The difference is much smaller in Denmark, Italy, the Netherlands and Sweden. The difference between gross and net replacement rates for unemployed is however considerably smaller than was the case for old age individuals.

Table 8: Average income of unemployed as a % of average income of workers and average income of all individuals.

Country	income all individuals			income worker		
	gross	net	difference gross - net	gross	net	difference gross - net
Austria	93.1	106.5	13.3	53.7	63.9	10.2
Belgium	95.5	108.0	12.6	45.4	55.9	10.6
Denmark	119.8	122.3	2.5	70.4	74.7	4.4
Finland	90.0	98.4	8.4	45.2	52.9	7.7
France	76.6	84.1	7.5	40.3	46.5	6.2
Germany	80.5	94.9	14.5	42.0	56.3	14.3
Greece	62.2	69.1	6.9	27.7	31.6	3.9
Ireland	77.1	90.1	13.0	29.7	37.6	7.9
Italy	21.9	24.4	2.5	11.3	13.1	1.8
Netherlands	69.4	72.4	2.9	36.8	39.9	3.0
Portugal	64.5	74.1	9.6	32.8	39.9	7.1
Spain	67.5	73.3	5.8	24.3	27.2	2.9
Sweden	104.9	107.6	2.6	60.2	66.6	6.4
UK	52.1	61.5	9.4	27.6	34.5	6.9

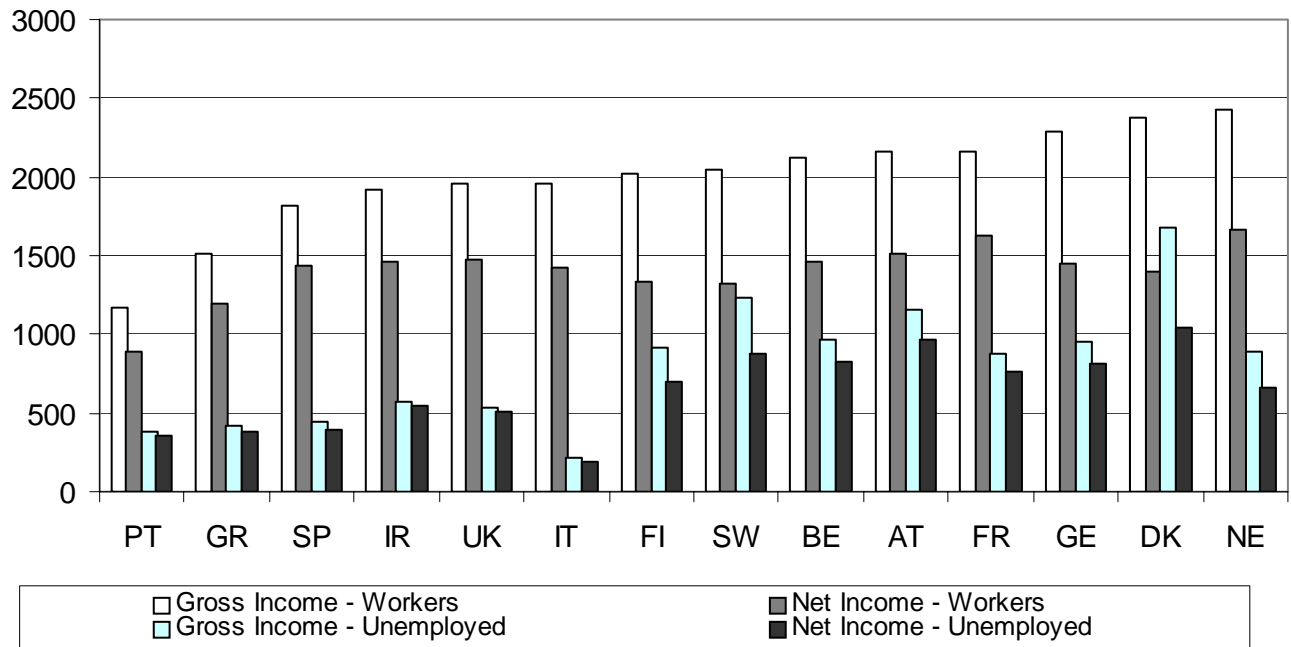
Source: EUROMOD

6.2 Gross and net incomes of unemployed and workers

Figure 7 compares the average amounts of income from workers and unemployed (in Euro purchasing power parities, see appendix 1b). Southern Europe, Ireland and the UK have the lowest average income of unemployed. There is a middle group

including France, the Netherlands, Finland, Belgium and Germany. Income of the unemployed is on average relatively high in Austria, Sweden and especially Denmark.

Figure 7: Average gross and net income of workers and unemployed in the EU, 1998, amounts in Euro PPP.



Source: EUROMOD

6.3 Taxes paid by unemployed and earners

In this section we compare the relative tax burden of the unemployed with that of workers. The difference between the two categories varies considerably among countries.

Table 9: Taxes and social insurance contributions paid by workers and unemployed as a % of their gross income, EU, 1998

	Earners			Unemployed		
	Total taxes	PT	SIC	Total taxes	PT	SIC
Austria	30.2	14.6	15.6	16.9	5.7	11.2
Belgium	30.9	20.0	10.9	14.8	9.7	5.1
Denmark	41.0	30.9	10.1	37.4	30.6	6.8
Finland	34.1	27.1	7.0	23.1	18.9	4.2
France	24.6	6.0	18.6	13.0	3.0	10.0
Germany	36.5	19.5	17.0	15.0	5.6	9.4
Greece	21.0	9.9	11.1	9.7	6.4	3.3
Ireland	24.0	20.2	3.8	3.8	2.8	1.0
Italy	27.3	19.0	8.3	15.4	10.7	4.7
Netherlands	31.2	11.6	19.6	26.0	7.0	19.0
Portugal	23.6	12.9	10.7	6.9	2.7	4.2
Spain	20.4	16.7	3.7	10.8	5.9	4.9
Sweden	35.6	30.0	5.6	28.8	23.1	5.7
UK	24.3	17.8	6.5	5.5	4.2	1.3

Source: EUROMOD

As was the case for old age individuals, unemployed individuals pay on average less taxes than earners (though the average tax rate for the unemployed is still relatively high in Denmark, the Netherlands and Sweden). The difference between earners and the unemployed is most pronounced in the case of social insurance contributions. But also for personal taxes the difference is quite big in Austria, Belgium, Germany, Ireland, Portugal, Spain and the UK. In most of these countries, unemployment benefits are tax exempt or can benefit from a special tax relief.

6.4 Taxes paid on unemployment benefits and earnings

For most workers total income is made up of earnings. As we have seen in section 3, this is not the case for the unemployed: gross unemployment benefits in almost all countries make up less than half of gross income. So the results in the previous section tell us little about the tax burden on unemployment benefits in particular. Therefore, we have tried to isolate taxes on this type of benefits, in order to identify the effects of the tax system on this income component. Table 10 expresses personal taxes and social contributions on earnings and on unemployment benefits as a percentage of the individual's income component.

Table 10: PT and SIC on earnings as a % of gross earnings (only earners), and PT and SIC on unemployment benefits (UB) as a % of gross unemployment benefits (only unemployed), EU, 1998

	Earnings			UB		
	Taxes	SIC	Net earnings	Taxes	SIC	Net UB
Austria	15.0	13.8	71.2	0.0	0.0	100.0
Belgium	20.9	11.6	67.5	5.8	0.0	94.2
Denmark	31.3	10.5	58.2	28.8	2.5	68.7
Finland	27.9	7.6	64.5	20.1	1.4	78.5
France	4.5	19.7	75.9	0.9	1.5	97.6
Germany	18.8	17.7	63.5	0.0	0.0	100.0
Greece	9.8	11.5	78.7	4.9	0.0	95.1
Ireland	20.5	4.0	75.6	0.0	0.0	100.0
Italy	19.0	8.9	72.1	10.3	0.0	89.7
Netherlands	11.2	19.4	69.5	7.0	20.3	72.7
Portugal	13.0	11.0	76.0	0.0	0.0	100.0
Spain	16.7	3.7	79.6	3.1	2.5	94.4
Sweden	31.3	6.2	62.5	26.0	6.9	67.0
UK	16.0	6.7	77.3	-0.7	0.0	100.7

Source: EUROMOD

The difference between gross and net earnings varies between 42% (in Denmark) and 20% (Spain). The range of variation is wider for unemployment benefits: between 33% (Sweden) and -0.7% (UK). Personal taxes are much lower on unemployment benefits than on earnings, except in Finland, Italy and Sweden. Social contributions on unemployment benefits are negligible, except in the Netherlands and Sweden.

6.5 Decile distributions

We only present here the results for the two lowest deciles, as the number of unemployed is rather small in the highest deciles. The highest tax burden for unemployed with a low income is found in Scandinavia and the Netherlands (see

figure 8). These are also the countries with the largest difference between gross and net unemployment benefits. In all other countries, gross and net unemployment benefits are (almost) the same for the 1st and 2nd decile.

6.6 Progressivity of taxes on unemployment benefits and earnings

In all countries, except Ireland, inequality is bigger for unemployment benefits than it is for earnings. In most countries where taxes are levied on unemployment benefits, these taxes are proportional. Only in France there is a stronger inclination towards progressivity and in Belgium towards regressivity. As France has a highly progressive personal income tax system it is not surprising that taxes on unemployment benefits also exhibit a more progressive pattern. The negative sign of the Kakwani index of taxes on UB in Belgium is somewhat surprising, as there is a tax credit for low unemployment benefits. This tax credit, however, decreases when the benefit is combined with earnings. As the lowest unemployment benefits are often combined with income from work, the tax credit does not or hardly applies for these groups, thus probably explaining the more regressive pattern of personal taxes.

Table 11: Gini (G) of earnings, resp. unemployment benefits; and Kakwani (K) w.r.t. to earnings resp. unemployment benefits, EU-15, 1998

	Earnings			UB		
	Gini Earnings	Kakwani Tax on W	Kakwani SIC on W	Gini UB	Kakwani Tax on UB	Kakwani SIC on UB
Austria	0.3006	0.2148	-0.0582	0.5626	-	-
Belgium	0.2823	0.1501	-0.0004	0.4913	-0.1222	-
Denmark	0.2575	0.0532	-0.0429	0.4072	0.0091	-0.0705
Finland	0.2444	0.0706	0.0059	0.5825	0.0124	0.0183
France	0.2824	0.3436	-0.0301	0.6013	0.1599	0.2359
Germany	0.2950	0.1267	-0.0427	0.4874	-	-
Greece	0.3553	0.2963	-0.0723	0.8521	0.0837	-
Ireland	0.3241	0.1533	-0.0318	0.2229	-	-
Italy	0.3100	0.1022	-0.0695	0.9046	0.0174	-
Netherlands	0.2627	0.2609	-0.0477	0.7803	0.0595	0.0085
Portugal	0.3993	0.2716	0.0000	0.6411	-	-
Spain	0.3570	0.1869	-0.1672	0.6441	0.0361	0.0792
Sweden	0.2413	0.0640	-0.0669	0.4792	0.0108	0.0028
UK	0.3145	0.1113	-0.0423	0.8939	0.0321	-

Source: EUROMOD

In most countries no SIC on unemployment benefits are levied. In those countries where they are, the distribution is proportional. Only in France, these contributions are progressive, and even much more than SIC on earnings, due to the progressive rate structure of the “Cotisation Sociale Généralisée” on unemployment benefits.

Figure 8a: Taxes paid by unemployed and workers (left and right bar respectively for each country) as a % of individual gross income in the 1st decile, Euro PPP, EUROMOD 1998

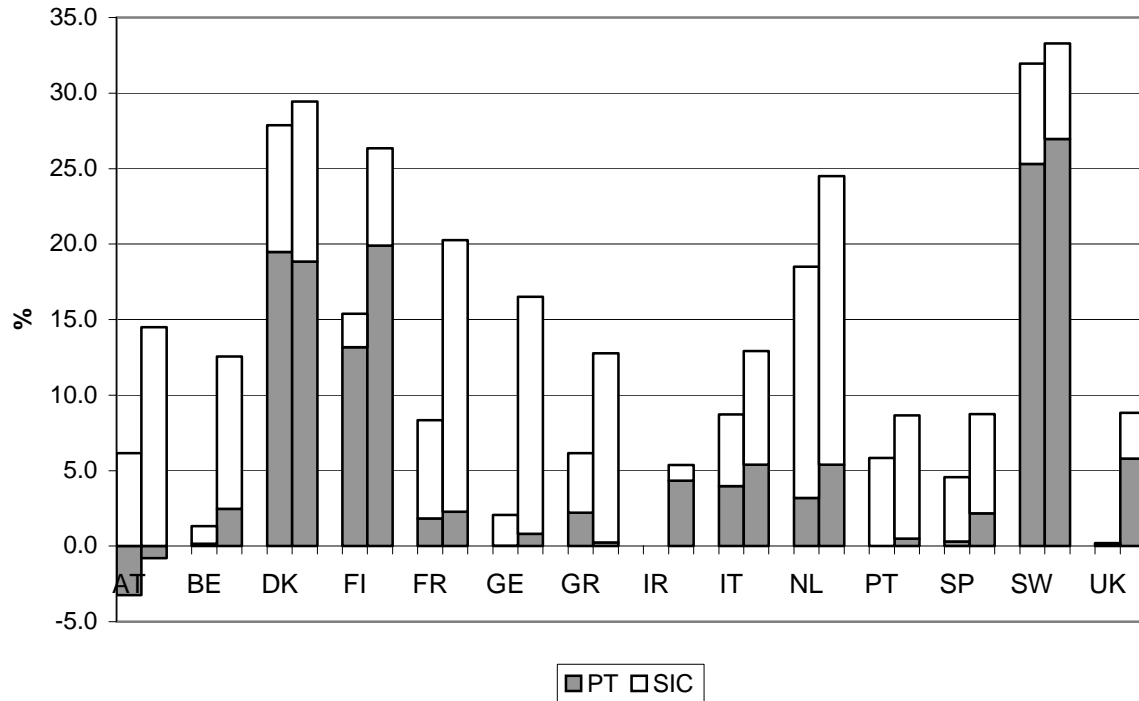


Figure 8b: Gross and net unemployment benefits and earnings (left and right bar respectively for each country) in the 1st decile, Euro PPP, EUROMOD 1998

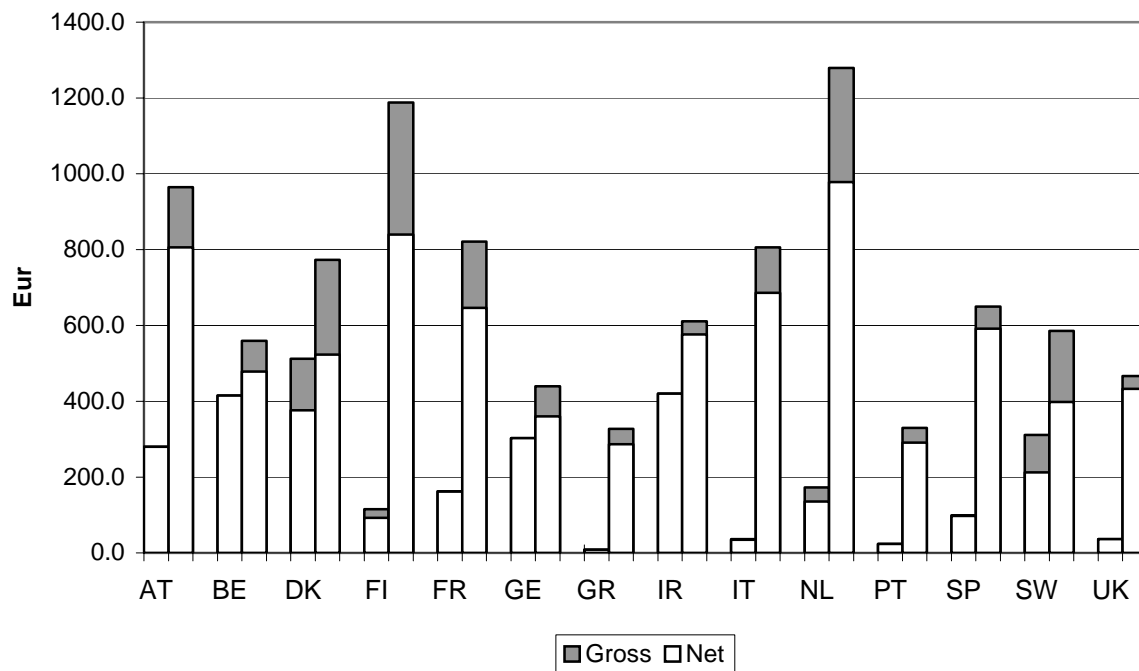


Figure 9a: Taxes paid by unemployed and workers (left and right bar respectively for each country) as a % of individual gross income in the 2nd decile, Euro PPP, EUROMOD 1998

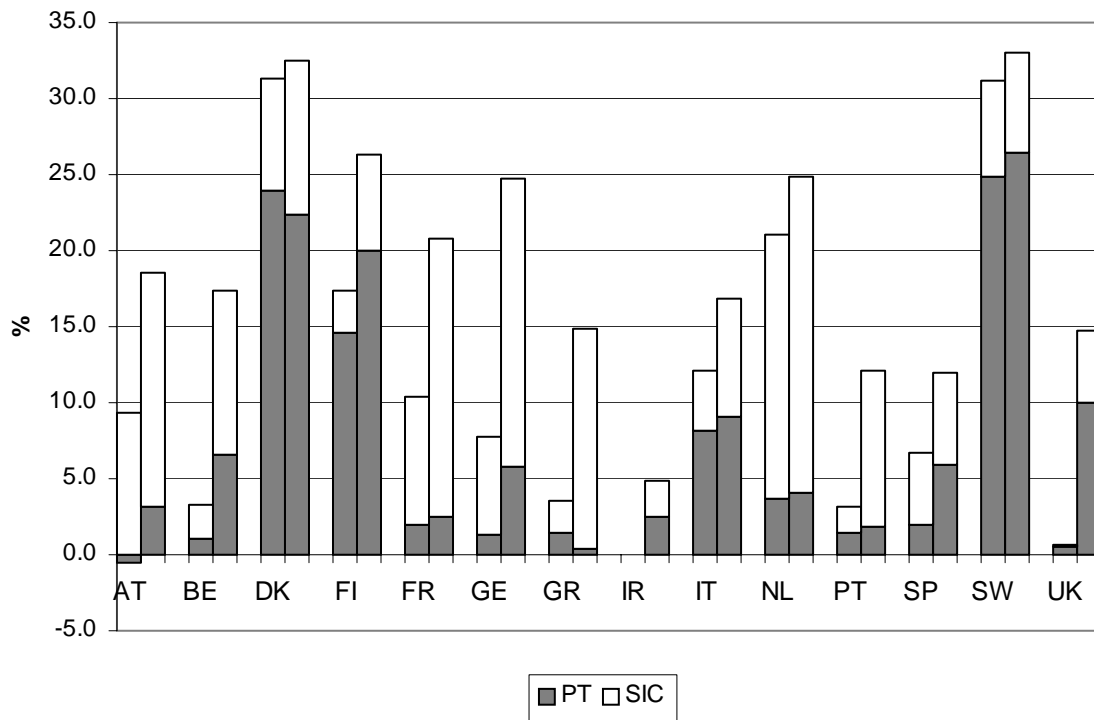
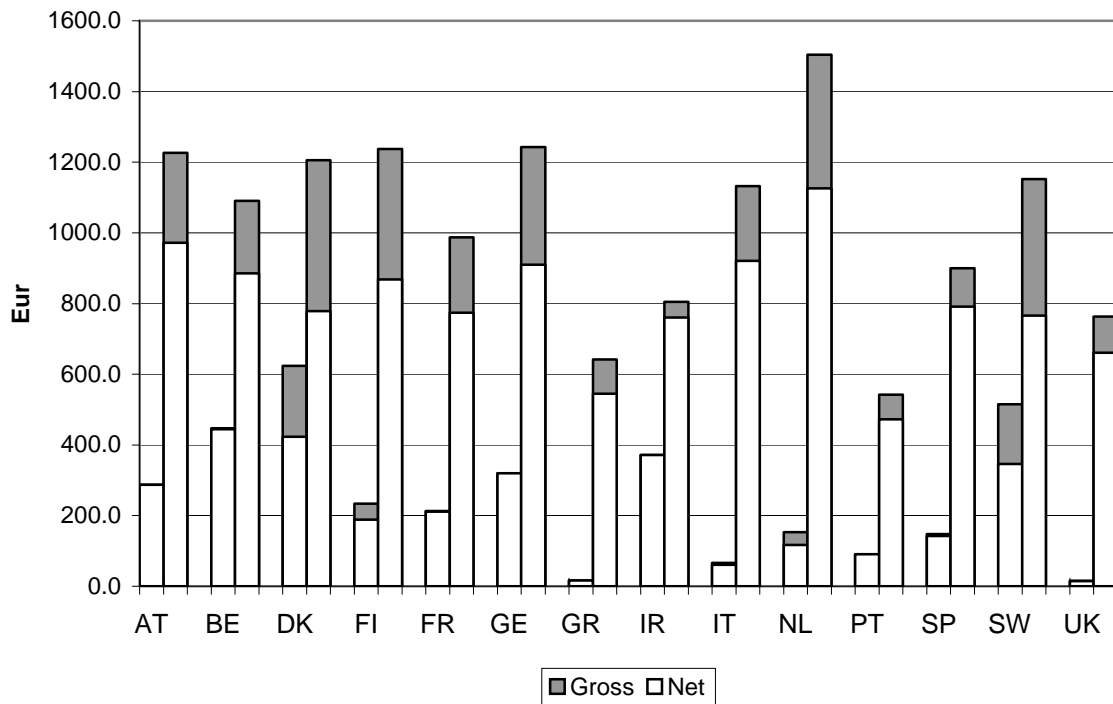


Figure 9b: Gross and net unemployment benefits and earnings (left and right bar respectively for each country) in the 2nd decile, Euro PPP, EUROMOD 1998



7 Is there a link between taxes on replacement incomes and the welfare state types?

In section 2 we have formulated the hypothesis that there may be a link between the way social benefits are treated in the tax system and the type of welfare state. Let us now investigate whether the results of the previous sections provide evidence to support this.

But before we do this, on the basis of the results in Verbist (2004) we can see if there is a relationship between the redistributive effect of personal taxes and social insurance contributions in general and the type of welfare state. Apparently, this is not the case. The results point to three different groups as regards their redistributive efforts through taxes: taxes are highly redistributive in Austria, Belgium, Denmark, Finland, Germany and Luxembourg. The redistributive effect of taxes is very low in France, Greece, Italy, Spain and Sweden. Ireland, the Netherlands, Portugal and the UK score somewhere in between. Consequently, it is not so that all Scandinavian countries have a high redistributive effect: Sweden is situated in the group with a low reduction of inequality through taxes. Maybe the strongest line is that almost all the Southern European countries have a low redistributive effect, with the exception of Portugal that is found in the moderate group. Maybe the situation is different if we focus on taxes on replacement incomes alone.

We expect that the *liberal welfare states*, in particular Ireland and the UK, have a low level of taxes on benefits. This should apply both for personal taxes and for social insurance contributions. As the welfare state in these countries relies more on the solidarity principle, no social security contributions should be due on either pensions or unemployment benefits, also because they are to some extent financed by general means rather than by social contributions. It is indeed the case that the gap between gross and net pensions is relatively small in Ireland and the UK, a.o. because no SIC are due on these income sources. The personal tax level is in general rather low in Ireland and the UK; if we add the old age allowance that is applied, to this fact, then we find a relatively low tax burden on pensions. This applies even more strongly for unemployment benefits: gross and net unemployment benefits are more or less equal, as they are (almost) exempt from social contributions and personal taxes. We also expected that taxes on replacement incomes would be more progressive than taxes on earnings, as the lowest incomes should not pay taxes as they are considered as minimum income provisions. It is indeed the case that taxes on pensions in Ireland and the UK are far more progressive than taxes on earnings. But also compared to other countries, progressivity of taxes on pensions is high: except for Germany, both countries have the highest Kakwani indices for taxes on pensions.

For the *social-democratic welfare states* we expect to find a high level of taxes on benefits, mainly consisting of personal taxes. We do not expect these taxes to be very progressive. This is also confirmed: the tax burden on pensions and unemployment benefits is highest in the Scandinavian countries, and almost entirely because of personal taxes. Progressivity of personal taxes on replacement income is quite similar to that on income from work in Denmark, but it is much higher in Finland and

Sweden, because of the existence of tax provisions for the elderly in these two countries

For the so-called *conservative welfare states* the picture is far less clear-cut. As these systems are in general insurance-based, we expect to find a tax burden on replacement incomes that consists of both personal taxes (at a level similar to that of earnings) and insurance contributions (at a lower level than those on earnings). For the same reason we also expect progressivity of these taxes to be similar to those on income from work. We found that the personal tax burden is rather similar for pensions and earnings in Austria, France, Luxembourg, the Netherlands and Italy. The tax burden on pensions is much lower in Belgium, Germany and the three other Southern European countries. Social insurance contributions on pensions are much lower than those on earnings for all countries (even zero in all Southern European countries except Greece). Personal taxes on unemployment benefits are rather low in most countries, except Italy and the Netherlands. Social insurance contributions are almost everywhere zero, with a big exception being the Netherlands. As regards progressivity: in general personal taxes are more progressive on pensions than on income from work (with a considerable difference for Austria, Belgium, Germany, Italy the Netherlands, Portugal and Spain). The reverse is true for unemployment benefits: personal taxes on unemployment benefits are far less progressive than taxes on income from work.

8 Conclusion

Summarising, we can draw the following observations and conclusions on the basis of our research on the relationship between taxes and replacement incomes in the EU-15.

1. On average old age pensions and unemployment benefits are taxed at a lower rate than income from work in all the EU-15 countries. There are three reasons for this. Firstly, gross income of old age and unemployed individuals is on average lower, and as personal income tax systems are progressive this will lead to a higher tax burden for workers. Secondly, some countries have special provisions in their personal income tax system for old age and for pension and unemployment income. Thirdly, pensioners and unemployed persons pay less in social insurance contributions than workers.
2. The average tax rate for pensioners at the lower end of the income distribution is very low in Belgium, Ireland, Italy, Portugal, Spain and the UK. This is due to the fact that no (or almost no) social insurance contributions have to be paid on the lowest pensions, and to special income tax provisions (tax allowance for old age in Ireland and the UK; tax credit for pension income in Belgium; tax deduction for pension income in Portugal). The tax burden for low income pensioners is highest in Luxembourg, the Netherlands, Finland, Sweden and especially Denmark; in the Scandinavian countries this is mainly due to local taxes, whereas in Luxembourg and the Netherlands social contributions are most important. For higher income groups, the tax burden of pensioners is much closer to that of workers.
3. In general, the tax burden at the lower end of the income distribution is much lower for the unemployed than for workers. The highest tax burden for unemployed with a low income is found in Scandinavia (local taxes) and the

Netherlands (social contributions), where we also find the largest difference between gross and net unemployment benefits. In all other countries gross and net unemployment benefits are (almost) the same in the lowest income deciles.

4. In most countries (except Denmark, Germany and Luxembourg) inequality of pre-tax income is higher for pensions than for earnings. Also progressivity of taxes on pensions is higher than that of taxes on earnings in most countries (the exceptions are Denmark and Greece). Personal taxes on pensions are most progressive in Germany and least (almost proportional) in Denmark. In the countries where taxes are levied on unemployment benefits, these tend to be proportional. Also social contributions on replacement incomes tend to be close to proportional (with the exception of SIC on pensions in Belgium, Finland, France and the Netherlands).
5. As we have seen that taxes on replacement incomes vary among countries, we try to determine whether these differences can be linked to the typology of welfare regimes of Esping-Andersen. To some extent, such a link can be established. In the *liberal welfare states* (Ireland and the UK) the overall tax rate on benefits is low, and almost zero for the lowest incomes. Consequently, progressivity of taxes on replacement incomes is much higher than for earnings, which fits with the solidarity principle and the importance of minimum income provisions in this type of welfare state. For the *social-democratic welfare states* (Scandinavia) we expected to find a high level of taxes (mainly personal taxes) on benefits and a low degree of progressivity; this was confirmed by our results. For the so-called *conservative welfare states* the picture is far less clear-cut. Because of the insurance principle, we expected to find for these countries a tax burden on replacement incomes that consists of both personal taxes (at a level similar to that of earnings) and insurance contributions (at a lower level than those on earnings) and a degree of progressivity that is similar to that of earnings. This is only partially confirmed by our results: the personal tax burden is rather similar for pensions and earnings in Austria, France, Luxembourg, the Netherlands and Italy (but lower for pensions in the other countries and for unemployment benefits in almost all of these countries); social insurance contributions on pensions and unemployment benefits are much lower than those on earnings for all countries (for some countries even zero). The degree of progressivity, however, differs quite a lot between replacement incomes and earnings in almost all these countries.

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Appendix 1a: EUROMOD datasets

Country	Base Dataset for EUROMOD	Date of collection	Reference time period for incomes
Austria	Austrian version of European Community Household Panel (W5)	1999	annual 1998
Belgium	Panel Survey on Belgian Households (W6)	1999	annual 1998
Denmark	European Community Household Panel (W2)	1995	annual 1994
Finland	Income distribution survey	1998	annual 1998
France	Budget de Famille	1994/5	annual 1993/4
Germany	German Socio-Economic Panel (W15)	1998	annual 1997
Greece	European Community Household Panel (W2)	1995	annual 1995
Ireland	Living in Ireland Survey (W1)	1994	month in 1994
Italy	Survey of Households Income and Wealth	1996	annual 1995
Luxembourg	PSELL-2 (W5)	1999	annual 1998
Netherlands	Sociaal-economisch panelonderzoek (W3)	1996	annual 1995
Portugal	European Community Household Panel (W3)	1996	annual 1995
Spain	European Community Household Panel (W3)	1996	annual 1995
Sweden	Income distribution survey	1997	annual 1997
UK	Family Expenditure Survey	1995/6	month in 1995/6

Source: Sutherland, 2001

Appendix 1b: Purchasing Power Parities

Country	Exchange rate (a)	PPP (b)	EURO PPP =(a)x(b)
Austria	13.76030	1.0568	14.54
Belgium	40.33990	0.9852	39.74
Denmark	7.51130	1.2374	9.29
Finland	5.94573	1.1782	7.01
France	6.55957	1.0434	6.84
Germany	1.95583	1.0629	2.08
Greece	340.75000	0.8016	273.15
Ireland	0.78756	0.9903	0.78
Italy	1936.27000	0.8814	1706.63
Luxembourg	40.33990	1.0147	40.93
Netherlands	2.20371	0.9505	2.09
Portugal	200.48200	0.7200	144.35
Spain	166.38600	0.8399	139.75
Sweden	8.80730	1.2249	10.79
UK	0.67833	1.0773	0.73

Appendix 2 Tables

Table A.1: Proportion of workers, old age individuals (65+) and unemployed in **entire** population (N=all individuals)

<i>Country (N)</i>	<i>Workers</i>	<i>Pensioners</i>	<i>Unemployed</i>
Austria (7386)	30.3	16.4	3.9
Belgium (7057)	26.1	17.4	7.6
Denmark (7044)	30.3	13.2	9.6
Finland (26902)	19.6	14.3	12.5
France (29158)	24.8	15.4	7.3
Germany (18722)	29.6	17.4	5.9
Greece (15062)	18.3	17.6	5.5
Ireland (14585)	20.3	10.9	10.6
Italy (23924)	21.8	16.4	6.9
Luxembourg (6566)	31.2	14.9	0.8
Netherlands (11035)	28.6	13.1	8.6
Portugal (14468)	27.5	14.7	3.0
Spain (18991)	18.1	16.5	10.1
Sweden (38756)	20.4	18.0	9.5
UK (16586)	30.9	15.1	3.9

Source: EUROMOD

Table A.2: Distribution of pensioners over deciles

	1	2	3	4	5	6	7	8	9	10
Austria	16.9	11.5	11.2	10.5	7.7	9.9	9.1	6.6	7.2	9.3
Belgium	13.0	15.8	16.9	13.9	10.7	8.7	5.5	6.4	4.6	4.6
Denmark	26.2	35.0	17.8	6.4	4.9	3.2	1.4	1.8	2.7	0.6
Finland	19.2	18.9	17.4	10.8	10.8	6.8	4.4	3.5	3.8	4.4
France	8.7	11.8	12.5	12.0	11.1	10.2	7.3	7.9	9.8	8.7
Germany	10.5	12.2	10.7	12.9	11.1	10.9	10.4	7.0	6.2	8.2
Greece	21.6	15.6	14.4	10.2	9.6	6.9	6.9	5.3	4.5	5.1
Ireland	0.8	24.4	20.2	20.4	8.0	6.8	6.5	5.6	3.8	3.4
Italy	5.2	13.1	12.3	11.3	11.1	11.7	9.5	8.7	8.7	8.4
Luxembourg	7.0	11.2	8.7	12.4	15.4	12.1	9.1	10.6	7.4	6.2
Netherlands	6.8	21.4	18.6	10.1	8.7	5.6	4.4	7.2	9.3	8.1
Portugal	18.8	18.5	13.2	7.5	8.0	7.2	7.7	6.8	5.6	6.7
Spain	4.7	13.6	15.9	12.6	13.6	11.6	8.7	7.7	6.5	5.0
Sweden	10.2	24.9	15.1	10.4	7.9	7.9	6.4	5.3	5.2	6.6
UK	9.9	12.7	19.0	14.9	12.1	9.3	7.2	6.0	4.4	4.5

Source: EUROMOD

Table A.3: Distribution of unemployed over deciles

	1	2	3	4	5	6	7	8	9	10
Austria	11.9	14.3	11.3	10.9	9.7	10.5	12.0	8.0	8.4	2.8
Belgium	12.1	13.7	12.2	11.8	11.7	10.6	11.0	6.3	6.7	3.8
Denmark	8.2	10.3	16.1	13.4	12.2	9.3	10.3	9.4	7.3	3.4
Finland	19.7	12.4	10.5	11.8	9.8	9.9	9.4	6.8	6.0	3.6
France	22.0	15.2	12.4	11.0	8.9	8.2	8.5	5.1	4.8	4.0
Germany	16.8	16.0	14.9	10.5	8.7	9.5	7.3	7.4	6.4	2.5
Greece	12.1	12.4	12.1	11.9	10.0	11.7	13.5	5.8	7.0	3.6
Ireland	22.6	16.2	18.0	11.5	9.3	6.9	5.3	5.4	3.3	1.6
Italy	32.8	17.5	10.3	9.8	7.8	6.4	5.7	3.2	3.9	2.5
Netherlands	21.2	13.2	10.6	10.2	10.2	7.3	8.3	7.1	6.5	5.3
Portugal	7.3	10.0	12.6	14.6	13.4	14.2	8.0	14.3	3.7	1.8
Spain	18.1	13.5	10.8	12.2	9.6	8.5	9.8	9.0	5.0	3.6
Sweden	13.0	10.6	13.3	12.7	10.6	10.4	10.5	9.1	6.6	3.1
UK	26.7	20.5	15.3	9.7	6.5	5.0	6.1	3.8	3.0	3.5

Source: EUROMOD

Table A.4: Personal taxes paid by old age individuals as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	0.8	4.7	5.8	8.0	8.9	10.0	11.8	14.6	17.7	26.0
Belgium	0.9	0.6	0.6	4.2	7.2	9.4	12.5	15.0	18.4	29.8
Denmark	22.1	22.9	23.6	25.9	29.3	31.4	28.7	31.8	34.1	43.9
Finland	5.4	11.4	14.8	18.4	19.7	21.2	25.2	25.8	29.2	33.3
France	4.5	3.3	3.6	5.4	6.1	6.2	7.0	7.7	8.6	12.4
Germany	0.0	0.0	0.1	0.4	0.1	0.4	0.9	2.2	5.4	9.4
Greece	1.7	2.0	1.4	2.6	3.3	3.5	3.7	5.8	7.5	17.5
Ireland	0.6	0.0	0.1	0.9	3.6	6.5	7.0	7.5	10.5	18.4
Italy	3.5	4.1	5.5	10.4	12.8	14.0	14.6	16.8	18.1	21.7
Luxembourg	0.2	2.3	2.7	3.7	3.8	4.2	5.4	6.3	10.9	26.8
Netherlands	2.1	2.3	2.7	3.7	3.8	4.2	5.4	6.3	10.9	26.8
Portugal	0.1	0.4	0.6	0.8	1.4	1.3	2.8	4.0	5.2	14.1
Spain	0.1	0.5	0.9	2.9	3.1	5.3	8.0	10.0	13.5	21.7
Sweden	15.3	14.6	23.7	25.1	26.3	26.6	27.1	27.7	30.2	26.0
UK	3.0	4.1	4.5	6.3	7.0	7.3	9.4	13.2	15.9	22.4

Source: EUROMOD

Table A.5: Personal taxes paid by workers as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	-0.8	3.2	5.8	9.5	9.3	11.6	12.0	14.3	16.8	22.5
Belgium	2.5	6.6	9.4	11.5	13.4	15.8	18.3	20.5	22.7	26.0
Denmark	18.8	22.3	25.3	27.4	27.7	28.7	30.1	30.1	31.9	35.7
Finland	19.9	19.9	21.4	21.5	22.3	24.2	25.0	26.2	27.5	31.7
France	2.3	2.5	2.9	3.2	3.5	3.4	3.9	4.6	5.7	10.4
Germany	0.8	5.8	8.3	11.4	14.3	16.5	17.5	19.8	21.4	27.7
Greece	0.2	0.4	1.1	2.5	3.6	5.4	6.8	8.2	9.9	17.5
Ireland	4.3	2.5	4.3	8.5	12.1	14.0	15.9	18.4	22.4	26.8
Italy	5.4	9.1	12.2	14.4	16.5	17.0	18.3	19.0	21.0	24.3
Luxembourg	0.3	0.7	1.6	2.9	3.1	6.7	9.8	12.1	16.5	25.3
Netherlands	5.4	4.1	4.5	5.2	6.8	7.6	9.3	8.4	12.2	20.8
Portugal	0.5	1.9	2.2	4.1	5.3	6.0	8.0	10.0	14.6	21.9
Spain	2.2	5.9	8.2	9.5	10.8	11.4	12.5	14.3	16.5	23.2
Sweden	27.0	26.5	27.0	27.2	27.8	28.5	28.7	30.0	31.0	31.4
UK	5.8	9.9	12.2	13.5	14.8	15.3	16.0	16.8	18.2	21.6

Source: EUROMOD

Table A.6: Personal taxes paid by unemployed as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	-3.2	-0.5	1.4	3.5	5.5	7.6	6.2	12.9	4.7	21.2
Belgium	0.2	1.1	1.8	6.1	12.2	13.7	13.3	15.0	15.4	17.0
Denmark	19.5	24.0	26.0	25.1	27.1	27.9	28.6	29.1	30.6	50.6
Finland	13.2	14.6	17.1	18.0	19.1	20.4	21.0	22.2	22.3	24.0
France	1.8	2.0	2.1	2.4	2.9	2.7	3.6	3.6	4.2	5.8
Germany	0.0	1.3	2.4	4.4	5.8	4.9	8.4	8.4	12.6	12.4
Greece	2.2	1.4	4.0	2.2	2.4	2.2	3.5	6.3	12.7	17.0
Ireland	0.0	0.0	0.0	0.1	1.0	3.9	4.4	8.1	9.9	18.7
Italy	4.0	8.2	13.2	12.4	13.6	15.3	14.0	21.8	19.1	17.1
Luxembourg										
Netherlands	3.2	3.7	3.6	4.6	5.1	5.8	8.4	6.6	10.0	16.9
Portugal	0.0	1.5	0.1	0.7	0.5	2.9	2.9	3.5	11.0	1.6
Spain	0.3	2.0	4.0	4.3	4.6	5.4	6.5	9.8	10.3	11.7
Sweden	25.3	24.9	24.4	22.3	21.8	21.3	23.5	21.2	24.4	23.5
UK	0.1	0.6	0.8	4.5	4.4	8.5	7.2	9.2	12.9	15.4

Source: EUROMOD

Table A.7: SIC paid by old age individuals as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	3.7	3.5	3.4	3.6	3.6	3.5	3.4	3.4	4.2	4.2
Belgium	0.1	0.5	1.0	1.2	2.2	2.9	2.9	3.5	3.8	5.0
Denmark	0.1	0.1	0.5	0.7	1.6	2.3	2.5	6.2	5.6	2.3
Finland	1.0	2.3	2.8	3.3	3.2	3.4	3.6	3.5	3.9	2.9
France	0.9	1.7	3.8	4.8	5.3	5.8	6.0	6.6	7.0	8.0
Germany	6.7	6.9	7.0	6.8	7.0	6.6	6.5	6.2	4.8	3.5
Greece	4.1	4.1	4.1	4.1	4.1	3.7	3.8	4.5	3.7	3.0
Ireland	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.6	0.8	1.2
Italy	0.1	0.1	0.1	0.1	0.0	0.3	0.6	0.4	0.6	1.4
Luxembourg	2.5	11.0	11.1	9.7	8.7	8.9	7.0	7.4	7.0	4.6
Netherlands	11.2	11.0	11.1	9.7	8.7	8.9	7.0	7.4	7.0	4.6
Portugal	0.1	0.5	0.3	0.4	1.6	1.1	1.5	1.1	0.6	1.2
Spain	0.8	0.5	0.2	0.3	0.1	0.1	0.5	0.3	0.4	0.4
Sweden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: EUROMOD

Table A.8: SIC paid by workers as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	14.5	15.3	15.6	16.2	16.4	16.5	16.7	16.4	16.0	13.8
Belgium	10.1	10.7	10.8	10.9	10.9	10.9	11.0	10.9	11.1	10.7
Denmark	10.6	10.2	10.4	10.4	10.4	10.4	10.3	10.4	10.1	9.7
Finland	6.4	6.4	6.6	6.6	6.8	7.0	7.1	7.2	7.2	7.0
France	18.0	18.2	19.0	19.6	19.3	19.1	19.0	19.0	18.7	17.8
Germany	15.7	19.0	19.2	19.5	19.4	19.1	18.6	18.5	16.9	12.8
Greece	12.5	14.5	15.8	15.3	14.0	12.6	11.4	11.6	10.4	8.7
Ireland	1.0	2.3	3.0	3.5	3.8	3.7	3.9	3.9	4.0	3.8
Italy	7.5	7.7	8.0	8.3	8.4	8.5	8.5	8.5	8.3	8.1
Luxembourg	10.6	11.1	10.8	11.0	10.6	10.2	10.2	9.8	9.3	7.6
Netherlands	19.1	20.8	21.1	21.4	21.3	21.2	20.7	21.8	20.0	15.7
Portugal	8.2	10.3	10.1	10.7	10.8	10.8	10.8	10.8	10.8	10.8
Spain	6.6	6.0	5.3	5.1	4.9	4.9	4.7	4.3	3.5	2.3
Sweden	6.3	6.5	6.4	6.6	6.7	6.5	6.6	6.5	6.2	4.1
UK	3.0	4.8	5.7	6.4	6.9	6.9	7.0	7.0	6.8	5.7

Source: EUROMOD

Table A.9: SIC paid by unemployed as a % of their gross income per decile, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	6.2	9.3	10.2	9.0	12.4	14.1	12.7	13.9	8.7	13.7
Belgium	1.2	2.2	1.9	3.5	5.6	5.8	8.0	7.6	6.9	7.6
Denmark	8.4	7.4	6.4	7.3	8.2	7.9	7.7	8.0	8.4	2.6
Finland	2.2	2.8	4.1	4.0	4.3	4.8	5.2	5.1	5.4	4.6
France	6.5	8.3	9.5	9.6	9.6	10.8	11.4	13.6	12.7	11.7
Germany	2.0	6.4	9.1	11.7	11.3	10.9	11.8	10.4	10.9	9.6
Greece	4.0	2.2	4.0	4.6	4.6	3.1	2.7	3.6	2.7	3.4
Ireland	0.0	0.1	0.2	0.4	1.1	1.8	1.9	3.0	2.3	2.6
Italy	4.7	3.9	3.6	4.1	4.5	5.4	5.0	5.8	6.7	4.2
Luxembourg										
Netherlands	15.3	17.4	17.2	19.6	19.4	21.5	20.5	22.6	21.8	17.9
Portugal	5.8	1.6	2.5	3.4	5.0	5.3	5.4	4.4	3.1	1.4
Spain	4.3	4.8	4.9	4.9	4.4	4.8	5.4	5.0	5.2	4.7
Sweden	6.6	6.3	6.2	5.6	5.5	5.4	5.7	5.1	5.8	4.3
UK	0.1	0.2	0.2	1.8	1.3	2.4	2.1	3.4	3.4	4.0

Source: EUROMOD

Table A.10: Gross pensions per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	554	687	822	911	963	1001	1115	1346	1643	2725
Belgium	241	538	675	715	808	911	1041	1095	1308	2035
Denmark	600	676	676	698	729	570	467	233	261	771
Finland	478	590	658	733	801	897	1052	1050	1360	1710
France	455	528	704	776	867	940	1129	1287	1463	2192
Germany	393	610	744	851	874	973	1084	1209	1427	1738
Greece	110	264	381	400	486	533	570	667	751	894
Ireland	272	357	382	403	422	368	467	474	451	520
Italy	388	437	469	637	751	795	863	978	1123	1615
Luxembourg	834	940	1211	1330	1493	1533	1763	1810	2239	2384
Netherlands	693	774	870	1008	1051	1184	1158	1639	1850	3030
Portugal	188	238	282	326	315	383	437	497	705	1035
Spain	262	315	409	462	476	561	619	721	907	1307
Sweden	506	600	805	881	946	1015	1084	1221	1367	1714
UK	377	431	464	549	622	657	784	971	1045	1574

Source: EUROMOD

Table A.11: Net pensions per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	530	628	740	799	839	857	932	1088	1281	1921
Belgium	240	533	665	680	740	796	879	884	1009	1294
Denmark	464	511	501	507	504	391	329	178	175	457
Finland	451	509	538	575	613	667	746	745	901	1057
France	453	521	672	728	806	872	1036	1165	1303	1846
Germany	364	565	690	789	810	903	1004	1113	1296	1550
Greece	105	251	363	376	453	495	530	607	677	757
Ireland	271	357	382	399	408	349	433	436	404	407
Italy	381	424	449	574	659	686	737	815	909	1216
Luxembourg	809	897	1151	1234	1359	1375	1537	1532	1785	1736
Netherlands	603	669	744	872	920	1030	1023	1423	1539	2114
Portugal	188	238	282	326	314	382	434	490	678	929
Spain	262	313	406	449	462	531	569	650	787	1062
Sweden	436	497	606	653	692	737	780	867	939	1104
UK	377	431	461	536	598	621	725	865	903	1261

Source: EUROMOD

Table A.12: Gross earnings per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	964	1227	1403	1621	1576	1821	1874	2057	2529	3474
Belgium	559	1091	1295	1321	1581	1698	1810	2103	2239	2992
Denmark	773	1206	1537	1681	1839	2003	2198	2252	2588	3434
Finland	1188	1238	1333	1361	1406	1555	1662	1785	1930	2680
France	821	987	1070	1240	1408	1579	1772	2017	2375	3658
Germany	440	1243	1429	1635	1725	1941	2040	2259	2596	3525
Greece	328	642	803	996	1016	1235	1313	1487	1679	2511
Ireland	611	805	1021	1179	1304	1430	1612	1788	2085	2648
Italy	806	1132	1412	1466	1604	1564	1694	1792	2096	2769
Luxembourg	1276	1636	1904	1852	2082	2717	2886	3069	3706	5427
Netherlands	1279	1504	1651	1763	1926	1955	2165	2206	2562	3598
Portugal	330	542	584	627	740	756	898	1043	1515	2849
Spain	650	900	1067	1155	1290	1348	1416	1575	1964	3002
Sweden	586	1152	1300	1398	1498	1628	1682	1818	1963	2688
UK	466	764	981	1091	1306	1426	1596	1782	2158	3144

Source: EUROMOD

Table A.13: Net earnings per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	806	971	1069	1181	1150	1289	1321	1411	1684	2201
Belgium	479	885	1016	1009	1175	1222	1256	1412	1458	1825
Denmark	523	778	957	1017	1110	1199	1294	1330	1492	1876
Finland	839	868	924	942	966	1047	1108	1172	1244	1607
France	647	774	839	967	1097	1235	1378	1557	1812	2625
Germany	361	911	1013	1112	1133	1247	1304	1402	1617	2137
Greece	287	545	664	816	835	1009	1071	1189	1333	1844
Ireland	576	761	941	1032	1090	1170	1286	1385	1530	1822
Italy	686	921	1104	1120	1194	1160	1234	1295	1472	1843
Luxembourg	1111	1420	1649	1575	1773	2232	2285	2373	2723	3605
Netherlands	978	1126	1230	1296	1394	1404	1527	1556	1760	2326
Portugal	291	472	506	532	619	627	727	823	1126	1910
Spain	591	792	923	986	1088	1129	1172	1281	1570	2236
Sweden	398	766	854	913	976	1053	1087	1155	1231	1585
UK	433	661	822	901	1054	1140	1261	1390	1653	2320

Source: EUROMOD

Table A.14: Gross unemployment benefits per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	280	287	204	304	261	178	204	165	602	154
Belgium	416	447	410	458	330	367	241	283	342	243
Denmark	512	624	922	713	599	667	599	648	577	335
Finland	115	234	245	272	319	276	253	297	267	270
France	163	213	223	270	270	300	382	343	367	399
Germany	303	320	314	235	382	317	326	409	268	406
Greece	9	17	6	15	17	16	23	33	27	16
Ireland	420	371	351	356	330	317	317	283	303	286
Italy	36	67	42	42	27	70	91	14	33	58
Luxembourg										
Netherlands	173	154	182	195	208	311	265	276	383	814
Portugal	24	91	207	173	153	234	160	417	213	31
Spain	99	148	125	149	136	139	135	145	228	186
Sweden	311	515	535	408	368	389	398	443	404	394
UK	36	15	40	26	41	77	58	11	100	15

Source: EUROMOD

Table A.15: Net unemployment benefits per decile, Euro PPP, 1998.

	1	2	3	4	5	6	7	8	9	10
Austria	280	287	204	304	261	178	204	165	602	154
Belgium	415	444	401	437	296	327	214	240	302	214
Denmark	377	423	640	495	410	459	405	436	387	213
Finland	93	188	194	213	249	215	197	229	204	205
France	162	211	220	265	266	295	365	328	348	377
Germany	303	320	314	235	382	317	326	409	268	406
Greece	8	17	6	15	17	16	21	30	25	15
Ireland	420	371	351	356	330	317	317	283	303	286
Italy	34	60	36	37	23	59	79	13	26	51
Luxembourg										
Netherlands	136	117	138	146	157	224	192	195	264	535
Portugal	24	91	207	173	153	234	160	417	213	31
Spain	98	143	119	144	129	131	128	131	201	163
Sweden	213	346	357	274	246	262	265	295	267	260
UK	36	15	41	26	42	77	57	11	100	15

Source: EUROMOD

Appendix 3: Specifying taxes and social contributions on income components for the 15 EU-countries

We have chosen to use the ‘proportional method’ to attribute taxes to the income components. This means that taxes are attributed to income components for the proportion of these taxable components in taxable income.

In this appendix we explain which variables are included in the three income concepts and in the tax concepts:

- pensions
- unemployment benefits
- income from work
- personal income taxes
- social insurance contributions (SIC)

1 AUSTRIA

The denominator for PIT is **denom** = ytaxable + deductions + allowances, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

1.1 Pensions (=Pen)

- a) $pen = at_iben_minpen + at_iben_minpenCS + at_iben_penChBon + at_iben_penChBonCS + atCIVPEN + atEARPEN + atINVPEN + atSIBPEN + atSPCPEN + atSURPEN + coPRVPEN$ (all taxable, except part of coPRVPEN)
- b) taxes on pen = tax * pen / denom
- c) Social insurance contributions paid on pensions:
 $pensic = at_eesic_ASVG_hipen + at_eesic_BKUVG_hi * ((spec_pen + pubpen) / (B-KUVG_base + spec_pen\&empty + spec_pen + pubpen)) + (co_pi_eesic - at_eesic_ASVG_pi) * ((pubpen + CSPubpen) / (empty + pubpen + CSPubpen))$

1.2 Unemployment benefits (=UB)

- a) $UB = atUNEMPB + atUNEMPY$
- b) taxes on unemployment benefits = 0
- c) SIC on UB: $UBsic = 0$

1.3 Income from work (=Workinc)

- a) $workinc = coEMPY + atCOMP$
- b) taxes on income from work = tax * workinc / denom
- c) SIC paid on income from work:
 $= at_eesic_ASVG_pi + at_eesic_ASVG_hi + at_eesic_ui + at_eesic_housing + at_eesic_union + (co_pi_eesic - at_eesic_ASVG_pi) * (empty / (empty + pubpen + CSPubpen)) + at_eesic_BKUVG_hi * ((B-KUVG_base + spec_pen\&empty) / (B-KUVG_base + spec_pen\&empty + spec_pen + pubpen))$

2 BELGIUM

The denominator for PIT is **denom** = ytaxable + deductions, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

2.1 Pensions (=Pen)

- a) $\text{pen} = \text{beANTPEN} + \text{beOTHPEN} + \text{beRETPEN} + \text{beSURPEN}$ (all taxable)
- b) taxes on pen = $\text{tax} * \text{pen} / \text{denom}$
- c) SIC on pensions : $\text{pensic} = \text{be_eesic_hipen}$

2.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{beUNEMPY}$
- b) taxes on unemployment benefits = $\text{tax} * \text{UB} / \text{denom}$
- c) SIC on UB: $\text{UBsic} = 0$

2.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) taxes on income from work = $\text{tax} * \text{workinc} / \text{denom}$
- c) SIC on income from work: $\text{WorkSIC} = \text{be_eesic_hi} + \text{be_eesic_pi} + \text{be_eesic_ui}$

3 DENMARK

The denominator for PIT is **denom** = ytaxable + deductions, and Personal income taxes to be apportioned are **tax** = co_nat_inctax + dk_it_loc

3.1 Pensions (=Pen)

- a) $\text{pen} = \text{dk_sben_OldPen} + \text{dkATPPEN} + \text{dkSURPEN}$ (all taxable)
- b) taxes on pen = $\text{tax} * \text{pen} / \text{denom}$
- c) SIC on pensions : $\text{pensic} = 0$

3.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{dk_iben_ue}$ (taxable)
- b) taxes on unemployment benefits = $\text{tax} * \text{UB} / \text{denom}$
- c) SIC on UB: $\text{UBsic} = (\text{dk_eesic_atp} + \text{dk_eesic_pen}) * \text{UB} / (\text{UB} + \text{coEMPY})$

3.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) taxes on income from work = $\text{tax} * \text{workinc} / \text{denom}$
- c) SIC on income from work: $\text{WorkSIC} = \text{dk_eesic_ue} + \text{dk_eesic_gen} + ((\text{dk_eesic_atp} + \text{dk_eesic_pen}) * \text{coempy} / (\text{UB} + \text{coEMPY}))$

4 FINLAND

The denominator for PIT is **denom1** = ytaxable + deductions, and
Personal income taxes to be apportioned are **tax1** = co_nat_inctax + fi_it_local + fi_it_church
The denominator for SIC is **denom2** = local_taxbase + fi_both_all + fi_local_all, and
Personal income taxes to be apportioned are **tax2** = fi_eesic_sickness

4.1 Pensions (=Pen)

- a) pen = coPRVPEN + fi_benpen (all taxable)
- b) taxes on pen = tax1 * pen / denom1
- c) SIC on pensions : pensic = tax2 * pen / denom2

4.2 Unemployment benefits (=UB)

- a) UB = fiBENbub + fiBENeub (taxable)
- b) taxes on unemployment benefits = tax1 * UB / denom1
- c) SIC on UB: UBsic = tax2 * UB / denom2

4.3 Income from work (=Workinc)

- a) workinc = coEMPY
- b) taxes on income from work = tax1 * workinc / denom1
- c) SIC on income from work: WorkSIC = fi_eesic + (tax2 * Workinc / denom2)

5 FRANCE

The denominator for PIT is **denom** = ytaxable + deductions, and
Personal income taxes to be apportioned are **tax** = co_nat_inctax

5.1 Pensions (=Pen)

- a) pen = coPRVPEN + frBENINV + frPEN + frPENRVS + frPREPEN (all taxable)
- b) taxes on pen = tax * pen / denom
- c) SIC on pensions : pensic = fr_eesic_pen_csg + fr_eesic_pen_cm + fr_eesic_pen_crds + fr_eesic_pen_css

5.2 Unemployment benefits (=UB)

- a) UB = coMATERY + frGRCHO (taxable)
- b) taxes on unemployment benefits = tax * UB / denom
- c) SIC on UB: UBsic = fr_eesic_cho_csg + fr_eesic_cho_crds + fr_eesic_cho_retrcomp + fr_eesic_cho_css

5.3 Income from work (=Workinc)

- a) workinc = coEMPY
- b) taxes on income from work = tax * workinc / denom
- c) SIC on income from work: WorkSIC = co_gen_eesic + fr_eesic_emp_crds + fr_eesic_emp_csg

6 GERMANY

The denominator for PIT is **denom** = ytaxable + deductions + allowances, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

6.1 Pensions (=Pen)

- a) $\text{pen} = \text{coPRVPEN} + \text{geBEN007} + \text{geBEN008} + \text{geBEN009} + \text{geBEN010} + \text{geBEN011} + \text{geBEN012} + \text{geBEN013} + \text{geBEN014} + \text{geBEN015} + \text{geBEN016} + \text{geBEN017}$ (only part of it is taxable)
- b) $\text{taxes on pen} = \text{tax} * (\text{ge_it_pension_earn} + \text{geBEN008} + \text{geBEN014}) / \text{denom}$
- c) Social insurance contributions paid on pensions:
 $\text{PenSic} = (\text{co_hi_eesic} + \text{co_di_eesic}) * (\text{ge_it_pension_earn} + \text{geBEN008} + \text{geBEN014}) / (\text{pen} + \text{reg_wages})$

6.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{geBEN001} + \text{geBEN002}$
- b) taxes on unemployment benefits = 0
- c) SIC on UB: $\text{UBsic} = 0$

6.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) $\text{taxes on income from work} = \text{tax} * \text{workinc} / \text{denom}$
- c) SIC paid on income from work: $\text{WorkSic} = (\text{co_pi_eesic} + \text{co_ui_eesic}) + \text{reg_wages} / (\text{pen} + \text{reg_wages}) * (\text{co_hi_eesic} + \text{co_di_eesic})$

7 GREECE

The denominator for PIT is **denom** = ytaxable + deductions + allowances, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

7.1 Pensions (=Pen)

- a) $\text{pen} = \text{coPRVPEN} + \text{gr_sben_oga_farmer} + \text{gr_sben_socpen} + \text{grben_oa} + \text{grben_si} + \text{grben_su}$ (all taxable)
- b) $\text{taxes on pen} = \text{tax} * \text{pen} / \text{denom}$
- c) Social insurance contributions paid on pensions: $\text{PenSic} = \text{gr_pesic}$

7.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{grBEN_UN}$ (taxable)
- b) $\text{taxes on unemployment benefits} = \text{tax} * \text{UB} / \text{denom}$
- c) SIC on UB: $\text{UBsic} = 0$

7.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) $\text{taxes on income from work} = \text{tax} * \text{workinc} / \text{denom}$
- c) SIC paid on income from work: $\text{WorkSic} = \text{gr_cssic} + \text{gr_eesic}$

8 IRELAND

The denominator for PIT is **denom** = ytaxable + deductions + allowances, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

8.1 Pensions (=Pen)

- a) $\text{pen} = \text{coPRVPEN} + \text{ir_benoan} + \text{ir_benocp} + \text{ir_benret} + \text{ir_benwnc}$ (all taxable)
- b) taxes on pen = $\text{tax} * \text{pen} / \text{denom}$
- c) Social insurance contributions paid on pensions: $\text{PenSic} = 0$

8.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{ir_benlua} + \text{ir_bensua} + \text{ir_benunb} + \text{irUNS}$
- b) taxes on unemployment benefits = 0
- c) SIC on UB: $\text{UBsic} = 0$

8.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) taxes on income from work = $\text{tax} * \text{workinc} / \text{denom}$
- c) SIC paid on income from work: $\text{WorkSic} = \text{co_gen_eesic}$

9 ITALY

The denominator for PIT is **denom** = ytaxable + deductions, and Personal income taxes to be apportioned are **tax** = it_inctax + it_it_productive_act

9.1 Pensions (=Pen)

- d) $\text{pen} = \text{coPRVPEN} + \text{it_sben_supp_pen1} + \text{it_sben_supp_pen2} + \text{it_sben_supp_pen3} + \text{it_sben_supp_pen5} + \text{it_sben_supp_pen6} + \text{it_sben_supp_pen7} + \text{it_sben_supp_pen8} + \text{itPEN1} + \text{itPEN2} + \text{itPEN3} + \text{itPEN5} + \text{itPEN6} + \text{itPEN7} + \text{itPEN8} + \text{itPENotp} + \text{itPENT14} + \text{itPENTX9}$ (all taxable)
- e) taxes on pen = $\text{tax} * \text{pen} / \text{denom}$
- f) Social insurance contributions paid on pensions: $\text{PenSic} = 0$

9.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{itBENcig} + \text{itBENcom} + \text{itBENmob}$
- b) taxes on unemployment benefits = $\text{tax} * \text{UB} / \text{denom}$
- c) SIC on UB: $\text{UBsic} = 0$

9.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) taxes on income from work = $\text{tax} * (\text{workinc} - \text{itTAXEVA}) / \text{denom}$
- c) SIC paid on income from work: $\text{WorkSic} = \text{co_gen_eesic}$

10 LUXEMBOURG

The denominator for PIT is **denom1** = ytaxable + deductions, and
Personal income taxes to be apportioned are **tax1** = co_nat_inctax
The denominator for SIC is **denom2** = coEMPY + coMATERY + pen + UB, and

10.1 Pensions (=Pen)

- a) $\text{pen} = \text{coPRVPEN} + \text{luPENDIS} + \text{luPENERP} + \text{luPENPRV} + \text{luPENPUB} + \text{luPENWPR} + \text{luPENWPU}$ (all taxable)
- b) $\text{taxes on pen} = \text{tax1} * \text{pen} / \text{denom1}$
- c) $\text{SIC on pensions : pensic} = \text{co_hi_eesic} * \text{pen} / \text{denom2}$

10.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{luUNEMPY}$ (taxable)
- b) $\text{taxes on unemployment benefits} = \text{tax1} * \text{UB} / \text{denom1}$
- c) $\text{SIC on UB: UBSic} = (\text{co_hi_eesic} + \text{co_pi_eesic}) * \text{UB} / \text{denom2}$

10.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) $\text{taxes on income from work} = \text{tax1} * \text{workinc} / \text{denom1}$
- c) $\text{SIC on income from work: WorkSIC} = (\text{co_hi_eesic} + \text{co_pi_eesic}) * \text{workinc} / \text{denom2}$

11 NETHERLANDS

The denominator for PIT is **denom1** = ytaxable + deductions + allowances, and
Personal income taxes to be apportioned are **tax** = co_nat_inctax
There are three denominators for apportioning SIC: 1) $\text{denomUIeesic} = \text{UIeesic_base}$
1) $\text{denomHieesic} = \text{ZFWeesic_base}$
2) $\text{denomPieesic} = \text{Pieesic_base} + \text{co_di_sesic} + \text{co_it_total_ded} + \text{co_it_total_tfa} + \text{coMAINT} + \text{nlMAINCY}$

11.1 Pensions (=Pen)

- a) $\text{pen} = \text{coPRVPEN} + \text{nl_sben_statePen} + \text{nl_sben_survben}$ (all taxable)
- b) $\text{taxes on pen} = \text{tax} * \text{pen} / \text{denom1}$
- c) $\text{SIC on pensions: pensic} = (\text{pen} - \text{nlANN}) * ((\text{co_hi_eesic} / \text{denomHieesic}) + (\text{co_pi_eesic} / \text{denomPieesic}))$

11.2 Unemployment benefits (=UB)

- a) $\text{UB} = \text{nlbenwgu} + \text{nlbenwwu} + \text{nl_sben_chioaw} + \text{nl_sben_nochioaw}$ (all taxable)
- b) $\text{taxes on unemployment benefits} = \text{tax} * \text{UB} / \text{denom1}$
- c) $\text{SIC on UB: UBSic} = \text{UB} * ((\text{co_hi_eesic} / \text{denomHieesic}) + (\text{co_pi_eesic} / \text{denomPieesic}) + (\text{co_ui_eesic} / \text{denomUIeesic}))$

11.3 Income from work (=Workinc)

- a) $\text{workinc} = \text{coEMPY}$
- b) $\text{taxes on income from work} = \text{tax} * \text{workinc} / \text{denom1}$
- c) $\text{SIC on income from work: WorkSIC} = (\text{Workinc} - \text{coPENCON} - \text{nlSPOON}) * ((\text{co_hi_eesic} / \text{denomHieesic}) + (\text{co_pi_eesic} / \text{denomPieesic}) + (\text{co_ui_eesic} * \text{WorkInc} / \text{denomUIeesic}))$

12 PORTUGAL

The denominator for PIT is **denom** = ytaxable + deductions, and Personal income taxes to be apportioned are **tax** = pt_it

12.1 Pensions (=Pen)

- a) $pen = coPRVPEN + ptBEN02A + ptBEN02B + ptBEN03A$ (all taxable)
- b) taxes on pen = tax * pen /denom
- c) Social insurance contributions paid on pensions: PenSic = 0

12.2 Unemployment benefits (=UB)

- a) $UB = itBENcig + itBENcom + itBENmob$
- b) taxes on unemployment benefits = 0
- c) SIC on UB: UBSic = 0

12.3 Income from work (=Workinc)

- a) $workinc = coEMPY$
- b) taxes on income from work = tax * workinc /denom
- c) SIC paid on income from work: WorkSic = pt_eesic

13 SPAIN

The denominator for PIT is **denom** = ytaxable + deductions, and Personal income taxes to be apportioned are **tax** = co_nat_inctax

13.1 Pensions (=Pen)

- a) $pen = coPRVPEN + SpBE002a + SpBE002b + SpBE002c + SpBE002d + SpBE003a + SpBE003b$ (all taxable)
- b) taxes on pen = tax * pen /denom
- c) Social insurance contributions paid on pensions: PenSic = 0

13.2 Unemployment benefits (=UB)

- a) $UB = SpBE001a + SpBE001b$
- b) taxes on unemployment benefits = 0
- c) SIC on UB: UBSic = sp_UNSIC

13.3 Income from work (=Workinc)

- a) $workinc = coEMPY$
- b) taxes on income from work = tax * workinc /denom
- c) SIC paid on income from work: $WorkSic = sp_eesic_agrarian_emp + sp_eesic_apprenticeship + sp_eesic_general + sp_eesic_parttime$

14 SWEDEN

The denominator for PIT is **denom** = ytaxable + deductions, and
Personal income taxes to be apportioned are **tax** = sw_nat_inctaxnet + sw_it_municipal
The denominator for SIC is **denom2** = pensicY + swnsjukp + swtaxsee

14.1 Pensions (=Pen)

- a) pen = swpenssf (not taxable) + swpenssp (taxable)
- b) taxes on pen = tax * swpenssp / denom
- c) SIC on pensions : pensic = 0

14.2 Unemployment benefits (=UB)

- a) UB = swbenunt (taxable)
- b) taxes on unemployment benefits = tax * UB / denom
- c) SIC on UB: UBSic = sw_pensic * (UB / denom2)

14.3 Income from work (=Workinc)

- a) workinc = coEMPY
- b) taxes on income from work = tax * workinc / denom
- c) SIC on income from work: WorkSIC = sw_pensic * (Workinc / denom2)

15 UK

The denominator for PIT is **denom** = ytaxable + deductions + allowances, and
Personal income taxes to be apportioned are **tax** = co_nat_inctax

15.1 Pensions (=Pen)

- a) pen = coPRVPEN + ukBENpen + ukBENser + ukBENwar + ukBENwid (all taxable)
- b) taxes on pen = tax * pen / denom
- c) Social insurance contributions paid on pensions: PenSic = 0

15.2 Unemployment benefits (=UB)

- a) UB = uk_iben_ue (taxable)
- b) taxes on unemployment benefits = tax * UB / denom
- c) SIC on UB: UBSic = 0

15.3 Income from work (=Workinc)

- a) workinc = coEMPY
- b) taxes on income from work = tax * workinc / denom
- c) SIC paid on income from work: WorkSic = co_gen_eesic