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AIM-AP

Accurate Income Measurement for the Assessment of Public Policies

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Citizens and Governance in a Knowledge-based Society

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Francesco Figari,¹ Alari Paulus,¹ Holly Sutherland,¹
Panos Tsakloglou,² Gerlinde Verbist,³ and Francesca Zantomio³

**Distributional effects of policy simulations
related to non-cash income component**

AIM-AP Project 1

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¹ Institute for Social and Economic Research, University of Essex

² Athens University of Economics and Business and CERES

³ Centre for Social Policy Herman Deleeck, University of Antwerp

1. Introduction

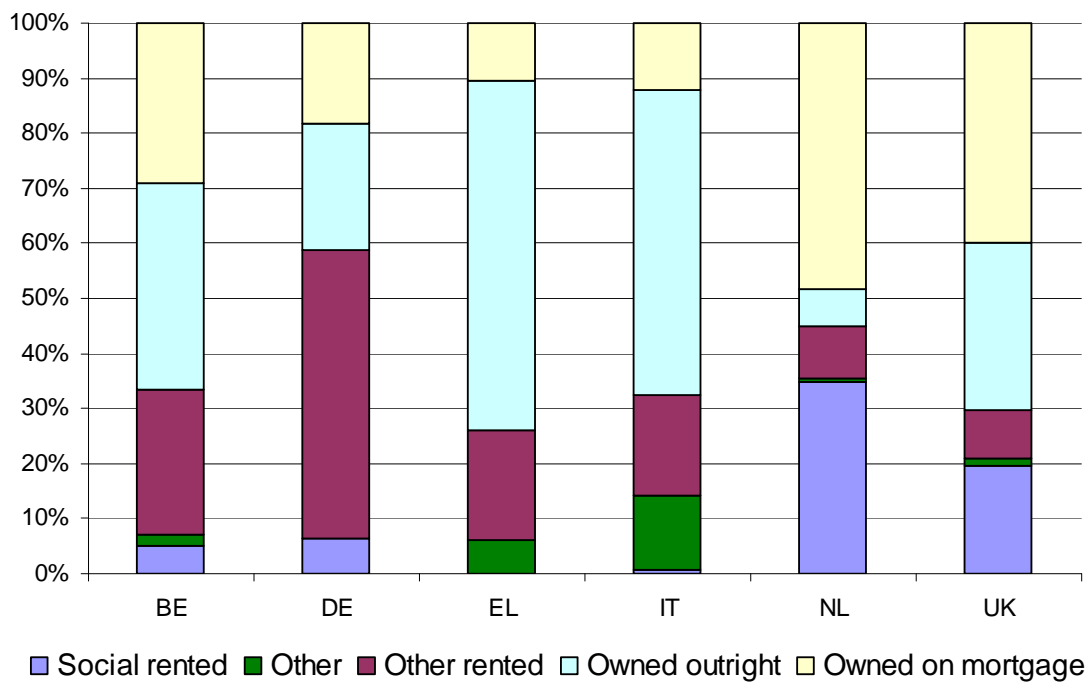
The analysis carried out in the framework of AIM-AP highlighted the importance of including non-cash incomes in distributional studies, in order to depict more accurately the welfare level of the population members. In the context of tax-benefit micro-simulation modeling, it is interesting to analyse the distributional effects of alternative policy simulations related to the project's results. This is the aim of the present paper. More specifically, three types of policies are analysed: (a) policies treating imputed rent as taxable income, (b) the introduction of a graduate tax scheme, and, (c) the introduction of co-payments for the provision of public health care services, with or without tax revenue neutrality. For the purposes of our analysis we employ the tax-benefit micro-simulation model EUROMOD [Sutherland (2007)]. In the simulations related to medical co-payments, all AIM-AP countries are involved (Belgium, Germany, Greece, Ireland, Italy, Netherlands and UK), while in the simulations related to imputed rent and graduate tax Ireland was excluded from the analysis for technical reasons. The next three sections deal with each of these policies, while the final section provides the conclusions.

2. Taxation of imputed rent

In line with the findings of existing empirical studies [Meulemans and Cantillon (1993), Yates (1994), Buckley and Gurenko (1997), Kiel and Zabel (1999), Frick and Grabka (2003), Marquier (2003), Saunders and Siminski (2004), Gasparini and Escudero (2004), Wolff and Zacharias (2006)], the results of AIM-AP [Frick et al (2008)] demonstrated that imputed rent is equal to a considerable proportion of household disposable income. The corresponding estimates for the AIM-AP countries range between 6.0% and 11.0%, while the inclusion of imputed rent in the concept of resources reduces substantially measured levels of inequality and (relative) poverty. The housing tenure of the population varies a lot in the countries under examination. According to the evidence reported in Graph 1, in Belgium, Greece, Italy, the Netherlands and the UK the majority of the population lives in own accommodation, while in Germany most population members live in rented dwellings. In Italy and, particularly, in Greece, the majority of the population lives in residencies owned outright, while in the Netherlands and the UK most of the homeowners still have to re-pay their mortgages. Over a third of the Dutch

population lives in social rented accommodation and the corresponding proportions are also high in the UK and, to a lesser extent, Belgium and Germany, while they are negligible or non-existent in Italy and Greece. Finally, a considerable proportion of the population in Italy and, to a lesser extent, in Greece lives in rent-free accommodation (provided by non-resident family members, employers, etc.)

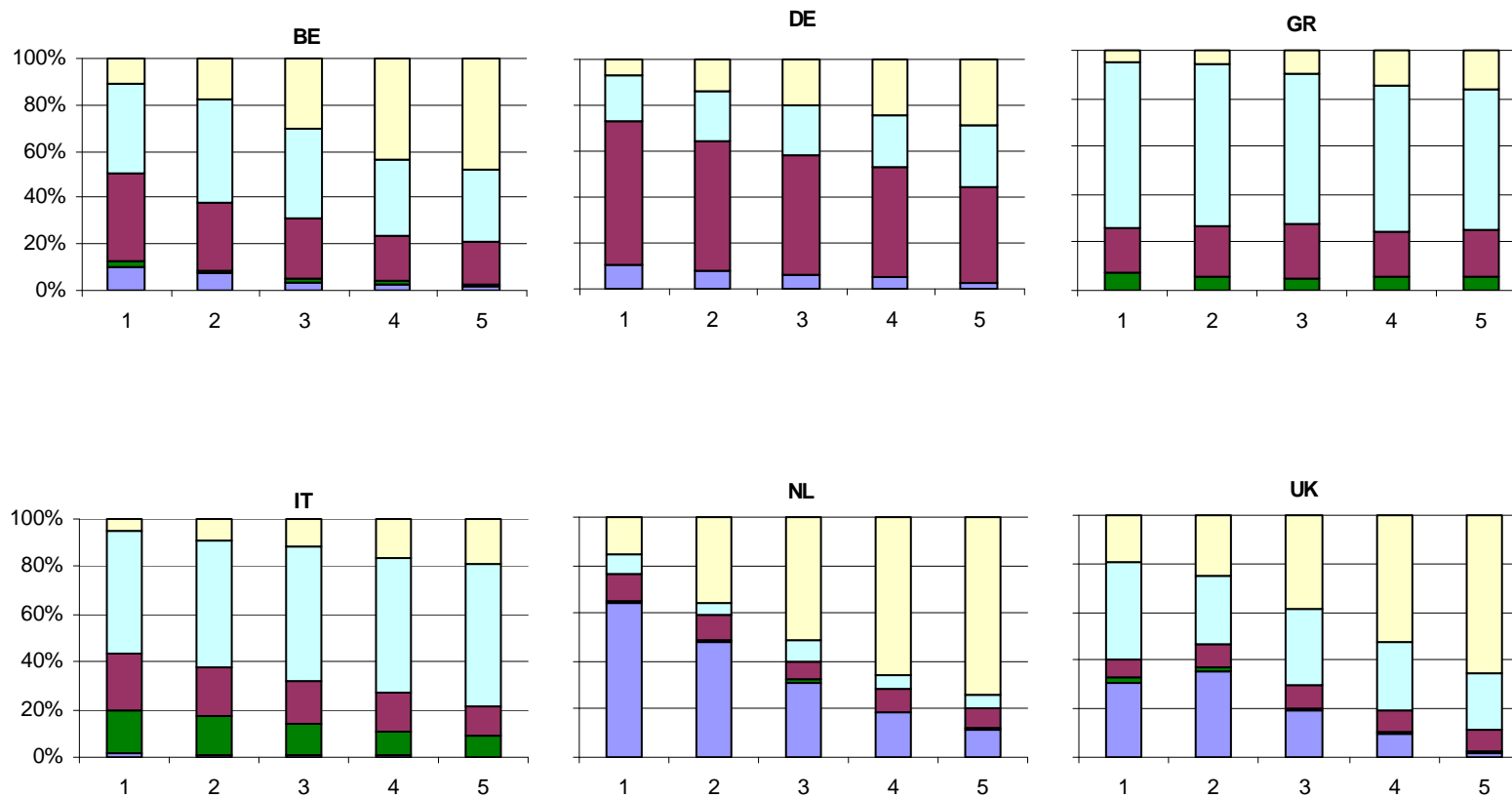
Graph 1. Distribution of the population according to housing tenure



Graph 2 provides a breakdown of household tenure by quintile, when the population members are ranked according to their equivalised disposable household income. In all countries the higher the quintile the higher the share of the population living in accommodation owned on mortgage and the lower the share of those living in social-rented housing. In most countries the shares of those living in property owned outright as well as those living in market-rented accommodation are relatively stable across quintiles (with the exception of Germany in the case of the latter).

The intervention of the state in the housing market takes numerous forms and varies considerable across countries. In some countries part of imputed rent is treated as taxable income, in many there are interest payment tax relief policies, in a few part of the rent paid by market renters is exempt from taxation, while in others housing is

Graph 2. Distribution of the population according to housing tenure by quintile



provided at below market rates to particular segments of the population (mainly in the form of social renting depicted in Graphs 1 and 2).

Since, essentially, imputed rent is a type of income, treating a form of income in ways different than other types of income for tax purposes may be considered as undesirable. Hence, in the remainder of this section, using EUROMOD, we remove all special tax treatments of incomes or expenses related to housing and include imputed rent net of mortgage interest payments and maintenance costs in the concept of taxable income and attempt to analyse the likely fiscal and distributional effects.

Table 1. Fiscal effects of including imputed rent in the concept of taxable income
(no change in the tax rules)

	Proportional change in	
	Personal Income Tax Revenue	Disposable Income
BE	13.9%	-3.6%
DE	5.8%	-1.2%
EL	24.2%	-2.5%
IT	13.2%	-3.2%
NL	28.2%	-4.7%
UK	9.5%	-1.7%

Table 1 reports the effects of this policy change on the disposable monetary income of the population as well as on the income tax revenues collected by the government. Naturally, since in all countries under consideration income taxation is progressive and the extra incomes from imputed rent are taxed at the marginal tax rates, disposable monetary income declines and income tax receipts rise (in some cases very considerably). Cross-country differences are very considerable. The change in disposable income is relatively small in Germany (-1.2%) where a large proportion of the population lives in accommodation rented in commercial terms and in the UK (-1.7%) where mortgage interest tax relief policies are negligible. On the contrary, the change in disposable income is very considerable in the Netherlands (-4.7%) where there are relatively few market renters, Belgium (-3.6%) and Italy (-3.2%) where home

ownership is widespread. Homeownership is also widespread in Greece, but the change in disposable income is smaller (-2.5%) since many of the homeowners are poor and remain under the taxable threshold even after the inclusion of imputed rent in the concept of taxable income.

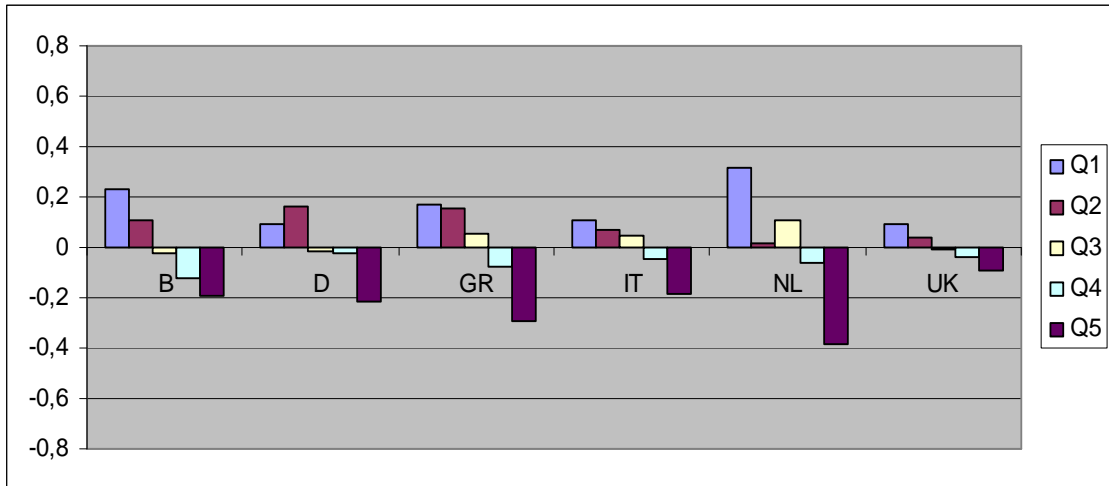
When imputed rent is included in taxable income, income tax revenues rise substantially in all countries under examination. The proportional changes are larger where the marginal tax rate paid by a considerable proportion of the population is high (the Netherlands: +28.2%) or the income taxes collected are relatively low (Greece: +24.2%). At the other end, the proportional increase in the income taxes is smaller in Germany (+5.8%) where many population members live in market rented accommodation and do not enjoy an imputed rent and in the UK (+9.5%) where the decline in the significance of mortgage interest tax relief reduces the corresponding fiscal impact.

The figures reported in Table 1 suggest that it is likely to be unrealistic to expect that imputed rent will be taxed without any significant return of taxes to the population. Therefore, we decided to simulate two alternative tax revenue neutral policies. In the first scenario, tax revenue neutrality is achieved through a proportional rebate in the tax liabilities of all taxpayers. In the second scenario, the same neutrality is the outcome of a lump sum non refundable tax credit to everybody with positive tax liability. Naturally, these policies are likely to have very different distributional effects, since imputed rent is far more equally distributed than tax liabilities.

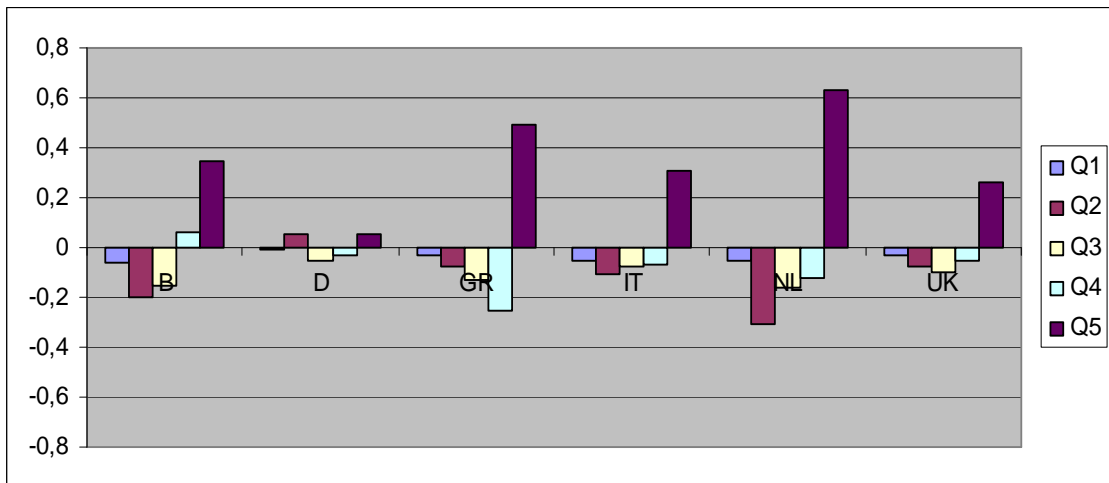
A first indication of the direction of the distributional effects is provided in Graph 3. The three parts of the graph report the changes in the quintile income shares as we move from the distribution of disposable income including imputed rent to the combined distribution of disposable income and imputed rent after the intervention of the tax system as described above. Graph 3a reports changes in quintile income shares when there is no change in the tax rules. In all countries, this policy results in increases in the shares of the poorer quintiles and declines in the shares of the richer ones and, particularly the top quintile. The changes are most pronounced in the Netherlands and Greece and least dramatic in Germany and the UK.

Graph 3b reports the corresponding changes when tax revenue neutrality is achieved through a proportional rebate in the tax liabilities of all taxpayers. Now the effect is exactly the opposite. In all countries apart from Germany, the income share of the

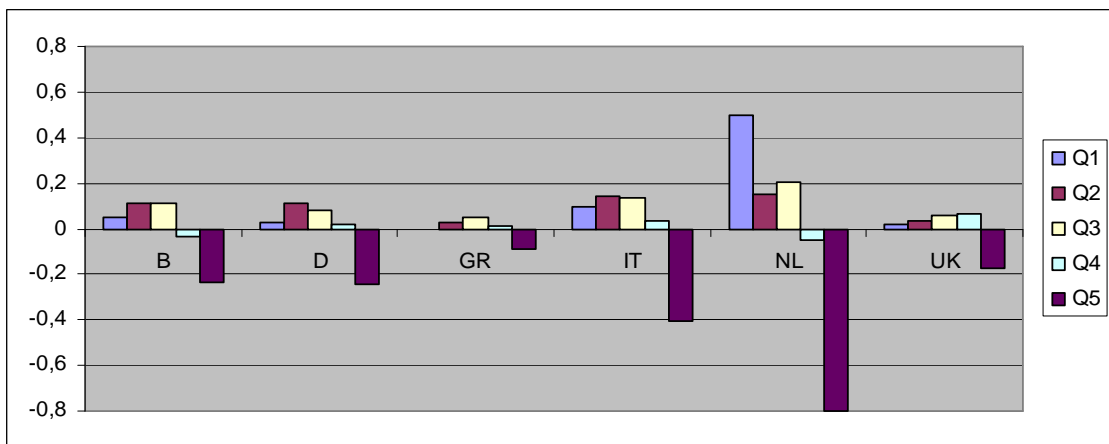
Graph 3a Changes in quintile shares when imputed rent is treated as taxable income
(no change in tax rules)



Graph 3b Changes in quintile shares when imputed rent is treated as taxable income
(tax revenue neutrality through a proportional rebate)



Graph 3c Changes in quintile shares when imputed rent is treated as taxable income
(tax revenue neutrality through a proportional rebate)



top quintile rises substantially, while those of the four bottom quintiles (three in Belgium) decline. It is interesting to note that since the bottom quintiles in most countries includes individuals that pay little or no income taxes, in Greece, Italy, the Netherlands and the UK the declines in the shares of the three middle quintiles are larger than that of the bottom quintile.

Graph 3c presents the corresponding changes when tax revenue neutrality results from a lump sum non refundable tax credit to everybody with positive tax liability. This time the results are relatively similar to those reported in Graph 3a. The income share of the top quintile declines in all countries while the shares of the three poorest quintiles rise - in most cases modestly.

Table 2. Proportional changes in inequality as a result of the inclusion of imputed rent in the concept of taxable income

		Imputed Rent in taxable income - no change in the tax rules	Revenue neutrality through proportional rebate	Revenue neutrality through lump sum tax credit
Belgium	Gini	-2.0%	2.3%	-1.3%
	A(0_5)	-3.6%	4.4%	-2.3%
	A(1_5)	-3.0%	1.8%	-1.0%
Germany	Gini	-1.3%	0.1%	-1.1%
	A(0_5)	-2.5%	0.2%	-2.2%
	A(1_5)	-2.3%	0.1%	-1.6%
Greece	Gini	-1.6%	1.5%	-0.3%
	A(0_5)	-2.7%	3.5%	0.1%
	A(1_5)	-2.6%	2.8%	-6.7%
Italy	Gini	-1.0%	1.1%	-1.7%
	A(0_5)	-1.8%	2.3%	-2.9%
	A(1_5)	-3.6%	0.0%	-3.7%
Netherlands	Gini	-2.7%	2.6%	-5.0%
	A(0_5)	-5.0%	5.6%	-8.9%
	A(1_5)	-5.2%	3.4%	-8.0%
UK	Gini	-0.6%	0.9%	-0.5%
	A(0_5)	-1.1%	2.1%	-1.1%
	A(1_5)	-1.2%	1.3%	-0.7%

Table 2 reports changes from the baseline (distribution of disposable monetary income) in three inequality indices – Gini, Atkinson(0.5) and Atkinson(1.5) – in the three aforementioned scenarios. Gini is relatively more sensitive to changes close to the middle of the distribution, while Atkinson(0.5) and Atkinson(1.5) are, respectively, relatively more sensitive to changes close to the top and the bottom of the distribution. Naturally, the distributional outcomes depend on several factors, such as the share of imputed rent beneficiaries in the population and their location in the distribution of disposable income, the progressivity of income taxation, the treatment of mortgage interest payments in the current tax system etc.

According to the results reported in the first column of the table, the inclusion of imputed rent in the concept of taxable income results in inequality declines in all countries under examination. The effect is strongest in the Netherlands and least strong in the UK. On the contrary, when we introduce tax revenue neutrality through a proportional tax rebate and the benefits, according to Graph 3b, accrue mainly to population members belonging to the top quintile, inequality rises. Since in this scenario most of the changes take place close to the top of the distribution, it is not surprising to observe that the largest increases in the second column of the table are recorded when Atkinson(0.5) is used as index of inequality. Again, the largest effects are observed in the Netherlands, while the mildest ones in Germany, where the value of the inequality indices barely change as a result of the policy reform. When tax revenue neutrality is achieved through a lump sum credit to all tax payers, inequality declines irrespective of the index used. The decline is largest in the Netherlands (between 8% and 9% according to the two Atkinson indices) and smallest in the UK (between -0.5% and -1.1%).

3. Graduate taxation

The results of AIM-AP show that public education transfers in-kind reduce aggregate inequality in a framework of static incidence analysis [Callan et al (2007)]. The progressively redistributive effect is due primarily to transfers to primary and secondary education students. These results are in line with the results of other studies using comparable methodologies [James and Benjamin (1987), Lampman (1988), Smeeding et al (1993), Evandrou et al (1993), Whiteford and Kennedy (1995), Steckmest (1996), McLennan (1996), Huguenenq (1998), Tsakloglou and Antoninis

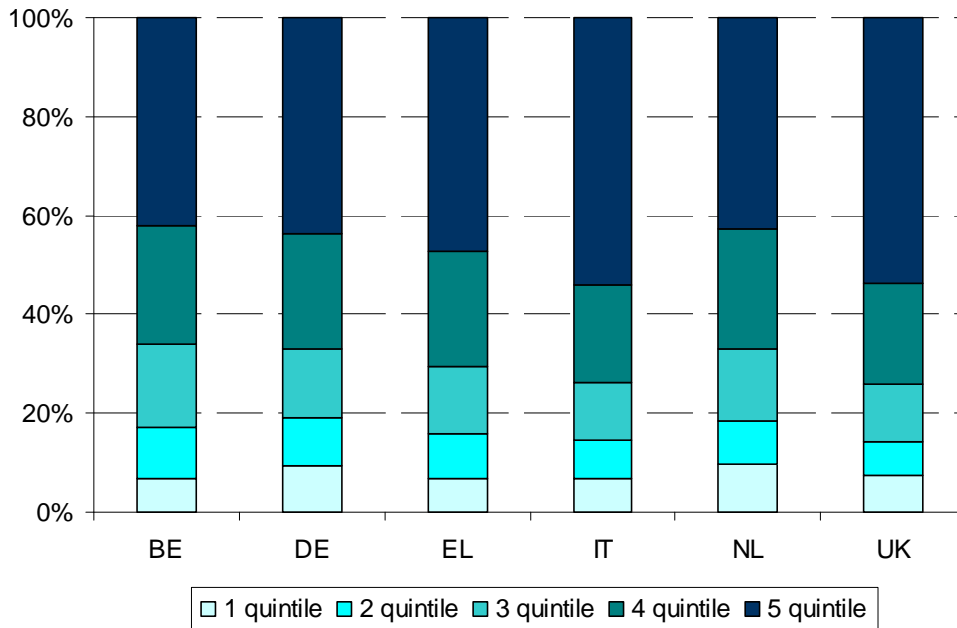
(1999), Harris (1999), Antoninis and Tsakloglou (2001), Sefton (2002), Lakin (2004), Harding, Lloyd and Warren (2006), Garfinkel, Rainwater and Smeeding (2006), Marical et al (2006)]. Transfers to tertiary education students appear to have a pretty modest impact in such a framework of analysis and, moreover, the existing evidence using life-cycle data seems to suggest that such transfers increase rather than reduce inequality in a life-cycle framework of analysis [Ter Rele (2007)]. The latter is in line with the evidence of empirical studies carried out in the context of human capital theory demonstrating that (a) in most developed countries private returns to education are quite substantial, and, (b) that almost always private returns to education are higher than the corresponding social returns [Asplund and Telhado-Pereira (1999), Psacharopoulos and Patrinos (2004)].

Partly based on such evidence, several European governments have recently started considering seriously the idea of introducing methods for the private financing of a share of the costs of tertiary education. The obvious way to do this is through the introduction of fees. However, despite high monetary rewards to tertiary education graduates in the future, fees may act as a deterrent to (risk-averse) students coming from poor households. This is the reason that it is usually recommended to accompany the fees with loans payable through a graduate tax (as well as grants for students from poor households). Such schemes are already operational in a number of European countries such, such as the UK.

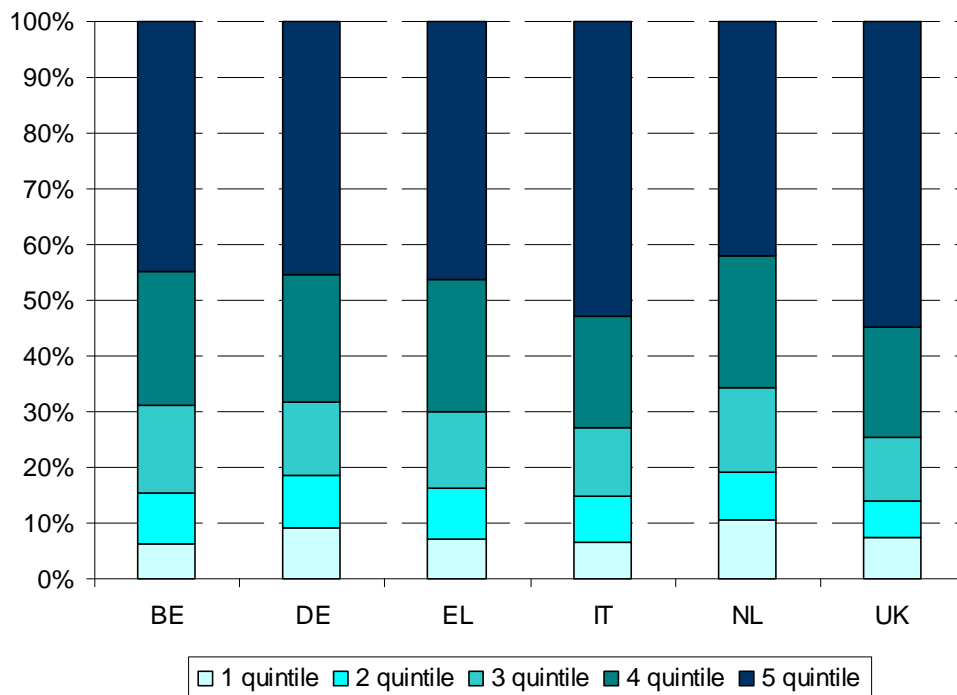
This section attempts to analyse the likely distributional (and fiscal) effects if a system of graduate taxation was already in place in six European countries (Belgium, Germany, Greece, Italy, the Netherlands and the UK), using the tax-benefit microsimulation model EUROMOD. As the evidence of Graphs 4a and 4b shows, in all countries under consideration, tertiary education graduates are heavily over-represented in the top quintile of the income distribution, irrespective of whether the focus of analysis is the entire population (Graph 4a) or those aged below 65 (Graph 4b).

For the purposes of our analysis, we set the graduate tax rate at two alternative levels: 1% and 2%. The tax is applied to incomes in excess of the taxable threshold (i.e. it increases all income tax rates by 1% or 2%, respectively) and is paid only by individuals aged below 65. The graduate tax schemes considered by most European governments are more sophisticated than this scheme, but our simple cross-country

Graph 4a. Distribution of tertiary education graduates per quintile



Graph 4b. Distribution of tertiary education graduates aged below 65 per quintile



analysis allows for an examination of the effects of such a tax in a comparative framework. In a final stage, we also consider a fiscally neutral version of the tax.

Table 3 reports the fiscal effects of the introduction of the aforementioned graduate tax schemes. Naturally, the effects are always twice as large when the graduate tax is set at 2% instead of 1%. The effects on the disposable income of the population are pretty modest in most countries. Even when the tax rate is set at 2%, the decline in the disposable income of the population is between 0.3% and 0.8%. This figure is determined primarily by the share of tertiary education graduates aged below 65 in the population. The lowest figures are observed in the UK and Italy (-0.31% and -0.32%, respectively) and the highest in the Netherlands and Belgium (-0.78%).

Table 3. Fiscal effects of a graduate tax

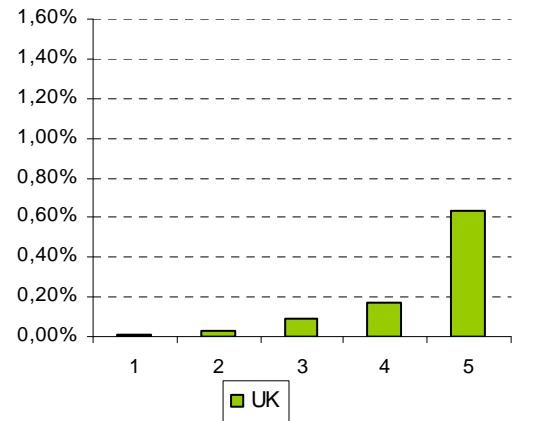
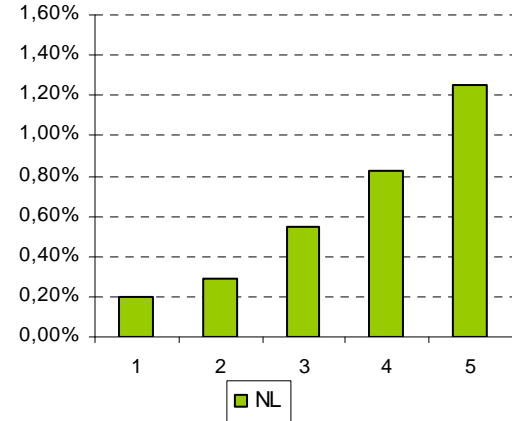
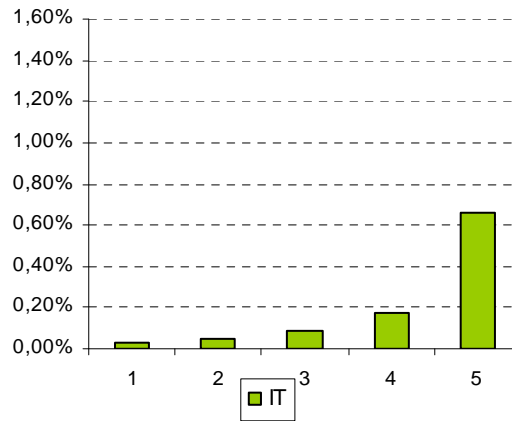
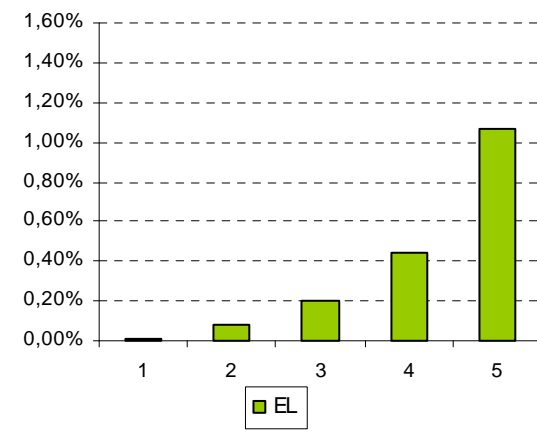
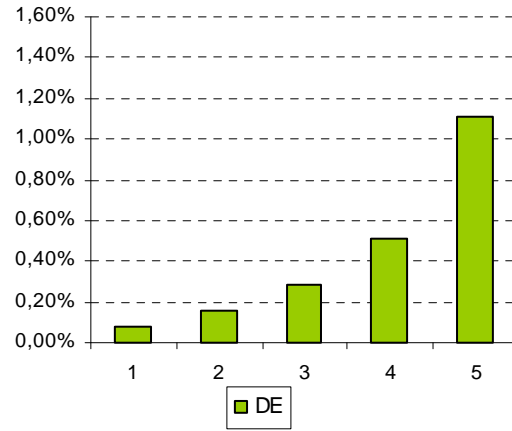
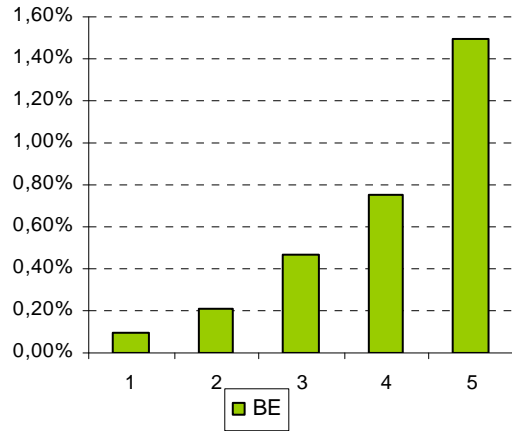
	Proportional change in				Graduate tax as a share of total public spending on tertiary education	
	Personal Income Tax Revenue		Disposable Income		gt=1%	gt=2%
	gt=1%	gt=2%	gt=1%	gt=2%		
BE	1.46%	2.93%	-0.39%	-0.78%	20.87%	41.75%
DE	1.53%	3.07%	-0.31%	-0.63%	32.14%	64.29%
EL	2.65%	5.47%	-0.27%	-0.56%	15.15%	31.21%
IT	0.68%	1.36%	-0.16%	-0.32%	11.39%	22.78%
NL	2.76%	5.52%	-0.39%	-0.78%	39.02%	78.07%
UK	0.85%	1.69%	-0.16%	-0.31%	19.71%	39.42%

gt: graduate tax (imposed on taxable income)

Graph 5 reports the share of quintile disposable income devoted to the graduate tax, when the tax rate is set at 2%. In all countries, the richer the quintile the higher the share of income earmarked for the payment of the graduate tax. In all countries apart from Italy and the UK, the income share of the top quintile that should be devoted to graduate taxes under this scheme exceeds 1%. In Greece, Italy and the UK there are very few graduates qualifying for graduate taxation in the bottom quintile and, hence, the share of this quintile's income directed to graduate taxation is extremely small; not so in the Netherlands, Belgium and Germany.

Returning to the evidence of Table 3, graduate taxes can contribute appreciably to the public purse, since they account for between 0.68% (Italy) and 2.76% (the

Graph 5. Graduate tax as a share of quintile disposable income (gt=2%)



Netherlands) of aggregate income taxation when the tax rate is set at 1% and twice as much when the rate is 2%. The main aim of a graduate tax is to cover part of the public tertiary education expenditures. The last two columns of Table 3 show that the schemes examined here can cover a very considerable proportion of these expenditures. When the graduate tax rate is 1% between 11.4% (Italy) and 39.0% (the Netherlands) of all public tertiary education expenditures are recovered and, of course, these figures are twice as high when the tax rate is set at 2%. Taking into account that in all countries under examination the share of current tertiary education students in their age cohort is substantially higher than the corresponding share of earlier generations of tertiary education students as well as the argument that tertiary education may create civic externalities that cannot be captured by standard economic models, it can be argued that if a simple graduate taxation system like the one examined here is to be adopted, it may be preferable to use a lower rather than a higher tax rate (i.e. 1% rather than 2%).

Table 4. Proportional changes in inequality as a result of the introduction of a graduate tax

		gt=1%	gt=2%	gt=2% and revenue neutrality through a proportional rebate
Belgium	Gini	-0.6%	-1.3%	0.5%
	A(0_5)	-1.1%	-2.3%	2.1%
	A(1_5)	-0.6%	-1.2%	2.3%
Germany	Gini	-0.5%	-0.9%	-0.1%
	A(0_5)	-0.9%	-1.7%	-0.2%
	A(1_5)	-0.7%	-1.4%	-0.2%
Greece	Gini	-0.4%	-0.7%	0.1%
	A(0_5)	-0.6%	-1.3%	0.2%
	A(1_5)	-0.5%	-0.9%	0.1%
Italy	Gini	-0.2%	-0.5%	-0.2%
	A(0_5)	-0.4%	-0.9%	-0.4%
	A(1_5)	-0.3%	-0.6%	-0.3%
Netherlands	Gini	-0.5%	-0.9%	0.1%
	A(0_5)	-0.8%	-1.6%	0.3%
	A(1_5)	-0.8%	-1.5%	0.1%
UK	Gini	-0.2%	-0.4%	-0.1%
	A(0_5)	-0.4%	-0.9%	-0.3%
	A(1_5)	-0.3%	-0.6%	-0.2%

The first two columns of Table 4 report the aggregate distributional effects of the aforementioned graduate taxation schemes. In all countries, the estimates of the inequality indices employed - Gini and Atkinson when the value of the inequality aversion parameter is set at 0.5 and 1.5 - decline, but not by a wide margin. The largest declines are recorded when the index used is Atkinson0.5 that is relatively more sensitive to changes close to the top of the distribution. The declines reported in the second column are roughly twice as large as those recorded in the first column. The largest proportional declines are recorded in Belgium, the Netherlands and Germany.

The last column of the table reports the distributional effects of a revenue neutral version of the 2% graduate tax scheme. More specifically, the revenues from the graduate tax revenues are returned to the taxpayers through a tax rebate reducing proportionally their income tax obligations. In all countries apart from Belgium the changes in the indices are negligible. This is not surprising since both changes - taxation and return of tax receipts - take place, essentially, within the same quintiles. In three countries inequality declines and in three increases as a consequence of this policy reform.

4. Health care (medical) co-payments

Like public education, the results of AIM-AP [Smeeding et al (2008)] show that in a framework of static incidence analysis the value of public health care services in kind is very substantial vis-à-vis disposable income and the corresponding transfers have a very strong inequality-reducing effect. These results are also in line with results of other studies using alternative data sets and methodologies [O'Higgins and Ruggles (1981), Evandrou et al (1993), Smeeding et al (1993), Gardiner K et al (1995), Steckmest (1996), Costello and Bains (2001), Sefton (2002), Lakin (2004), Carone et al (2005), Caussat et al (2005), Garfinkel et al (2006), Harding et al (2006), Aaberge and Langørgen (2006), Marical et al (2006), Wolff and Zacharias (2006)].

Due to ageing populations and advances in (sometimes very expensive) medical technology, the share of public health care spending is rising fast in all developed countries. Governments facing severe budget constraints are trying to reverse this trend or, at least, mitigate its pace. One of the most popular methods is through the

introduction of co-payments for health care services, thus reducing the associated problems of moral hazard in the behaviour of the users of these services. However, since the heaviest users of such services are usually located disproportionately in the bottom half of the income distribution, these co-payments have adverse distributional effects and efforts are made to devise policies that can mitigate public spending and produce as low as possible adverse distributional effects.

For the purposes of our analysis, each individual was assigned the average public health care spending of his/her age group using information for the OECD's SOX database and, then, we relied on EUROMOD and tried several alternative scenarios, varying the rate of co-payments (5%, 10%, 20%) as well as the paying population (all, persons aged below 65, non-poor persons). Tables 5-7 report the main fiscal effects of selected scenarios.

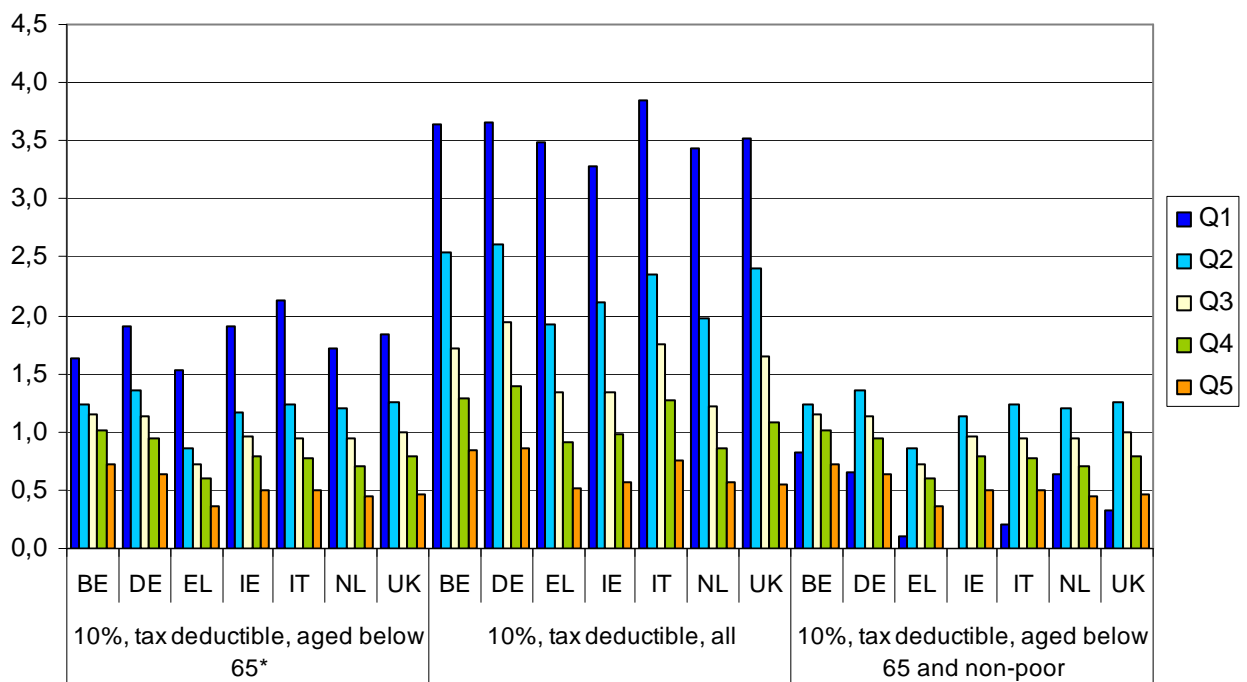
Table 5. Medical copayments as a share of disposable income

	5%, tax deductible, aged below 65	10%, tax deductible, aged below 65	20%, tax deductible, aged below 65	10%, tax deductible, all	10%, tax deductible, aged below 65 and non-poor
BE	0.5	1.0	2.1	1.7	1.0
DE	0.5	1.0	2.0	1.7	0.9
EL	0.3	0.6	1.3	1.2	0.5
IE	0.4	0.9	1.7	1.2	0.7
IT	0.4	0.9	1.7	1.5	0.7
NL	0.4	0.8	1.6	1.2	0.7
UK	0.4	0.8	1.7	1.3	0.7

Table 5 reports the share of medical copayments in disposable income. Five scenarios are presented. In the first three, copayments are paid by persons aged below 65 and the co-payment rate is set at 5%, 10% and 20%. In the fourth scenario, all population members pay co-payments at a rate of 10%, while in the last scenario copayments are set at 10%, but they are paid only by persons aged below 65 who are above the poverty line. In all cases, co-payments are tax deductible, while at the same time policies related to tax deductibility of private health expenditures that

exist in some countries are switched off. Naturally, the figures reported in the second and the third columns of the table are multiples of the figures in the first column. Cross-country differences are not enormous in the first three columns of the table. When copayments are set at 5%/10%/20% of the value of health care services and they are paid only by persons aged below 65, they account for approximately 0.4%/0.9%/1.7% of disposable income (more in Belgium and Germany; less in Greece). When the rate is set at 10% and is paid by all population members, the figure is between 1.2% and 1.7% of disposable income, while when the rate is the same but copayments are paid by non-poor persons aged below 65 cross-country differences are larger and it declines to between 0.5% (Greece) and 1.0% (Belgium).

Graph 6. Medical co-payments as a share of quintile disposable income



Graph 6 reports the income share of these copayments per quintile, when the population members are grouped according to their equivalised disposable income, under three scenarios (10% all, 10% only those below 65, 10% only those below 65 and non-poor). Taking into account that the heaviest users of public health care services are the elderly, that a considerable proportion of them can be found in the bottom half of the income distribution and that public health care services are far more equally distributed than disposable income, it is not surprising to note that the

share of copayments in the disposable income of the population is higher the poorer the quintile in the first two parts of the graph. Naturally, the bars are lower in the first part of the graph, where the elderly do not pay copayments. The patterns in the first and the last parts of the graph are identical with the exception of the shares of the first quintile that are truncated (in all countries all poor are located in the bottom quintile). It is interesting to note that in Ireland Greece and Italy that have high poverty rates copayments of the bottom quintile are negligible or non-existent.

Table 6. Medical copayments as a share of total income tax

	5%, tax deductible, aged below 65	10%, tax deductible, aged below 65	20%, tax deductible, aged below 65	10%, tax deductible, all	10%, tax deductible, aged below 65 and non-poor
BE	1.96	3.94	7.97	6.27	3.62
DE	2.60	5.22	10.58	8.63	4.60
EL	2.86	5.75	11.60	10.63	4.78
IE	2.73	5.49	11.12	7.97	4.42
IT	1.83	3.67	7.40	6.36	3.04
NL	2.91	5.86	11.87	8.80	5.08
UK	2.25	4.52	9.12	7.16	3.84

Table 6 depicts copayments as a share of income taxes in the countries under examination. Although the differences across scenarios are large and the cross-country differences substantial, in all countries the revenues collected through copayments vis-à-vis those collected through income taxation seem to be substantial. For example, when the rate of copayments is set at 10%, when all population members contribute the amount collected is equal to 6.3%-10.6% of total income tax revenues. When the population is restricted to the non-elderly the figure declines to 3.7%-5.9%, while if the poor as well as the elderly are exempted from copayments it declines further to 3.0%-5.1%.

Table 7 reports the share of public health care expenditure that can be recovered using the above policies. When the copayment rate is set at 10% this is the figure of the total spending that is recovered when all population members pay. The figure

declines to 5.4%-6.9% when the elderly are exempted and 4.5-5.8% when apart from the elderly the poor are also excluded from the co-payments.

Table 7. Medical copayments as a share of total public healthcare spending

	5%, tax deductible, aged below 65	10%, tax deductible, aged below 65	20%, tax deductible, aged below 65	10%, tax deductible, all	10%, tax deductible, aged below 65 and non-poor
BE	3.15	6.31	12.62	10.00	5.79
DE	3.03	6.06	12.12	10.00	5.34
EL	2.71	5.43	10.86	10.00	4.52
IE	3.46	6.91	13.82	10.00	5.56
IT	2.90	5.80	11.59	10.00	4.81
NL	3.34	6.68	13.36	10.00	5.79
UK	3.16	6.33	12.66	10.00	5.38

Finally, Table 8 reports the effects of the alternative scenarios of the three inequality indices used in our analysis. Moreover, there are two tax revenue neutral simulations using as baseline a copayment rate of 10% paid by those aged below 65 and non-poor. In the first version copayment revenues are returned to the taxpayers through a proportional tax rebate, while in the second they are returned through a non-refundable tax credit. With a few exceptions that are due to outliers (in the case of Atkinson1.5) changes in inequality are not dramatic. As anticipated, in most cases the introduction of co-payments increases measured inequality, while the results of the tax neutral scenarios are stronger when tax rebates are used instead of tax credits.

Table 8. Proportional changes in inequality as a result of medical co-payments

		5%, aged below 65	10%, aged below 65	20%, aged below 65	10%, all	10%, aged below 65 and non-poor	10%, aged below 65 and non-poor + proportional tax rebate	10%, aged below 65 and non-poor + lump-sum tax reduction
BE	Gini	0.4	0.8	1.6	1.9	0.4	1.8	0.9
	A(0_5)	-4.0	-3.6	-3.2	-2.7	0.5	-1.8	-3.4
	A(1_5)	-20.3	-21.6	-23.1	-25.9	0.0	-20.5	-21.2
DE	Gini	0.5	0.9	1.9	1.8	0.4	1.9	1.1
	A(0_5)	0.9	1.9	3.9	3.5	0.7	3.7	2.2
	A(1_5)	0.5	1.9	4.0	3.8	0.3	3.4	2.4
EL	Gini	0.0	0.3	0.9	1.0	-0.1	1.7	0.9
	A(0_5)	-3.3	-2.5	-3.1	-1.1	-0.3	0.3	-1.5
	A(1_5)	3.1	10.1	13.2	11.3	-0.5	11.8	11.1
IE	Gini	0.4	0.9	1.7	1.4	0.2	1.5	0.9
	A(0_5)	0.4	1.1	3.1	2.2	0.3	2.4	1.3
	A(1_5)	2.7	1.3	3.6	2.3	0.0	2.3	1.6
IT	Gini	0.4	0.8	1.6	1.3	0.2	1.3	0.6
	A(0_5)	-3.5	-2.8	-1.2	-2.0	0.3	-1.8	-3.0
	A(1_5)	3.8	2.1	7.7	2.6	0.0	2.8	2.1
NL	Gini	0.3	0.7	1.3	1.3	0.3	1.3	0.4
	A(0_5)	0.1	0.9	1.2	1.9	0.5	2.2	0.4
	A(1_5)	2.5	8.0	0.3	9.0	0.2	9.0	7.8
UK	Gini	0.4	0.8	1.6	1.5	0.3	1.4	0.8
	A(0_5)	0.3	1.0	2.4	2.3	0.5	2.3	0.9
	A(1_5)	-6.0	-5.2	-3.3	-4.0	0.2	-4.2	-4.9

5. Conclusions

The analysis of the paper shows clearly that it is both feasible and, most probably, desirable to incorporate non-cash income components in standard tax-benefit microsimulation models. Three examples were analysed concerning the treatment of imputed rent as taxable income, the introduction of a graduate taxation scheme and the introduction of copayments for the provision public health care services in-kind. Even though the simulations are relatively simple, they highlighted the fact that there are several alternatives for the policymaker that is interested in the distributional results of his/her actions to choose from.

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