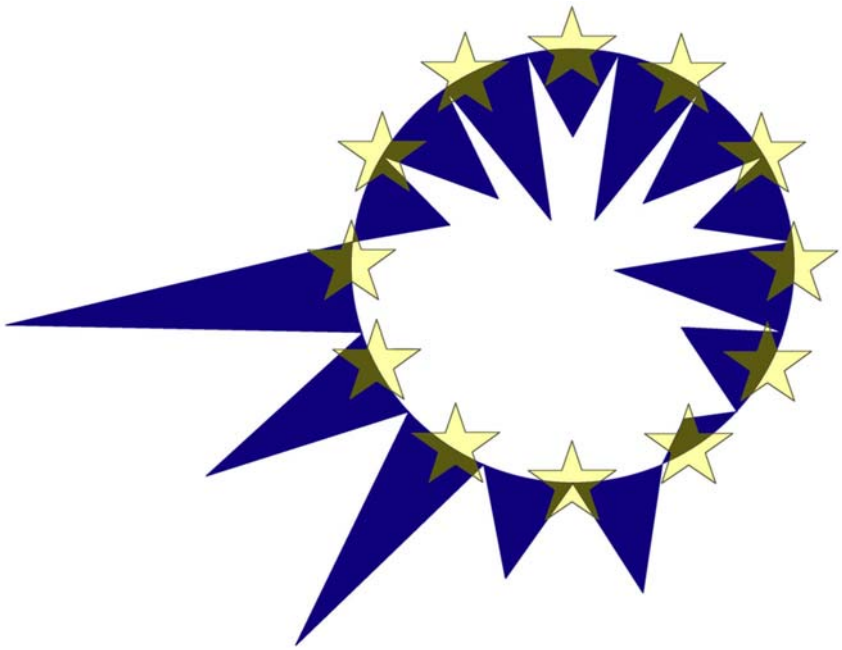
EUROMOD

COUNTRY REPORT



EUROMOD Country Report

GREECE
(2001 TAX-BENEFIT SYSTEM)

Manos Matsaganis and Panos Tsakloglou

November 2004

EUROMOD Country Report – Greece 2001

Manos Matsaganis & Panos Tsakloglou

Athens University of Economics & Business

Greece

NOVEMBER 2004

Contents

1. The tax-benefit system in 2001

1.1. Social benefits[1]

Social benefits (defined so as to cover the entire range of income transfers or benefits in cash) have two major components: *contributory* and *non-contributory* benefits.

Contributory benefits are related to employment and are financed *via* employer and employee contributions. Access to benefits is dependent on claimants' contributory record and the occurrence of a specified contingency such as retirement or unemployment. Benefit levels are, as a rule, positively related to previous earnings. In Greece, as elsewhere in continental Europe, contributory benefits are provided by social insurance "funds" (i.e. semi-autonomous entities created for that purpose).

Non-contributory benefits, funded out of general taxation, can be distinguished into income-tested *social assistance* and non-income-tested *categorical* or *universal benefits* (depending on access rules).

Social assistance benefits are awarded following a test of the claimant's income or a "means test" (that is, a test of both income and wealth) and are designed to raise the incomes of families in poverty, sometimes explicitly to some minimum standard. In theory, benefit rates are inversely related to income. In practice, many such benefits in Greece are awarded at a flat rate.

Categorical or universal benefits are granted on the basis of a specified contingency, such as disability or birth of a child, to all individuals within that category. Therefore, categorical or universal benefits are not conditional on either income or contributions. As a result, benefit amounts are typically set at a flat rate.

Table 1 shows the relative strength of the various types of social benefits in Greece in terms of expenditure. Most benefits are contributory and earnings-related. Less than 5% of social security spending is income tested.

Table 1: **Social benefits by type** (2001)

	income tested	not income tested	total
contributory	0.2	83.4	83.6
non-contributory	4.7	11.8	16.4
total	4.8	95.2	100.0

Note: Own elaboration of data collected from social insurance organisations and other benefit agencies. Social benefits are defined as the aggregate of social transfers in cash. Total expenditure on social benefits in 2001 was €18,675 million.

Table 2 looks at the composition of social benefits in Greece by category. More than 90% of benefits are retirement pensions. All other benefits taken together account for less than 1.4% of GDP.

[1] Section 1.1 draws considerably on Matsaganis (2003).

Table 2: **Social benefits by category** (2001)

	€ million	% all benefits	% GDP
retirement benefits	16 870	90.3	12.90
family benefits	523	2.8	0.40
unemployment benefits	518	2.8	0.40
sickness benefits	427	2.3	0.33
disability benefits	293	1.6	0.22
other benefits	44	0.2	0.03
all social benefits	18 675	100.0	14.28
of which: non-contributory	3 068	16.4	2.35
of which: income tested	904	4.8	0.69

Note: Retirement benefits cover old age, invalidity and survivor pensions, including the pensioner social solidarity benefit *ΕΚΑΣ*. Other benefits include housing and emergency benefits.

Source: Own estimates from data collected from benefit agencies and other sources.

1.1.1. *Retirement benefits*

Retirement benefits form the backbone of social protection in Greece, accounting for 12.9% of GDP and over 90% of all social transfers. Pensions are provided by a multiplicity of social insurance agencies or "funds", mostly operating earnings-related, pay-as-you-go schemes.

Approximately 2.5 million primary pensions were paid out in 2001, plus another 1 million supplementary pensions and a number of lump-sum separation benefits. Almost one third of all social insurance primary pensions are awarded in the event of either invalidity or widowhood, split evenly between these two types of retirement benefits, with the remaining being old age pensions. Most retirement benefits are contributory.

Table 3: **Social insurance affiliation of pensioners** (2001)

	no. of pensioners	% of all
private sector employees	959 364	38.4
IKA	*863 636*	*34.5*
seamen (NAT)	*62 000*	*2.5*
banking employees	*23 627*	*0.9*
press workers	*4 827*	*0.2*
other private sector workers	*5 275*	*0.2*
public sector employees	407 778	16.4
civil servants	*348 190*	*14.0*
public enterprises	*59 588*	*2.4*
self-employed	289 732	11.6
own-account workers (*OAAE*)	244 875	9.8
lawyers, doctors & engineers	43 207	1.7
other self-employed workers	1 651	0.1
farmers (*ΟΓΑ*)	832 222	33.4
all pensioners	2 489 097	100.0

Source: Own elaboration of data derived from Ministry of Labour & Social Insurance (2003) and Ministry of Finance (2002).

Almost 2 million pensions are provided by three funds: *IKA* (private sector workers), *ΟΓΑ* (farmers) and *OAEE* (the fund of own-account workers, except for the "liberal professions" – lawyers, engineers, doctors – and some other small groups who are organised separately). On the other hand, state pensions are received by 350 thousand retired civil servants and other beneficiaries (again, except employees of public enterprises who are organised separately). As Table 3 shows, these four groups account for 92% of all pensioners.

Out of a total pension expenditure of almost €16.9 billion, about €14.5 billion or 11% of GDP was in 2001 spent on contributory pensions. This is shown in Table 4.

Table 4: **Expenditure on retirement benefits** (2001)

	€ million	% all benefits	% GDP
contributory pensions			
social insurance pensions (except farmers)	10 826	58.0	8.29
civil servants pensions	2 816	15.1	2.16
social insurance separation payments	491	2.6	0.38
farmer supplementary pension	341	1.8	0.26
non-contributory pensions			
farmer basic pensions	1 732	9.3	1.33
pensioner social solidarity benefit *ΕΚΑΣ*	378	2.0	0.29
war & national resistance	170	0.9	0.13
pensions of non-insured elderly	116	0.6	0.09
all retirement benefits	16 870	90.3	12.92
of which: non-contributory	2 397	12.8	1.84
of which: income tested	494	2.6	0.38

Note: Social insurance covers old age pensions, invalidity pensions and survivor pensions from all social insurance organisations except the farmers' fund *ΟΓΑ*. Both primary and supplementary pensions are included. Note that separation payments, paid as lump sum, are recorded separately. Farmer supplementary pensions include old-age, survivor and invalidity supplementary pensions. Farmer basic pensions include old-age, survivor, invalidity and orphan basic pensions.

Source: Ministry of Labour & Social Insurance (2001), Ministry of Finance (2000) and own estimates from data collected from social insurance funds.

The largest non-contributory pension programme is the basic pension received by 800 thousand retirees of the farmers' fund *ΟΓΑ*. This is paid to persons aged over 65 who have lived in rural areas and worked in agriculture or similar activities such as fishing for at least 25 years. Although the basic pension is incompatible with the receipt of a social insurance pension, it is not income tested and is paid at a flat rate (€144 a month in 2001). The basic pension is to be phased out (as the new *ΟΓΑ* contributory pension, introduced in 1998, is being gradually phased in).

Other non-contributory programmes include the pensioner social solidarity benefit *ΕΚΑΣ*, introduced in 1996, as well as the social pension for non-insured elderly, set at the same rate as the basic pension for farmers. Both programmes are income-tested. At the time of its introduction *ΕΚΑΣ* was presented as a radical policy shift, away from across-the-board rises in the minimum pension and towards targeted interventions to help low-income pensioners. Despite its subsequent expansion (in terms of both access conditions and benefit value, set at €82 monthly for full-rate claimants in 2001) *ΕΚΑΣ* still only accounts for about 2% of total pension expenditure.

Social pensions, *ΕΚΑΣ* and farmer basic pensions (together with smaller-scale programmes

such as war and national resistance pensions) are all explicitly non-contributory. Nevertheless, it would be quite wrong to assume that the remaining retirement programmes are somehow "self-financed", through employer and employee contributions. Overall, the state's financial contribution to retirement pensions – beyond that arising from its role as employer – has been estimated at just over 40% of all pension expenditure.

One form of state support is through the mechanism of the minimum pension. This is received by approximately 600 thousand retirees of *IKA*, the largest fund insuring most private sector workers. About 35% of the minimum pension's value (€364 monthly in 2001) consists of an implicit top-up to the "organic amount", that is the amount a low income worker would have been entitled to on the basis of contributions alone. This implicit top-up costs IKA alone over €1 billion a year.

1.1.2. *Family benefits*

Income transfers to families with children include non-contributory benefits and occupational family allowances. In 2001, total expenditure on the various schemes amounted to €523 million (0.40% of GDP), equivalent to 2.8% of the social security budget. This is shown in Table 5.

Table 5: **Expenditure on family benefits** (2001)

	€ million	% all benefits	% GDP
lifetime pension to many-children mothers	179	1.0	0.14
large family benefit	103	0.6	0.08
3rd child benefit	64	0.3	0.05
unprotected child benefit	18	0.1	0.01
civil servants family allowance	94	0.5	0.07
ΟΑΕΔ family allowance	64	0.3	0.05
all family benefits	523	2.8	0.40
of which: non-contributory	365	2.0	0.28
of which: income tested	365	2.0	0.28

Note: As an occupational allowance, civil servants family allowance is classified here as a contributory benefit, although strictly speaking no contributions are actually paid.

Source: Ministry of Labour & Social Insurance (2001), Ministry of Finance (2000) and own estimates from data collected from benefit agencies.

The so-called "many-children benefits" (*πολυτεκνικά επιδόματα*) comprise "lifetime pension for mothers of many children", "large family benefit" and "3rd child benefit". The three benefits are funded out of general taxation, though they are delivered by *ΟΓΑ*, the farmers' social insurance fund. Contribution requirements do not apply. At the time of their introduction, in 1993, the benefits were not subject to an income test. Subsequently, they became income tested in 1997, though the income requirement was abolished again in 2002. Over 300 thousand families are currently in receipt of one of these benefits.

"Unprotected child benefit" was introduced in 1960. It is a non-contributory benefit, aimed to low-income single parent families, or households who care for orphans born to their kin (foster families are not eligible). It is a low-value benefit, claimed by about 34 thousand families.

Occupational family allowances are automatically added to eligible civil servants' pay. Other allowances are paid by the "Manpower Employment Organisation" *ΟΑΕΔ*, a tripartite organisation funded through employee and employer contributions plus state subsidies. Eligibility is extended to all private sector employees irrespective of social insurance affiliation, though the allowances are conditional on a (minimal) contributory record. The low value of *ΟΑΕΔ* allowances (€6 and €18 a month for families with one and two children respectively in 2001) raise questions about take-up, although no official estimates are available.

The main characteristic of family benefits is that the amount of assistance increases almost exponentially with number of children – a pattern evident in the structure of tax reductions for children as well. Occupational family allowances, in particular, introduce a further division between civil servants and private sector workers, since the former receive much more substantial and timely assistance than the latter. Given that most children (and most *poor* children) live in families with one or two children, it follows that the structure of family benefits exposes many to the risk of poverty.

1.1.3. *Unemployment benefits*

Unemployment insurance is mandatory for all employees except tenured civil servants and agricultural workers. The "Manpower Employment Organisation" *ΟΑΕΔ* runs a variety of unemployment compensation schemes, the most important of which is "ordinary unemployment benefit".

Total expenditure on all unemployment insurance schemes in 2001 amounted to €514 million (0.40% of GDP), accounting for 2.8% of the social security budget. Eligibility rules require a contributory record of at least 200 insurance days in the first 24 of the 26 months prior to claiming. There is no income test. Students, first-time job seekers and (implicitly) the long-term unemployed are not eligible. Benefit is exhausted after at most 12 months, average duration being 7 months. The benefit rate in 2001 was €252 a month compared to a minimum wage of €526 (i.e. far below the two-thirds ratio originally set). Because of strict contributory requirements, coverage is limited: out of 533 thousand registered unemployed only 237 thousand claimed benefit in 1999.

By way of compensation, there also exist a variety of "extraordinary unemployment benefits" with less stringent rules. These include a 5-month benefit for first-time job seekers aged 20-29 who can prove they are out of work for over a year, lump-sum support for former recipients who remained unemployed after eligibility expired, special schemes for seasonal workers, other irregular workers, return migrants, former prisoners etc. In 1997, latest year for which data are available, there were about 125 thousand recipients of "extraordinary unemployment benefits" as a whole. Average benefit value over the entire duration of benefit may be approximately €570 per recipient in 2001.

1.1.4. *Sickness benefits*

Most social insurance funds provide sickness benefits in cash. These include statutory sick pay, maternity leave, birth grants, compensation for absence due to accidents at work and death grants – plus a variety of other benefits ranging from tuberculosis therapy to children holiday camps (hardly a "sickness benefit" at all). Various schemes are operated by social insurance funds, while non-contributory birth grants paid to civil servants and to uninsured mothers (the latter on an income-tested basis). Total expenditure on all sickness benefits in

2001 amounted to €427 million (0.33% of GDP), accounting for 2.3% of the social security budget.

Common statistical convention excludes the implicit cost to the state budget of civil servants' leave of absence due to sickness or maternity – on the grounds that, in their case, income replacement is not an issue as earnings are not interrupted.

Variations in benefit entitlement are present in this area as well. For instance, maternity leave on full pay is 17 weeks in the private sector, compared to 20 weeks in the public sector. Moreover, although mothers in the private sector are theoretically entitled to a shorter working day in the first two years after childbirth, this is rarely enforced. In contrast, their public sector counterparts can choose to give up a similar (but more generous) arrangement in favour of a 9-month parental leave on full pay. As a further example of unequal entitlements to maternity benefits between funds, note that lump-sum birth grants are paid at rates that vary eightfold from *ΟΓΑ* to the engineers' fund.

1.1.5. *Disability benefits*

These are non-contributory benefits, funded out of general taxation and administered by local government at the prefecture level (*Νομαρχίες*). Invalidity pensions, discussed earlier under retirement, are not included here. In the past, the benefits were subject to various forms of means testing. An attempt, in 1987, to standardise access rules was aborted 14 months later, when all income testing of disability benefits was abolished. Although no longer explicitly income tested, benefits are reduced or withdrawn altogether if the recipient is in employment, a pensioner, or in receipt of invalidity pension.

Disability benefits are highly heterogeneous by type of disability and sometimes by category of recipient. There are 10 categories and 22 sub-categories of disability, in addition to a generic "mobility allowance". Out of 140 thousand claimants over 73 thousand received "severe physical disability benefit", the monthly value of which in 2001 was €172. In the same year, total expenditure on disability benefits amounted to €293 million (0.22% of GDP), equivalent to 1.6% of the social security budget.

1.1.6. *Housing and emergency benefits*

This heading comprises cash assistance to tenants only, excluding both assistance in kind (such as the provision of social housing) and benefits to owner-occupiers (such as mortgage relief). The latter, in particular, are quite significant: owner occupation rates are high, while mortgage interest payments receive favourable tax treatment. Still, tax expenditure (Titmuss' famous "fiscal welfare"[2]) is not formally analysed as part of the social security budget.

The main instrument of cash assistance to tenants is the rent subsidy provided by the "Workers Housing Organisation" *OEK* (which is financed by payroll contributions and covers all private sector employees irrespective of social insurance membership). Rent subsidy is currently paid to approximately 31 thousand households. Access conditions are complex. Single applicants need a contributory record of at least 10 years, but lower eligibility criteria apply to various categories of claimants (such as families with many children, single mothers, the disabled, young couples, temporary workers, residents of remote areas, return migrants and others). In addition, the benefit is income tested: the income threshold increases with the number of dependent children and is more with young couples and the elderly. Finally, there

[2] See Alcock et al (2001).

is a maximum amount of rent for which subsidy may be paid. The benefit rate in 2001 was €100 a month for a family of four and was higher for families with more children.

A similar non-contributory benefit is paid by prefectures to landlords on behalf of non-insured elderly who are unable to meet their housing costs. Benefit rates in 2001 were €70 and €92 for singles and couples respectively. Approximately 800 households are in receipt of this form of housing assistance. Finally, emergency benefits may be paid to return migrants and immigrants of Greek origin by prefectures. The main benefit is a monthly allowance of about €35, aimed for those in financial hardship, aged over 60, claimed (according to some estimates) by 25 thousand persons. Various lump-sum benefits may also be provided as modest assistance for resettlement expenses, transportation of household durables etc.

Total expenditure on housing and emergency benefits in 2001 amounted to €44 million (0.03% of GDP), accounting for 0.2% of the social security budget

1.2. Taxes and social contributions

On the revenue side, individuals pay direct or indirect taxes and social contributions. Table 6 shows the relative strength of each. Indirect taxes account for almost 40% of all revenue, direct taxes for less than 28%, while about one-third of all revenue is collected through social insurance contributions.

Table 6: **Taxes and social contributions: overview** (2001)

	€ million	% all	% GDP
direct taxes	13 585	27.8	10.41
indirect taxes	19 498	39.9	14.94
social contributions	15 875	32.3	12.09
all taxes and social contributions	48 868	100.0	37.43

Source: Ministry of Finance (2002) and Eurostat (2004).

1.2.1. *Direct taxes*

As a source of public finance, direct taxation is not as significant in Greece as it is elsewhere in Europe, although its relative weight has increased over recent years. In 2001 direct taxation receipts corresponded to 10.4% of GDP, up from 7.7% in 1996.

Table 7: **Receipts from direct taxes** (2001)

	€ million	% all	% GDP
personal income tax	6 156	12.6	4.72
corporate income tax	4 172	8.5	3.20
property tax	507	1.0	0.39
other direct tax	2 750	5.6	2.11
all direct taxes	13 585	27.8	10.41

Source: Ministry of Finance (2002).

Personal income tax is the most important of all direct taxes, contributing €6,156 million in

2001 – that is over one-eighth of all revenue or 4.7% of GDP. Corporate income tax receipts amounted to €4,172 million, while another €3,257 million was collected through property tax and other direct taxes. This is shown in detail in Table 7.

1.2.2. *Indirect taxes*

On the contrary, indirect taxation in Greece remains a significant source of public finance. In 2001 indirect taxation receipts amounted to 14.9% of GDP, compared to 14.4% in 1996.

In terms of receipts, value added tax is clearly the most important of all taxes, contributing €10,732 million in 2001 (more than one-fifth of all revenue or 8.2% of GDP). Excise duties amounted to €6,321 million – that is, slightly more than the amount contributed by personal income tax. A further €2,445 million was collected through other indirect taxes. This is shown in detail in Table 8.

Table 8: **Receipts from indirect taxes** (2001)

	€ million	% all	% GDP
value added tax	10 732	22.0	8.22
excise duties	6 321	12.9	4.84
other indirect taxes	2 445	5.0	1.87
all indirect taxes	19 498	39.9	14.94

Source: Ministry of Finance (2002).

1.2.3. *Social contributions*

Given the weight of social insurance in the institutional configuration of the welfare state, social contributions in Greece account for a considerable proportion of government revenue (defined broadly for this propose). The relevant figure stood at about 12.1% of GDP in 2001.

Table 9: **Receipts from social contributions** (2001)

	€ million	% all	% GDP
employer *actual* social contributions	7 234	14.8	5.54
employee social contributions	6 595	13.5	5.05
self-employed workers SIC	1 611	3.3	1.23
pensioners and others SIC	345	0.7	0.26
all social contributions	15 785	32.3	12.09

Note: Employers *imputed* social contributions are excluded.

Source: Eurostat (2004).

Employer contributions[3] amounted to €7,234 million in 2001, while employee contributions to €6,595 million (5.5% and 5% of GDP respectively). A further €1,956 million was collected

[3] Social protection receipts as defined by Eurostat distinguish between *actual* and *imputed* employers' social contributions. The figure shown here (€7,234 million) corresponds to actual contributions alone, which is the variable of interest. For the record, imputed employers' social contributions (such as maternity leave on full pay) were worth another €6,763 million in 2001.

through social contributions paid by self-employed workers (including farmers), pensioners and others. This is shown in detail in Table 9.

As explained earlier, social insurance in Greece is fragmented along occupational lines. The affiliation of contributors is shown in Table 10.

Table 10: **Social insurance affiliation of contributors** (2001)

	no. of contributors	% of all
private sector employees	2,014,665	47.9
IKA	*1,900,000*	*45.1*
seamen (NAT)	*37,200*	*0.9*
banking employees	*28,352*	*0.7*
press workers	*23,168*	*0.6*
other private sector workers	*25,945*	*0.6*
public sector employees	460,474	10.9
civil servants	*383,009*	*9.1*
Public enterprises	*77,465*	*1.8*
self-employed	985,090	23.4
own-account workers (OAAE)	*759,112*	*18.0*
lawyers, doctors & engineers	*207,393*	*4.9*
other self-employed workers	*18,585*	*0.4*
farmers (*ΟΓΑ*)	749,000	17.8
all contributors	4,209,229	100.0

Source: Own elaboration of data derived from Ministry of Labour & Social Insurance (2003) and Ministry of Finance (2002).

2. Benefits and taxes / contributions simulated in EUROMOD

2.1. Social benefits

EUROMOD is a cross-country comparative benefit-tax model. The model simulates a variety of taxes and benefits in each of the 15 countries of the EU. The social benefits simulated for Greece include retirement and family benefits. Table 11 summarises how each of the social benefits analysed in section 1.1 is treated in EUROMOD.

Table 11: **Treatment of benefits in EUROMOD** (2001)

	treatment	variable name
retirement benefits		
old age pensions [a]	read off	*grben_oa*
survivor pensions [a]	read off	*grben_su*
invalidity pensions [ab]	read off	*grben_si*
farmer basic pension	simulated	*gr_sben_oga_farmer*
social pension	simulated	*gr_sben_socpen*
pensioner social solidarity benefit	simulated	*gr_sben_socsolidarity*
family benefits		
lifetime pension to many-children mothers [ac]	...	...
large family benefit	simulated	*gr_sben_cb_large_family*
3rd child benefit	simulated	*gr_sben_cb_third*
unprotected child benefit	simulated	*gr_sben_cb_unprotected*
civil servant family allowance	simulated	*gr_sben_cs_cb*
ordinary family allowance	simulated	*gr_sben_cb*
unemployment benefits [a]	read off	*grben_un*
disability benefits [a]	read off	*grben_di*
housing benefits [d]	...	...

Note: [a] No information on contributions or other eligibility conditions is available in the original dataset.

[b] The variable *grben_si* includes sickness benefits.

[c] Recorded under "large family benefits" in the original dataset.

[d] Housing benefits are not recorded in the original dataset.

EUROMOD is a *static* microsimulation model. As such, it is unable to simulate benefits that depend on a contributory record. Earnings-related social insurance pensions are the clearest example of such benefits[4]. Unemployment benefits and sickness benefits are not simulated because they are dependent on prior contributions, occupational status and other categorical conditions on which no information is available in the dataset. Non-contributory disability benefits are not simulated for a similar reason, as the ECHP dataset used contains no

[4] Partial exceptions to this rule concern *ΟΑΕΔ* family allowances (since the contribution requirement in this case is minimal), civil service family allowances (where are classisfied as contributory only in a technical sense) and the pensioners' social solidarity benefit *ΕΚΑΣ* (which limits eligibility to low-income pensioners already drawing a social insurance pension).

information on disability[5]. All these benefits are "read off" the original dataset.

On the contrary, it has been possible to simulate retirement benefits that are either flat-rate (*ΟΓΑ* basic pension and social pension) or related to current income (*ΕΚΑΣ*). Family benefits are also simulated, with the exception of lifetime pension to many-children mothers which is not simulated because no information on total number of children mothered by claimant (including those children no longer living with the family) is available in the original dataset. Lifetime pension is not recorded separately in the dataset, which implies that the relevant benefit may have been reported as large family benefit. Finally, housing benefits are not recorded at all in the original dataset for Greece.

Overall, the benefits simulated in EUROMOD accounted for a combined expenditure of over €2.5 billion in 2001, that is about 14% of all spending on social benefits or 2.0% of GDP.

2.1.1. *Farmer basic pension (gr_sben_oga_farmer)*

This is a non-contributory pension, awarded to men and women living in rural areas, aged 65 and over, not in receipt of another social insurance pension, who had been active for at least 25 years in agriculture or similar sectors (such as fishing).

Eligibility conditions

Everyone receiving *ΟΓΑ* farmer basic pension in the dataset (*benelig1_name=GROGAPNS*) is eligible[6].

Income test

There is no income test.

Benefit amount

The base amount in 2001 was €141.46 per month, paid 14 times a year. Since EUROMOD assumes annual amounts to be equal to monthly amounts multiplied by 12, this is equivalised to €165.03 as if it were paid in 12 monthly instalments (*SingPay=165.0315*).

Supplements of €2.93 a month per dependant are also payable (see below). Supplements are calculated as a multiple of the base amount (*es_ch=0.02068; es_spouse_age1=0.02070*).

Definitions

Dependants are defined as:

(a) spouse aged below 65, that is too young to qualify for a farmer basic pension of

[5] In any case, given their great fragmentation, simulating disability benefits in Greece would have required extremely detailed information on type of disability, employment status etc.

[6] As explained earlier, the dataset contains no information on employment history. Therefore, it cannot identify pensioners who had been active for at least 25 years in agriculture or similar sectors. The other conditions (aged 65 and over, not in receipt of another social insurance pension) were not checked. A small proportion of beneficiaries (less than 7%) were found to be aged less than 65, but this was allowed in view of the fact that recipients of widowhood, invalidity or orphan *ΟΓΑ* basic pension can be younger.

her own right (*es_spouse_age1_max=64*),

(b) children aged up to 18 or up to 22 if in full-time education (*TAX_UNIT=cb_family*).

2.1.2. *Social pension (gr_sben_socpen)*

This is a non-contributory, income-tested pension. It is reserved to people over 65 years of age, who are not in receipt of a contributory pension from a social insurance scheme and lack independent means of support.

Eligibility conditions

Beneficiaries must be over 65 (*ge_Age1_lt=65*), except if in receipt of a social insurance pension (*ge_inc_il=socpen_ex*, defined as *socpen_ex=grben_di, grben_oa, grben_si, grben_su*).

Income test

Benefit is granted if family income does not exceed the benefit amount itself[7] (*select_il=socpen_means*).

Benefit amount

The social pension is set at the same amount as the *ΟΓΑ* farmer basic pension.

The base amount in 2001 was €141.46 per month, paid 14 times a year. Since EUROMOD assumes annual amounts to be equal to monthly amounts multiplied by 12, this is equivalised to €165.03 as if it were paid in 12 monthly instalments (*SingPay=165.0315*).

Supplements of €2.93 a month per dependant are also payable (see below). Supplements are calculated as a multiple of the base amount (*es_ch=0.02068; es_spouse_age1=0.02070*).

Those above the income threshold are not eligible at all. That is, benefit is not withdrawn gradually as other income rises. In other words, benefit award is a binary variable: either the full amount is paid or no benefit at all.

Definitions

Family income assessed (*socpen_means*) includes all sources of gross income, with the only exception of irregular lump sum benefits (*coIrRegY*) that are disregarded.

Dependants are defined as:

(a) spouse aged below 65, that is too young to qualify for a social pension of her own right (*es_spouse_age1_max=64*),

(b) children aged up to 18 or up to 22 if in full-time education (*TAX_UNIT=cb_family*).

[7] Therefore, it is possible for one spouse to be eligible for social pension if the other spouse receives *ΟΓΑ* farmer basic pension (same amount as social pension), provided he or she has no other income.

2.1.3. *Pensioner social solidarity benefit (gr_sben_socsolidarity)*

This benefit, known as *ΕΚΑΣ*, is an income-tested supplement aimed at recipients of old age and survivor pension over 60 or of invalidity pension irrespective of age. It is restricted to those receiving a contributory social insurance pension. *ΟΓΑ* pensioners are excluded on the grounds that their pension is not contributory.

Eligibility conditions

Beneficiaries must be over 60 if in receipt of an old age pension (*benelig1_name =grben_oa; ge_age1_lt=60*) or a survivor pension (*benelig2_name=grben_su; ge_age2_lt=60*). There is no age condition if in receipt of an invalidity pension (*benelig3_name=grben_si*). Recipients of a farmer basic pension (*ge_var1_name=gr_sben_oga_farmer*) or a social pension (*ge_var2_name= gr_sben_socpen*) are excluded.

Income test

Three income concepts are assessed separately:

(a) personal net income from retirement benefits and employment earnings,

(b) personal income from all sources,

(c) family income.

In 2001 the full rate was paid to those with annual incomes below:

(a) €5,263

(b) €6,742

(c) €10,492 respectively[8].

More specifically, the first income condition (personal net income from retirement benefits and employment earnings) is formulated as *ge_inc1_lt=5779.0755*, which is the threshold for access to the lowest rate of benefit (*case4_uplt_amount*). Furthermore, the personal income condition is *ge_inc2_lt=6742.2597*, while the family income condition is *ge_tu_inc_lt= 10491.7828*.

Benefit amount

The full rate of *ΕΚΑΣ* (€81.80 a month in 2001, paid 14 times a year) is paid to claimants with incomes below all thresholds. Since EUROMOD assumes annual amounts to be equal to monthly amounts multiplied by 12, the full rate is equivalised to €95.47 as if it were paid in 12 monthly instalments (*case1_amount=95.4731*).

Reduced rates are paid to those below the personal income and the family income threshold, but with personal net income from retirement benefits and employment earnings up to 10% above the relevant threshold.

[8] Note that assessment is based on tax returns of the year before the application, for incomes earned two years before the application (that is the most recent year for which a tax return is available). Since information on past incomes is not incorporated in EUROMOD, the income conditions are treated as if they referred to incomes earned in the application year.

More specifically, benefit rates are as shown in Table 12.

Table 12: ***EKAΣ* rates by net income from pensions and employment earnings** (2001)

income condition (€ per year)		benefit rate
lower bound	upper bound	(€ per month)
case1_lolt_amount=0	*case1_uplt_amount=5263.0814*	*case1_amount= 95.4731*
case2_lolt_amount=5263.0814	*case2_uplt_amount=5469.4937*	*case2_amount=71.6057*
case3_lolt_amount=5469.4937	*case3_uplt_amount=5607.0726*	*case3_amount=47.7383*
case4_lolt_amount=5607.0726	*case4_uplt_amount=5779.0755*	*case4_amount=23.8674*

Definitions

The income concept used for the first income condition (personal net income from retirement benefits and employment earnings) comprises social insurance pensions of all types except farmer basic pensions and social pensions (*penY=grben_oa+grben_si +grben_su*), as well as employment earnings (*coempY*).

The income concept used for the second (personal income from all sources) and third (total family income) conditions is the tax base (*gr_it_taxbase*). The tax base is defined as taxable income minus exemptions (self-employed and farmer social contributions plus the various tax allowances). This is analysed in section 2.2.3.

The tax unit for the family income condition is *ge_tu_inc_tu= cb_family*.

2.1.4. *Large family benefit (gr_sben_cb_large_family)*

This benefit is targeted to families with four or more children, provided that at least one of these is less than 22 years of age and still living at the parental home. Families with four or more children who are all grown up and independent are eligible for another benefit (lifetime pension to many-children mothers).

Eligibility conditions

Access to large family benefit is limited to families with at least four children, irrespective of their age[9].

On the other hand, the amount of benefit paid is determined by the number of those children who are below 22 and not married nor cohabiting (*es_ch_age1_max =22*).

Income test

An income test determining access to large family benefit was introduced in 1997 and was abolished in 2002.

The annual income threshold[10] in 2001 was €29,347 (*inc_lt =29347.0286*), increased by 10%

[9] As a matter of fact, eligibility is not restricted to children living in the parental home, but the dataset provides no information on blood ties beyond a given household. In view of that, recipient numbers are expected *a priori* to be under-estimated.

[10] See footnote 8.

per child after the fourth (*ch4_inc_lt=2934.7028*).

Benefit amount

The benefit rate in 2001 was €34.07 per month per eligible child, paid 12 times a year (*SingPay=34.066*).

This is subject to a minimum benefit rate for the family as a whole. In 2001 the minimum rate was set at €67.50 (*SBEN_amt_min=67.4981*).

Families above the income threshold are not eligible at all. That is, benefit is not withdrawn gradually as other income rises. In other words, benefit award is a binary variable: either the full amount is paid or no benefit at all.

Definitions

The family comprises the head, his partner and their children irrespective of age (*TAX_UNIT = large_family*).

Family income as assessed (*emp_cb_third_means*) includes the benefit itself.

2.1.5. *3rd child benefit (gr_sben_cb_third)*

This benefit is targeted to families with a third child aged 6 years or less.

Eligibility conditions

Access to 3rd child benefit is limited to families with three children (*ge_nch_lt=3; le_nch_lt =3*), of which at least one is aged 6 or younger (*ge_nch_age1_max= 6*).

Income test

An income test for access to 3rd child benefit was introduced in 1997 and was abolished in 2002.

The annual income threshold[11] in 2001 was €23,478. As a matter of fact, the income concept used for assessment included 3rd child benefit itself. In view of that, the relevant income test in the model is reduced by the amount of the benefit (*emp_cb_third_means=21842.4896*).

Benefit amount

The benefit rate in 2001 was €136.26 per month, paid 12 times a year (*SingPay=136.2611*).

Families above the income threshold are not eligible at all. That is, benefit is not withdrawn gradually as other income rises. In other words, benefit award is a binary variable: either the full amount is paid or no benefit at all.

[11] See footnote 8.

Definitions

The family comprises the head, his partner and their children irrespective of age (*TAX_UNIT = large_family*).

The family income concept used for assessment (*emp_cb_third_means*) is the taxable income (*taxableY*).

2.1.6. *Unprotected child benefit (gr_sben_cb_unprotected)*

This non-contributory benefit is targeted to low-income single-parent families or low-income households comprising orphans born to relatives (i.e. foster families are not eligible).

Eligibility conditions

Since the dataset cannot identify households comprising orphans born to relatives, access to unprotected child benefit as operationalised here is limited to single-parent families alone (*IsLp1=1*).

Income test

The annual income threshold[12] in 2001 was €2,817 for a three-member family (*inc_lt =234.7762* on a monthly basis).

The threshold is increased by €247 for each additional member beyond the first three (*pers3_inc_lt=20.5429* on a monthly basis).

Benefit amount

The benefit rate per eligible child in 2001 was set at €44.02 per month, paid 12 times a year (*SingPay=44.0205; es_ch=1*).

Families above the income threshold are not eligible at all. That is, benefit is not withdrawn gradually as other income rises. In other words, benefit award is a binary variable: either the full amount is paid or no benefit at all.

Definitions

Children are defined as individuals aged up to 18, or up to 22 if in full-time education (*TAX_UNIT=cb_family*).

The family income concept used for assessment (*emp_cb_means_disreg_rent*) excludes rent.

2.1.7. *Civil servant family allowance (gr_sben_cs_cb)*

This is a non-contributory benefit paid to all civil servants with children as an allowance (i.e. salary supplement).

[12] See footnote 8.

Eligibility conditions

Eligible are families where at least one parent is a civil servant (*IsCIVSRV=1*).

Income test

There is no income test.

Benefit amount

The amount of benefit rises with the number of children.

Benefit rates are shown in Table 13.

Table 13: **Civil servant family allowance rates by number of children** (2001)

no. of children	benefit rate	
	marginal increments as multiples of base rate *(SingPay=17.6082)*	€ per month (cumulative)
1	*es_ch_parity1 = 1.0000*	17.61
2	*es_ch_parity2 = 1.0000*	35.22
3	*es_ch_parity3 = 2.0000*	70.43
4	*es_ch_parity4 = 2.6667*	117.39
5	*es_ch_parity5 = 4.1667*	190.76
6	*es_ch_parity6 = 4.1667*	264.12

Note that the family allowance can be paid to both parents, if both are civil servants.

Definitions

Children are defined as individuals aged up to 18, or up to 22 if in full-time education (*TAX_UNIT=cb_family*).

2.1.8. *Ordinary family allowance (gr_sben_cb)*

This is a contributory benefit, known as *ΟΑΕΔ* family allowance, paid to families of private sector workers[13] with children. Unlike civil servant family allowance, it is not paid as salary supplement but has to be claimed separately.

Eligibility conditions

Eligible are families where at least one parent is a private sector employee (*IsEmployee1=1*), or a recipient of unemployment benefit (*benelig1=1; benelig1_name=grben_un*)[14]. Civil servants are not eligible (*IsCIVSRV=-1*).

[13] In fact, as a result of collective agreements, separate arrangements are in force in some sectors, for instance in banking, not simulated here.

[14] Claimants must also have a rather minimal contributory record (at least 50 days in the previous year, unless in receipt of unemployment benefit or incapable of working because of illness or disability). This is ignored here.

Income test

Prior to 1999 *ΟΑΕΔ* family allowance was inversely related to family income (lower rates of benefit were paid to higher-income families). Since 1999 benefit has been paid at a flat rate to all beneficiaries irrespective of income.

Benefit amount

The amount of benefit rises with the number of children.

Benefit rates are shown in Table 14.

Table 14: **Ordinary family allowance rates by number of children** (2001)

no. of children	benefit rate	
	marginal increments as multiples of base rate *(SingPay=5.8694)*	€ per month (cumulative)
1	*es_ch_parity1 = 1.000*	5.87
2	*es_ch_parity2 = 2.000*	17.61
3	*es_ch_parity3 = 3.750*	39.62
4	*es_ch_parity4 = 1.450*	48.13
5	*es_ch_parity5 = 1.375*	56.20

Definitions

Children are defined as individuals aged up to 18, or up to 22 if in full-time education (*TAX_ UNIT=cb_family*).

2.2. Personal income tax

The main tax simulated for Greece is personal income tax (gr_it). As mentioned earlier, personal income tax receipts amounted to €6,156 million in 2001, which is equivalent to about 18.6% of all tax revenue (i.e. excluding social contributions that are treated separately).

All residents are required to file income tax returns if their annual income exceeds €3,000. Over 4.95 million tax units on behalf of 9.89 million persons (including dependent children) filed a tax return in 2002 (i.e. for incomes earned in 2001). Therefore, the coverage of personal income tax reached 90.2% of the entire population.

2.2.1. *Tax unit*

Personal income tax is individual. Spouses file a joint income tax return, but their incomes are entered separately and taxed individually (*TAX_ UNIT=individual*).

However, as explained shortly, there is a partial exception to this rule: various tax allowances and/or tax credits are jointly assessed (*TAX_ UNIT=cb_family_tax*). The tax unit for the joint assessment of tax allowances/credits is broader as it includes both spouses and any dependent children.

2.2.2. *Tax allowances*

Tax allowances are defined as exemptions from taxable income.

Five tax allowances are simulated here: (a) medical expenses tax allowance, (b) mortgage interest tax allowance, (c) education expenses tax allowance, (d) rent tax allowance and (e) private insurance contributions tax allowance.

2.2.2.1. Medical expenses tax allowance (*gr_it_med_ded*)

Medical expenses in 2001 could be exempted from taxable income in full up to the sum of €29,347 (*incomebase_il = taxableY*; *maximum for full deduction: Gr_maxded1=29347.028*). Any excess amount up to the sum of €44,021 could be exempted in half (*maximum for partial deduction: Gr_maxded2=44020.5429; rate for partial deduction: Gr_medded_rate=0.5*). No exemption could be allowed for the part exceeding €44,021.

More specifically, the exemption is calculated according to the rule shown in Table 15.

Table 15: **Calculation of medical expenses tax allowance** (2001)

case no.	*if :*		*then :*
	taxable income (Y)	medical expenses (M)	exemption (E)
1a	Y< €29,347	M < Y	E = 100% M
1b		M > Y	E = 100% Y
2a	€29,347 < Y < €44,021	M < Y	E = €29,347 + 50% (M − €29,347)
2b		M > Y	E = €29,347 + 50% (Y − €29,347)
3a	Y > €44,021	M < €44,021	E = €29,347 + 50% (M − €29,347)
3b		M > €44,021	E = €36,684*

Note: * E = €29,347 + 50% (€44,021 − €29,347) = €36,684

Note that this tax allowance is jointly assessed: individual medical expenses are summed up across all tax unit members. In the case of two-earner households, the resulting exemption is then reallocated to the spouses in proportion to their taxable income (*TAX_UNIT=cb_family_tax*)[15].

The variable identifying medical expenditure (*medexp_var=grEXHLTH*) has been imputed on the basis of a procedure explained elsewhere[16].

2.2.2.2. Mortgage interest tax allowance (*co_morint*)

The interest (not capital) repayments of housing loans taken out before 31 December 1999 could be fully exempted from taxable income in 2001. In the case of housing loans taken out after 1 January 2000, interest repayments could be exempted in full if the housing unit bought was up to 120 square metres. If the housing unit exceded 120 square metres the exemption

[15] The procedure for sharing tax allowances between spouses is shown in module "*co_share_var_il* = sharing tax allowances between spouses" (share_il_name=it_shared_allowances; prop_il_name=taxableY; output_var_name=gr_it_fam_ded; TAX_UNIT =couple).

[16] See O'Donoghue, Baldini & Mantovani (2001), discussed here in section 3.3.4.

was calculated on a *pro rata* basis[17].

The interest component of mortgage repayments depends on the exact type of housing loan, but is generally a decreasing function of time: in early years interest repayments are a higher proportion of total mortgage repayments than towards the end of the repayment period.

Since such detailed information is lacking, a simple method is applied in order to separate interest repayments from capital ones. As a rough approximation, the discriminating variable is the age of the head of the tax unit (*select_var=coAGE*).

More specifically, two cases are identified:

- If the head of the tax unit is aged up to 39 (*case1_uplt_amount=39*), interest payments are assumed to be 40% of total mortgage repayments (*case1_amount=0.4*).
- If the head of the tax unit is aged 40 or over (*case2_lolt_amount=40*), interest payments are 20% of total mortgage repayments (*case2_amount=0.2*).

The variable identifying mortgage repayments (*grMORT*), containing both interest and capital repayments, is then multiplied by the appropriate factor (stored in *co_temp1*).

2.2.2.3. Education expenses tax allowance (*gr_it_tuition_ded*)

Expenses on private lessons or cramming school fees in 2001 were exempted from taxable income in full up to the sum of €440 per year (*case1_uplt_amount=440.2054*). If such expenses exceded that threshold, the exemption was calculated as 40% of the relevant amount (*number1=0.4*), subject to a minimum of €440 (*case2_lolt_amount=440.2055*) and a maximum of €734 (*case2_uplt_amount=733.6757*).

The variable identifying education expenditure (*var1=grExEduc*), imputed on the basis of a procedure explained elsewhere[18], contains items that may not or may not be eligible for the tax allowance (such as, for instance, tuition fees at private schools). On the other hand, claims for the exemption of eligible items must be accompanied by the relevant receipts, which will not be available if the tuition in question is provided on a "moonlighting" basis (as is often the case with private lessons). For these reasons, as a rule of thumb only 50% of the variable value is assumed to be eligible for the tax allowance (*var1=grExEduc; number1=0.5*).

Note that this tax allowance is jointly assessed: individual education expenses are summed up across all tax unit members. In the case of two-earner households, the resulting exemption is then reallocated to the spouses in proportion to their taxable income (*TAX_UNIT=cb_family_tax*)[19].

2.2.2.4. Rent tax allowance (*gr_it_rent_ded*)

In 2001 rent was exempted from taxable income in full up to the sum of €440 per year (*case1_uplt_amount=440.2054*). If rent exceded that threshold, as was likely to be always the case, the exemption was calculated as 40% of the relevant amount (*number1=0.4*), subject to a minimum of €440 (*case2_lolt_amount=440.2055*) and a maximum of €734 (*case2_uplt_*

[17] Since the original data used here are for the year 1995 updated to 2001, only the first case is simulated here (full exemption of mortgage interest repayments).

[18] See footnote 16.

[19] See footnote 15.

amount=733.6757). The variable identifying rent is read off the original data (*var1= coRent*).

Note that this tax allowance is jointly assessed: household expenditures on rent are allocated to tax-paying members in proportion to their taxable income (*TAX_ UNIT=cb_family_tax*)[20].

2.2.2.5. Private insurance contributions tax allowance (*gr_it_priv_contrib_ded*)

Private insurance contributions in 2001 were exempted from taxable income in full up to the sum of €440 per year (*case1_uplt_amount=440.2054*). If insurance contributions exceded that threshold, the exemption was calculated as 40% of the relevant amount (*number1=0.4*), subject to a minimum of €440 (*case2_lolt_amount=440.2055*) and a maximum of €734 (*case2_uplt_ amount=733.6757*). The variable identifying private insurance contributions is read off the original data (*var1= priv_contrib*).

Note that this tax allowance is jointly assessed: individual expenditures on private insurance contributions are summed up across all tax unit members. In the case of two-earner households, the resulting exemption is then reallocated to the spouses in proportion to their taxable income (*TAX_ UNIT=cb_family_tax*)[21].

2.2.3. *Tax base*

The tax base (*gr_it_taxbase=il1−il2*) is defined as taxable income (*il1=taxableY*) minus the various exemptions (*il2= it_ded*).

Taxable income includes all sources of income. More specifically, the definition of taxable income is as follows:

> *taxableY = coempy + coinvy + coirregy + columpy + comainty + comatery + coothery + copropy + coprvpen + coregy + coslfemy gr_sben_cb + gr_sben_cs_ cb + gr_sben_oga_farmer + gr_sben_socpen + gr_sben_socsolidarity + grben_ oa + grben_si + grben_su + grben_un*

Exemptions from the tax base include social insurance contributions plus the tax allowances referred to above:

> *it_ded = gr_eesic + gr_cssic + gr_sesic + gr_frmsic + gr_pesic + co_morint + gr_it_med_ded + gr_it_tuition_ded + gr_it_rent_ded + gr_ it_priv_contrib_ded*

2.2.4. *Tax schedule*

Income taxation is graduated, with progressively higher marginal tax rates applying to higher income brackets. The tax schedule in 2001 included 6 such brackets. This is shown in Table 16.

[20] See footnote 15.

[21] See footnote 15.

Table 16: **Tax schedule: general case** (2001)

tax band no.	income bracket (€ per annum)		tax rate (%)
	lower limit	upper limit	
1	0	6,163	0
2	6,163	8,352	5
3	8,352	13,359	15
4	13,359	23,357	30
5	23,357	50,028	40
6	50,028	n.a.	42.5

In the case of tax payers with income from employment earnings and/or retirement benefits, the upper limit to tax band 1 could be extended by up to €880 per annum (*emp_pen_band1_add= 880.4108; pen_emp_il=pen_emp; pen_emp = coempy + grben_di + grben_oa + grben_si + grben_su + grben_un*)[22].

The resulting tax schedule is shown in Table 17.

Table 17: **Tax schedule: employees and pensioners** (2001)

tax band no.	income bracket (€ per annum)		tax rate (%)
	lower limit	upper limit	
1	0	7,043	0
2	7,043	8,352	5
3	8,352	13,359	15
4	13,359	23,357	30
5	23,357	50,028	40
6	50,028	n.a.	42.5

2.2.5. Tax credits

Tax credits are defined as deductions from tax due. Two such instruments are simulated here: (i) child tax credit and (ii) household expenses tax credit.

Note that these tax credits are non-refundable. In other words, final tax is calculated as the amount of tax resulting from the tax schedule (*cosim_polout*) minus the sum of all tax credits (*co_it_total_tcred*), subject to a minimum of 0 (*lo_limit_amount=0*).

2.2.5.1. Child tax credit

The per-child value of the tax credit is a positive function of the number of children in the tax unit. This is shown in Table 18 below.

[22] The justification for this seems to be the perceived need to compensate employees and pensioners for the fact that other categories of tax payers (e.g. the self-employed) are widely believed to understate their true incomes in order to evade tax.

Table 18: **Child tax credit** (2001)

no. of children	child tax credit	
	per child (€ per annum)	per tax unit (€ per annum)
case1_lolt_amount=0	case1_amount=0	0
case2_ lolt_amount=1	case2_amount=88.041	88
case3_ lolt_amount=2	case3_amount=102.7146	205
case4_ lolt_amount=3	case4_amount=205.4292	616
case5_ lolt_amount=4	case5_amount=234.7762	939
case6_ lolt_amount=5	case6_amount=264.1233	1,321
case7_ lolt_amount=6	case7_amount=293.4703	1,761
case8_ lolt_amount=7	case8_amount=322.8173	2,260
case9_ lolt_amount=8	case9_amount=352.1643	2,817
case10_ lolt_amount=9	case10_amount=381.5114	3,434

Note that, in the case of two-earner households, the child tax credit is allocated to the spouses in proportion to their taxable income (*TAX_UNIT=cb_family _tax*)[23].

2.2.5.2. Household expenses tax credit (*gr_it_household_exp_tcred*)

According to the tax rules in force in 2001, the household expenses tax credit is calculated as follows:

- First, total household expenses are identified from a relevant variable list (*il1=hh_exp; hh_exp = grEXCLFT + grEXHOUS + grEXLEIS + grEXOTHR + grEXREST*), subject to a maximum of €2,935.
- Then, eligible expenses are derived by multiplying total household expenses by a factor of 30% (*number1=0.3*), subject to a maximum of €880 (*up_limit=880.4109*).
- Finally, the tax credit is derived by multiplying eligible expenses by the marginal tax rate applicable (*gr_it_mitr*), subject to a maximum marginal tax rate of 15% – that is a maximum tax credit of €132 (*up_limit=132.0616*).

Note that, in the case of two-earner households, the household expenses tax credit is allocated to the spouses in proportion to their taxable income (*TAX_UNIT=cb_family _tax*)[24].

2.2.6. *Withholding tax on benefits (gr_ benit)*

Certain benefits are taxed at source at 10% plus 1.2% stamp duty. When, after the financial year is over, beneficiaries file a tax return, they can choose either to have their benefits taxed as normal income, or to "have their liability exhausted with the tax already withheld". In the former case, the 10% tax deducted at source (not the stamp duty) will be assessed against tax due. In the latter case, benefits will be taxed at a flat rate of 10% + 1.2%.

[23] The procedure for sharing tax credits between spouses is shown in module "*co_share_var_il* = sharing tax credits between spouses" (share_il_name=it_shared_tc; prop_il_name=taxableY; output_var_name=co_it_ total_tcred; TAX_UNIT =couple).

[24] See footnote 23.

In theory, the rule means that rational taxpayers have benefits taxed as income only when their marginal tax rate is below 10%. In practice, few tax payers enter income from certain benefits in their tax return.

In view of the above, the withholding tax on benefits (*gr_benit*) is assumed to apply to the following benefits alone (*number1=0.112; il1=bentaxbase*):

- large family benefit (*gr_sben_cb_large_family*)
- 3rd child benefit (*gr_sben_cb_third*)
- unprotected child benefit (*gr_sben_cb_unprotected*)
- disability benefits (*grben_di*).

By contrast, all other benefits are assumed to be taxed as normal income.

2.3. Social contributions

Social contributions are paid by all members of social insurance organisations, whether active or retired. As elsewhere in continental Europe, membership of a social insurance organisation is compulsory.

Social insurance in Greece, as explained earlier, is highly fragmented, with contribution rates varying considerably between (and, sometimes, within) social insurance organisations. In view of that, attempting to simulate all possible cases would be rather futile (and, probably, superfluous).

Instead, each contributor category is represented by the largest social insurance organisation for that category. This is shown in Table 19.

Table 19: **Social contributions simulated** (2001)

contributor category	rules simulated	variable name	coverage (%)
private sector employees	*IKA*	*gr_eesic*	94.3
public sector employees	*civil servants insurance*	*gr_csrsic*	83.2
self-employed	*TEBE*	*gr_sesic*	56.9
farmers	*ΟΓΑ*	*gr_frmsic*	100.0
all contributors			85.3

Moreover, pensioner social contributions are also applied (*gr_pesic*), while the rules of *IKA* are used to simulate employer social contributions (*gr_ersic*).

2.3.1. *Employee social contributions (gr_eesic)*

Workers insured with *IKA* (94.3% of all private sector employees) pay social contributions at a flat rate of 15.9% (*rate=0.159*) of reference earnings (*incomebase_il=coEMPY)*. Here, as explained above, *IKA* contribution rules are applied to the entire sample of private sector employees. This sample excludes civil servants and other public sector workers (*exclude_ civsrv=1*), as these are covered by a separate scheme.

Occupations that are officially classified as "hazardous" are subject to extra contributions at 3.45% of earnings (*add_rate=0.0345*). Workers in "hazardous" occupations are identified by

a special variable (*add_rate_var=grHAZ*). This is discussed in section 3.3.4.1.

An upper earnings threshold of €1,741 in 2001 (*upper_limit_contrib=1741.4526*) applies to those first employed before 31 December 1992, while later entrants to the labour market have to pay contributions on their full earnings. In order to operationalise this, a variable has been created (*grYEARSINWRK*) to restrict eligibility for the contribution ceiling to those with 9 or more years in employment (*upper_limit_y_in_wrk=9*).

2.3.2. *Employer social contributions (gr_ersic)*

Employer contributions on behalf of workers insured with *IKA* are set at 28.16% of reference earnings (rate=0.2816). *IKA* contribution rules are applied to all private sector employees. The sample of workers on behalf of which employer contributions are paid is the same as for employee social contributions (*gr_eesic*). "Hazardous" occupations are subject to additional employer contributions at 2.15% of earnings (*add_rate=0.0215*).

As explained above, a contribution ceiling (for earnings over €1,741 in 2001) applies to those first employed before 31 December 1992 (*upper_limit_contrib=1741.4526*). Later entrants to the labour market have to pay contributions on their full earnings. A variable has been created (*grYEARSINWRK*) to restrict eligibility to those with 9 or more years in employment (*upper_limit_y_in_wrk=9*).

Private sector social contributions, based on *IKA* rules, for both employees and employers are analysed as shown in Table 20 below.

Table 20: **Social contributions: private sector employees** (2001)

social insurance contributions (SIC) paid for:	contributions due as % of reference earnings	
	employee (*gr_eesic*)	employer (*gr_ersic*)
case 1: general regime		
primary pension	6.67	13.33
supplementary pension	3.00	3.00
sickness insurance	2.55	5.10
unemployment insurance	1.00	2.00
family benefits	1.00	1.00
other benefits	1.68	3.73
total SIC: general regime	15.90	28.16
case 2: hazardous occupations		
primary pension	2.20	1.40
supplementary pension	1.25	0.75
extra SIC: hazardous occupations	3.45	2.15
total SIC: hazardous occupations	19.35	30.31

2.3.3. *Civil servants social contributions (gr_csrsic)*

Civil servants (83.2% of all public sector employees) pay social contributions at a flat rate of 16.22% (*rate1=0.1622*) of reference earnings (*base_il=coEMPY)*. As explained earlier, civil service contribution rules are applied to all public sector sector employees. Civil servants are identified through a variable in the original dataset (*coCIVSRV; IsCivSrv=1*).

Social contributions of public sector workers, as proxied by civil servants, are analysed in Table 21 below.

Table 21: **Social contributions: public sector employees** (2001)

social insurance contributions (SIC) paid for:	employee contributions (*gr_cvsic*) due as % of reference earnings
primary pension	6.67
supplementary pension	5.00
sickness insurance	2.55
separation benefits	2.00
total SIC	16.22

2.3.4. *Self-employed social contributions (gr_sesic)*

Social contributions of self-employed persons not in agriculture are simulated on the basis of *TEBE* (the largest social insurance organisation in this category insuring 56.9% of all self-employed workers outside agriculture in 2001)[25].

Since reference earnings are not known in advance in the case of self employment, social contributions are set at fixed amounts per "insurance class", according to a schedule revised annually. In *TEBE* there are 10 insurance classes for those first employed before 31 December 1992 plus another 5 for later entrants to the labour market.

Self-employed social contributions, based on *TEBE* rules, are shown in Table 22 below.

Table 22: **Social contributions: self-employed workers** (2001)

insurance class (*grTEBEclass*)	contributions due (€ per annum)		
	pension insurance	sickness insurance	total
case 1: contributors to the "old" regime			
A	370	599	968
B	535	599	1,134
C	687	599	1,285
D	845	599	1,444
E	1,127	599	1,726
F	1,282	599	1,881
G	1,581	599	2,180
H	2,268	599	2,867
I	2,923	599	3,522
J	3,571	599	4,170
case 2: contributors to the "new" regime			
1	867	474	1,341
2	1,066	583	1,649
3	1,806	691	2,497
4	2,088	799	2,887
5	2,358	902	3,260

Note: "Old" contributors were first employed before 31 December 1992.

"New" contributors were first employed after 1 January 1993.

[25] *TEBE* has merged with two smaller social insurance organisations of the self-employed (*TAE* and *ΤΣΑ*) to create *OAEE*, which covered 77.1% of all self-employed workers not in agriculture in 2001.

On joining *TEBE*, contributors to the "old" regime (i.e. those already active on 31 December 1992) are allocated to insurance class E. After a year they move to insurance class F and after another five years to insurance class G. In 2001, 96.8% of all old members were in classes E, F or G.

Similarly, contributors to the "new" regime (i.e. those first employed after 1 January 1993) are allocated to insurance class 1. Every two years they move up one class, until they reach insurance class 5 where they can remain until retirement. In 2001, 96.6% of all new members were in classes 1 to 4.

The procedure for allocating contributors to insurance classes is explained in section 3.3.4.2.

2.3.5. *Farmer social contributions (gr_frmsic)*

Persons active in agriculture and related occupations such as fishing, as well as those active in other sectors but resident in rural areas – defined as settlements with a population below 2,000 inhabitants – are all insured with *ΟΓΑ*. Until recently *ΟΓΑ* mostly provided non-contributory benefits, such as farmer basic pensions. Since 1998 it has developed into a social insurance organisation, collecting contributions and providing contributory benefits, such as new farmer main pensions gradually introduced in the same year.

The most typical unit of the agricultural economy in Greece is the small family farm. As a consequence of that, although some *ΟΓΑ* members are employees, most are self-employed. In view of that, contributions are defined in proportion to a "theoretical income" in 7 insurance classes, revised annually. The amount of social contributions corresponding to each insurance class was set at approximately 8.5% of theoretical income in 2001 (7% for pension insurance plus 1.5% for sickness insurance).

Contributors can choose insurance class freely. In 2001, 76.8% of contributors were found in class 1, while about 6% each in classes 2, 3 and 7. The procedure for identifying farmers and for allocating contributors to insurance classes is explained in section 3.3.4.3.

Farmer social contributions are shown in Table 23 below.

Table 23: **Social contributions: farmers** (2001)

insurance class (*grFrmIncOrder*)	theoretical income (€ per annum)	contributions due (€ per annum)		
		pension	sickness	total
1	3,767	264	57	320
2	4,669	327	70	397
3	5,619	393	85	478
4	6,933	486	104	590
5	8,248	578	124	702
6	9,553	669	143	812
7	10,848	760	163	923

2.3.6. *Pensioner social contributions (gr_pesic)*

Pensioner social contributions are levied at a flat rate of 4% (*rate1=0.04*) of pension income (*base_il = grben_oa + grben_su + grben_si + gr_sben_oga_farmer + gr_sben_socpen*). Such contributions pay for sickness insurance and are deducted at source.

3. The data

3.1. General description

The database used here is the Greek sample of the European Community Household Panel (ECHP), a survey designed by Eurostat and carried out by the National Statistical Service of Greece (*ΕΣΥΕ*). The datafile used is the User Database (UDB), provided by Eurostat.

The information available in the database is drawn from a representative sample of the Greek population. All members of participating households are interviewed in detail if aged 16 or more. The database contains detailed information on income, housing and other demographic, social and economic characteristics of the respondents. The information available for children (individuals below the age of 16) is restricted to demographic characteristics – such as age, gender and relation to the other household members.

The baseline information used in the model has been derived from ECHP wave 3 (year 1996). As is the case with all ECHP waves, the incomes reported in that survey referred to the year before (1995). In order to reconcile income and labour status information, employment and occupation variables were taken from ECHP wave 2 (year 1995).

3.2. Sample selection / weighting

The original ECHP wave 3 contained 15,183 members of 5,214 households. Of these, 121 individuals in 46 households reported zero incomes from all sources. These households were excluded from EUROMOD input data. As a result, the sample used in the model numbers 15,062 individuals in 5,168 households.

The weights provided by the ECHP are household weights aiming to correct for selective non-response and panel attrition. In EUROMOD these weights have been scaled up to offset the exclusion of 121 individuals in 46 households from the original sample. No reweighting was performed. Sample statistics and output estimates were projected to a reference population of 10,542,100 individuals in 3,720,085 households. Population estimates were provided by the National Statistical Service of Greece on the basis of the 1991 Population Census.

3.3. Data adjustment

This section summarises the most important adjustments performed to make data suitable for the purposes of EUROMOD.

3.3.1. Net-to-gross conversion

The income information available in the survey is net of income tax withholdings and social insurance contributions. In order to obtain gross figures, a procedure has been developed *ad hoc*, taking into account current legislation on income tax withholdings and social insurance contributions. This procedure is explained in length elsewhere[26].

[26] See Immervoll & O'Donoghue (2001).

3.3.2. Splitting benefits

The ECHP has not been designed to reflect the social benefit system of any one country. It may therefore be the case that some variables in the UDB correspond to more social benefits each. This aggregation, though inevitable, remains a limitation for the purposes of simulating any particular benefit system in detail.

This is the case with the variable PI134 (social benefits / sickness and invalidity) in the ECHP for Greece. As defined in the original dataset, this variable covers a very heterogeneous mix of policy instruments, such as contributory invalidity pensions and sickness benefits as well as non-contributory disability benefits.

In view of that, a cut-off point in the original dataset was taken to split variable PI134 into two:

(a) contributory invalidity pensions or sickness benefits (*grben_si*) and

(b) non-contributory disability benefits (*grben_di*).

The choice of cut-off point (drs. 27,800 in 1995), as is always the case, was partly arbitrary. It was based on the observation that no invalidity pension was below the cut-off, while the number of those receiving disability benefit at a *higher* rate than the cut-off was less than 16,800 persons in all (0.16% of population). It must be added that later policy developments narrowed the gap between the two types of benefit: in 1994 the standard disability benefit ("severe disability benefit") was worth 32% the standard invalidity pension (*IKA*), while by 2001 the relevant ratio had risen to 47%.

In 2001, the median monthly value of *grben_si* was €279.38, while the median monthly value of *grben_di* was €147.74. Appropriate adjustments were made to account for the fact that the former is paid 14 times a year, while the latter only 12.

3.3.3. Expenditure

As the ECHP is an income survey, it contains no information on household expenditure. Such information, however, is necessary for the simulation of tax allowances discussed in section 2.2.2. The imputation of expenditure variables has been carried out according to a procedure developed *ad hoc* for the purposes of the EUROMOD model. This procedure is explained in detail elsewhere[27].

3.3.4. Contributors

As explained earlier (section 1), in Greece the benefit entitlements and social contributions of any given individual depend considerably on his or her social insurance affiliation. However, the original dataset contains no such information. As a consequence of that, contributors had to be somehow allocated to social insurance organisations – and, in some cases, to particular categories within organisations. The problem was particularly acute in the case of workers in "hazardous" occupations (*IKA*), the self-employed outside agriculture (*TEBE*) and farmers (*ΟΓΑ*).

[27] See O'Donoghue, Baldini & Mantovani (2001).

3.3.4.1. Hazardous occupations (*grHAZ*)

About 40% of all *IKA* contributors work in occupations officially designated as "hazardous". They have the right to retire on a full pension up to 5 years before others. On the other hand, as explained in section 2.3.1, they pay social contributions at a higher rate. It is for this reason that identifying those contributors is important for the purposes of modelling the benefit-tax system of Greece.

The following conditions were specified to identify workers in "hazardous" occupations:

- employment status must be "employee" (*coEmpSt=3*) and
- occupation must be "technician or associate professional" (*coOcc=3*) or "craft or trades worker" (*coOcc=7*) or "plant or machine operator" (*coOcc=8*) or
- occupation must be "skilled agricultural" (*coOcc=6*) or "elementary occupation" (*coOcc=9*), except when industry is "agriculture" (*coIndust=1* was excluded).

3.3.4.2. Self-employed (*gr_sesic*)

Self-employed contributors were identified as individuals satisfying the following conditions:

- employment status must be "employer or self-employed" (*coEmpSt=2*),
- income from self-employment must be non-zero (*coSlfEmY>0*) and
- contributions paid to farmers social insurance must be zero (*gr_frmsic=0*).

The last condition excludes farmers (see section 3.3.4.3).

Furthermore, as explained in section 2.3.4, it was assumed that all those identified as self-employed except farmers were contributors to *TEBE* (56.9% of that category really were in 2001).

Before the contributions of those identified as contributors could be modelled, two issues had to be resolved: firstly, how to identify contributors to the "old" regime (i.e. those first insured before 31 December 1992) from contributors to the "new" regime (i.e. those first insured after 1 January 1993); secondly, how to assign contributors to insurance classes.

In order to resolve the first issue, a new variable was constructed (*years_working*), showing the year difference between an individual's current age and the earliest age at which he or she could have entered the labour market. The latter was set equal to:

- 22 (females) / 24 (males) for those with tertiary education,
- 18 (females) / 20 (males) for those with upper secondary education,
- 16 (females) / 18 (males) for those with elementary or lower secondary education.

In other words, the possibility of someone starting work before finishing school or college was dismissed. Moreover, the earliest age for entering the labour market was postponed by two years in the case of males to account for compulsory military service.

If the year difference between an individual's current age and the earliest age at which he or she could have entered the labour market was negative or zero, the value of the new variable (*years_working*) was set equal to 1.

With a view to resolving the second issue, the resulting values of the new variable were used to allocate *TEBE* contributors between the "new" and the "old" contribution regimes. More specifically, to match the actual distribution of *TEBE* contributors, the lowest 25.7% with

respect to the distribution of *years_working* were classified as contributors to the new regime, while the remaining 74.3% were classified as contributors to the old regime.

Finally, self-employment earnings (*coSlfEmY*) were used to allocate contributors to insurance classes. To mimic the quasi-proportional effect intended, the higher one's earnings the higher his or her insurance classes. Income brackets were chosen so that the resulting distribution of contributors between insurance classes matched the actual one, shown in Table 24.

Table 24: **Distribution of *TEBE* contributors by insurance class** (2001)

insurance class (*grTEBEclass*)	no. of contributors	%
"old" contributors		
A	0	0.0
B	0	0.0
C	104	0.0
D	202	0.0
E	27,882	5.0
F	99,903	17.8
G	274,821	49.1
H	4,953	0.9
I	2,037	0.4
J	6,181	1.1
total "old" contributors	416,083	74.3
"new" contributors		
1	40,545	7.2
2	54,667	9.8
3	27,244	4.9
4	16,695	3.0
5	4,878	0.9
total "new" contributors	144,029	25.7
all contributors	560,112	100.0

Contribution rates by insurance class were shown earlier in Table 22.

3.3.4.3. Farmers (*gr_frmsic*)

Firstly, farmers had to be identified. All individuals satisfying the following condition were designated as farmers:

- industry must be "agriculture" (*coIndust=1*) and
- employment status must be "employer or self-employed" (*coEmpSt=2*) or "employee" (*coEmpSt=3*) or employment status must be "other"[28] (*coEmpSt=9*).

Secondly, contributors had to be selected among those identified as farmers. According to *ΟΓΑ* rules, although membership of the new main pension scheme instituted in 1998 is compulsory for the head of a farming household, it is optional for secondary workers (typically, wives). In view of the fact that many wives actually did choose to participate, both

[28] The employment status of wives or sons/daughters working in the family farm may be classified as "other".

spouses were selected as contributors if family income was below a multiple of 2.5 times the lowest rate of social contributions[29] (*gr_frmsic*).

Thirdly, contributors had to be allocated to insurance classes. As explained in section 2.3.5, farmer social contributions are related to a "theoretical income". However, precisely because that income is theoretical, contributors are free to choose which of the 7 insurance classes to join. Since the actual distribution of *ΟΓΑ* contributors by insurance class is known, in the model contributors were allocated to each insurance class according to their income.

More specifically, a new variable (*grFrmIncOrder*) was created to group contributors into the 7 insurance classes. The variable ranked individuals by income (*coEmpY+coSlfEmY*). In each group, the number of contributors was chosen to correspond to the actual distribution of *ΟΓΑ* contributors shown in Table 25.

Table 25: **Distribution of *ΟΓΑ* contributors by insurance class** (2001)

insurance class (*grFrmIncOrder*)	no. of contributors	%
1	574,857	76.8
2	44,308	5.9
3	45,039	6.0
4	23,712	3.2
5	13,579	1.8
6	4,592	0.6
7	42,743	5.7
all contributors	748,830	100.0

In other words, the 76.8% of contributors with the lowest income were allocated to insurance class 1, the next 5.9% to insurance class 2 and so on, up to the 5.7% of contributors with the highest income, allocated to insurance class 7.

3.4. Updating

The dataset used for Greece derives from the 1995 European Community Household Panel (ECHP). Employment earnings and social benefit data have been updated to the year 2001 on the basis of appropriate adjustment factors by income source. No account was taken of other economic, social and demographic changes taking place between 1995 and 2001.

The adjustment factors used are shown in Table 25 on the following page.

[29] The purpose of that is to avoid negative disposable family incomes. Note that individual net incomes can be negative (for example when the farmer's wife pays contributions even though she has no income of her own).

Table 26: **Uprating factors** (1995 to 2001)

income source	uprating factor
employment incomes	
gross earnings of public sector employees	1.665
gross earnings of private sector employees outside banking	1.446
gross earnings of banking employees	1.663
gross earnings from self-employment (university degree)	1.728
gross earnings from self-employment (other)	1.471
non-simulated benefits	
old age pensions (*grben_oa*)	1.428
invalidity pensions (*grben_si*)	1.428
non-contributory disability benefits (*grben_di*)	1.928
unemployment benefit (*grben_un*)	1.331
simulated benefits	
pensioner social solidarity benefit (*gr_sben_socsolidarity*)	2.343
farmer pension (*gr_sben_oga_farmer*)	1.925
social pension (*gr_sben_socpen*)	1.925

Source: Bank of Greece (2002) and own elaboration of data collected from social insurance organisations and other benefit agencies.

4. Validation

EUROMOD is validated against two types of sources. The first type is official statistics. This information permits one to contrast the results obtained from the EUROMOD baseline against publicly available statistics provided by official sources. This first feature is drawn upon in section 4.1 where *policy instruments* are validated.

The second source is the European Community Household Panel (ECHP). As explained in section 3.1, the EUROMOD module for Greece relies on the ECHP database in the first place. However, rather than reading household disposable income off the original data, EUROMOD recalculates it by simulating certain taxes and benefits. This second feature is drawn upon in section 4.2 where *distributive outcomes* are validated.

Before the results of validation are presented, it is rather necessary to strike a note of caution as regards the reference population used for projecting sample statistics. When EUROMOD was built, population projections provided by the National Statistical Service of Greece were based on the 1991 Population Census. These projections were substantially revised when data from the 2001 Population Census became available.

The main reason for that was the massive population movements witnessed in the 1990s. As severe economic crisis, political instability, civil unrest or outright war plagued the rest of southeastern Europe, an unknown number of foreign immigrants (estimated to be at the very least 600,000) chose to settle in Greece.

Since many immigrants remained illegal and, therefore, rather wary of officialdom, the 2001 Population Census could only provide a partial picture of demographic change in Greece. Nevertheless, as Table 27 shows, the differences between original and revised estimates can be considerable.

According to the revised estimates, the population of Greece is larger, while the proportion of children and the elderly is lower than previously thought – presumably due to the large influx of foreign immigrants of predominantly working age.

Table 27: **Population statistics** (2001)

	EUROMOD estimates	administrative data	ratio
children population (0-18)	2,398,911	2,221,900	1.08
elderly population (65+)	1,906,844	1,835,942	1.04
total population	10,542,100	10,931,206	0.96

Source: EUROMOD estimates: National Statistical Service of Greece (1999).

Administrative data: Eurostat website accessed 21 October 2004.

As EUROMOD results are scaled up to the original rather than revised population estimates, the discrepancy between the two may introduce an element of error. Moreover, as pointed out in section 3.4, the updating procedure takes no account of social, demographic and economic changes between 1995 and 2001 other than income growth. Both these points must be borne in mind in the following two sections where EUROMOD results are compared to figures from administrative sources.

4.1. Policy instruments

The performance of the EUROMOD baseline is evaluated against official statistics on social benefits, personal income tax and social contributions.

4.1.1. Social benefits

Simulated retirement benefits, simulated family benefits and non-simulated social benefits are validated separately with respect to recipient numbers, followed by a comparison of figures on aggregate expenditure.

4.1.1.1. Simulated retirement benefits

Table 28 shows number of recipients of simulated retirement benefits by age and gender.

EUROMOD overestimates the number of farmer basic pension recipients by about 8%. Over half the difference can be accounted for by recipients below 65 years of age[30].

More seriously, almost twice as many persons are actually in receipt of social pension than estimated by EUROMOD. The gender breakdown of the relevant figures shows that the difference is particularly large for female beneficiaries who make up the bulk of those in receipt of a social pension.

Finally, EUROMOD overstates the number of recipients of pensioner social solidarity benefit (*ΕΚΑΣ*) by a factor of 0.55.

Table 28: **Recipients of simulated retirement benefits** (2001)

	EUROMOD estimates	administrative data	ratio
farmer basic pension	665,917	617,639	1.08
males aged 0-64	22,034	0	n.a.
males aged 65+	220,693	221,015	1.00
females aged 0-59	5,162	0	n.a.
females aged 60+	418,029	396,624	1.05
social pension	22,651	43,535	0.52
males aged 0-64	396	0	n.a.
males aged 65+	9,453	13,103	0.72
females aged 0-59	0	0	1.00
females aged 60+	12,801	30,432	0.42
pensioner social solidarity benefit	577,297	373,000	1.55
males aged 0-64	69,539	n.a.	n.a.
males aged 65+	200,302	n.a.	n.a.
females aged 0-59	18,127	n.a.	n.a.
females aged 60+	289,328	n.a.	n.a.

Note: Own elaboration of data collected from social insurance organisations and other benefit agencies.

[30] As explained earlier (see footnote 6), a small proportion of beneficiaries were allowed in the model to be aged less than 65 in view of the fact that recipients of widowhood, invalidity or orphan *ΟΓΑ* pension can be younger.

Given that social pension and pensioner social solidarity benefit are both income-tested, the discrepancy between EUROMOD and administrative figures could be attributed to targeting errors. If this is the case, it would appear that social pension suffers from massive "leakages" (award of benefit to illegitimate recipients) and *EKAΣ* from equally massive "non-take up" (no award of benefit to legitimate recipients).

While such possibility cannot be excluded *a priori*, a degree of caution seems advisable when interpreting these results, since reporting errors are far from common at the extremes of the income scale and among survey respondents of an advanced age.

4.1.1.2. Simulated family benefits

Table 29 shows recipient statistics both in terms of number of families receiving and number of children for which benefit is received.

Table 29: **Recipients of simulated family benefits** (2001)

		EUROMOD estimates	administrative data	ratio
large family benefit				
	households	25,089	82,008	0.31
	children	77,518	337,873	0.23
3rd child benefit				
	households	30,833	38,342	0.80
	children	91,894	115,026	0.80
unprotected child benefit				
	households	41,203	34,440	1.20
	children	49,382	34,440	1.43
civil servant family allowance				
	households	436,858	208,350	2.10
	children	724,179	388,920	1.86
ordinary family allowance				
	households	560,049	300,000	1.87
	children	888,417	560,000	1.59

Note: Own elaboration of data collected from benefit agencies.

As explained in section 2.1.4, large family benefit is awarded to mothers according to the number of children they have given birth to, irrespective of whether the children remain in the parental home or not, provided that at least one of them does. Given that income surveys like the ECHP collect no information on the family ties linking individuals who are members of different households, it can be no surprise that EUROMOD grossly underestimates recipients of large family benefit.

The fact that more families claim 3rd child benefit than EUROMOD estimates suggests the presence of some degree of "leakage". However, this may be partly due to the way the income test for access to benefits is interpreted in the model vs. administrative practice. In real life, assessment of applications to 3rd child benefit in 2001 was based on tax returns from the year 2000 for incomes earned in 1999. Since information on past incomes is not incorporated in EUROMOD, the income conditions are treated as if they referred to incomes earned in the application year. It ought to be noted that this problem is not unique to 3rd child benefit, but applies equally to all income-tested benefits.

In view of the low value and poor administration of unprotected child benefit, the possibility of low take up suggested by administrative figures compared to EUROMOD estimates cannot be easily discounted.

Finally, the model seems to overestimate significantly the number of recipients of both family allowances simulated. The reason for this is quite simple: a multiplicity of schemes actually operate at sector (i.e. in banking) or company level (i.e. in public utilities), while EUROMOD simulates ordinary family allowance and civil servant family allowance as if they covered all private and all public sector workers respectively.

It should also be added that the model estimates the number of children receiving none of the family benefits at over 793,000 (33.1% of all children). This estimate cannot be "validated" as no such estimate is available from other sources.

4.1.1.3. Non-simulated social benefits

Table 30 shows number of recipients of non-simulated retirement benefits by age and gender.

EUROMOD seems to overestimate the number of recipients of old age pensions by 20%, mostly accounted for by the difference in number of female pensioners. However, this is more than offset by the corresponding underestimate of recipients of survivor and, especially, invalidity pensions[31].

Table 30: **Recipients of non-simulated retirement benefits** (2001)

		EUROMOD estimates	administrative data	ratio
old age pensions		1,172,520	974,680	1.20
	males aged 0-64	257,513	199,172	1.29
	males aged 65+	545,365	552,553	0.99
	females aged 0-59	79,700	52,649	1.51
	females aged 60+	289,942	170,307	1.70
survivor pensions		335,260	423,155	0.79
	males aged 0-64	1,977	16,823	0.12
	males aged 65+	2,079	24,471	0.08
	females aged 0-59	67,329	45,252	1.49
	females aged 60+	263,875	336,610	0.78
invalidity pensions		85,205	475,131	0.18
	males aged 0-64	38,925	138,853	0.28
	males aged 65+	8,959	153,318	0.06
	females aged 0-59	22,869	47,423	0.48
	females aged 60+	14,452	135,536	0.11

Note: Own elaboration of data collected from social insurance organisations and other benefit agencies.

As a matter of fact, taking all pensions together (irrespective of whether simulated or not) cuts the distance between EUROMOD and official statistics: the total number of recipients of all retirement benefits was 2,281,500 as estimated by EUROMOD against 2,534,000 as indicated

[31] As explained in section 3.3.2, those in receipt of invalidity pension were identified in the ECHP database by splitting the original variable PI134 (social benefits / sickness and invalidity). Therefore, the estimate obtained by the model is subject to a margin of error that is probably greater than is usually the case.

by administrative sources[32], that is an underestimate of 10%.

Nevertheless, the real discrepancy may be less than that, in view of the fact that official statistics in reality count the number of pensions, not pensioners: those receiving more than one pension at the same time would appear as different individuals in official statistics but not in the ECHP (and, by implication, EUROMOD).

It should also be mentioned that the model estimates that the number of elderly receiving no pension of any type was 238,000 (12.5% of all elderly). Again, this estimate cannot be "validated" as no such estimate is available from other sources.

Turning to the other non-simulated benefits, that is unemployment and disability benefits, it is rather striking that in both cases EUROMOD underestimates the number of recipients by a very substantial margin. This is shown in Table 31 below.

Table 31: **Recipients of other non-simulated benefits** (2001)

	EUROMOD estimates	administrative data	ratio
unemployment benefits	154,607	443,048	0.35
males aged 0-64	79,925	n.a.	n.a.
males aged 65+	0	n.a.	n.a.
females aged 0-59	74,681	n.a.	n.a.
females aged 60+	0	n.a.	n.a.
disability benefits	37,545	139,550	0.27
males aged 0-64	17,456	n.a.	n.a.
males aged 65+	3,331	n.a.	n.a.
females aged 0-59	6,997	n.a.	n.a.
females aged 60+	9,761	n.a.	n.a.

Note: Own elaboration of data collected from social insurance organisations and other benefit agencies.

As with all non-simulated policy instruments, the discrepancy observed must be attributed to the underlying database rather than to the model as such.

4.1.1.4. Expenditure on social benefits

Table 32 presents estimates of the aggregate cost of social benefits. In line with the estimates of receipient numbers discussed above, EUROMOD appears to overestimate expenditure on farmer basic pensions, *EKAΣ*, unprotected child benefit and contributory family allowances. All other benefits cost more in reality than as estimated by the model.

On the whole, EUROMOD underestimates total spending on social benefits by 27%. Family benefits taken together as simulated by EUROMOD amount to 18% below actual costs. On the other hand, retirement benefits, whether simulated or not, fare slightly better than average (an underestimate of 23%). Finally, expenditure on unemployment and disability benefits is grossly underestimated by the model (81%), more than is the case with recipient numbers.

[32] Retirement benefits here include simulated farmer basic and social pensions, as well as non-simulated old age, survivor and invalidity pensions. Since *EKAΣ* is a top-up benefit to elderly on low income already in receipt of a social insurance pension, recipients of *EKAΣ* were excluded from this calculation of total number of recipients of retirement benefits to avoid double counting.

Table 32: **Expenditure on social benefits** (2001)

	EUROMOD estimates	administrative data	ratio
farmer basic pension [a]	1,322	1,223	1.08
social pension	45	107	0.42
pensioner social solidarity benefit	609	378	1.61
simulated retirement benefits	**1,976**	**1,708**	**1.16**
large family benefit [b]	39	283	0.14
3rd child benefit	50	64	0.79
unprotected child benefit	28	18	1.55
civil servant family allowance	212	94	2.26
ordinary family allowance	96	64	1.51
simulated family benefits	**426**	**523**	**0.82**
old age pensions	8,895	9,851	0.90
survivor pensions	1,843	2,310	0.80
invalidity pensions [c]	317	3,429	0.09
non-simulated retirement benefits	**11,055**	**15,590**	**0.71**
unemployment benefits	95	518	0.18
disability benefits	58	293	0.20
other non-simulated benefits	**153**	**811**	**0.19**
all benefits [d]	**13,611**	**18,631**	**0.73**

Note: Own elaboration of data collected from social insurance organisations and other benefit agencies.

[a] The figure refers to old-age basic pension only, i.e. excludes survivor, invalidity and orphan basic pensions.

[b] Administrative data include €179 million spent on lifetime pension to many-children mothers.

[c] Administrative data include €427 million spent on sickness benefits.

[d] Except housing and emergency benefits (not recorded in the original dataset).

4.1.2. Personal income tax

Comparisons between EUROMOD and administrative figures on personal income tax must be handled with care, as tax evasion in Greece is known to be rife[33]. This is partly reflected in Table 33 on the following page.

More specifically, EUROMOD overestimates taxable income by 20%. Rather paradoxically, it then underestimates the tax base, even though by a mere 3%. As explained in section 2.2.3, in the model the tax base is defined as taxable income minus various exemptions. However, in administrative practice this is offset by upward adjustments to taxable income in the context of what is known as "presumptive taxation"[34]. Since the main purpose of this practice is to set minimum levels of taxable income for the self-employed, the effect of "presumptive taxation" in terms of tax receipts is modest. This probably explains why EUROMOD overestimates the total amount of tax collected by 16%, in spite of the fact that it underestimates the tax base.

[33] An OECD report cited estimates of the share of the informal economy in GDP at between 24% and 40%. As possible reasons it listed "the large number of self-employed in the workforce, inefficient tax administration, lack of a land register, the complexity and continuous revisions and amendments of tax laws, loopholes due to numerous tax allowances and exemptions, and the so-called 'third-party' taxes extensively used to fund various institutions, such as the pension funds of lawyers, engineers and media workers" (OECD 2001: 93).

[34] For more detail see the OECD report cited in the previous footnote (OECD 2001).

Table 33: **Personal income tax statistics** (2001)

	EUROMOD estimates	administrative data	ratio
no. of tax payers	6,435,197	7,613,656	0.85
taxable income (€ million)	70,441	58,657	1.20
tax base (€ million)	58,654	60,623	0.97
tax collected (€ million)	5,666	4,899	1.16
average effective tax rate	9.7%	8.1%	1.20

Source: Ministry of Finance (2003).

On the other hand, administrative data on the number of tax payers include spouses in single-earner tax units. In contrast, EUROMOD identifies as tax payers those individuals whose taxable income is non-zero (though in the model about 15,700 individuals do end up with zero income once exemptions are taken into account). As a result of that, the underestimation by EUROMOD of the number of tax payers is more apparent than real.

4.1.3. Social contributions

EUROMOD estimates on social contributions are compared to official statistics in terms of (a) number of contributors and (b) receipts collected.

As shown in Table 34, the model overestimates the number of public sector employees by a very significant margin, while it underestimates number of contributors in all other categories. Discrepancies may be attributed to a combination of sampling error (as in the case of farmers) and reporting error (as in the case of private sector employees) in the underlying database.

As a whole, there seem to be 780,000 more contributors than estimated by EUROMOD. Part of the difference must be due to the fact that an uknown number of workers pay contributions to more than one social insurance organisation.

Double affiliation is sometimes the case in the model too, where about 224,000 persons contribute to more than one scheme. Nevertheless, EUROMOD simulates double affiliation only when workers have two or more sources of income (e.g. self employment and dependent employment), while in real life double affiliation can also happen when workers contribute to more social insurance schemes covering different categories of the same income source (e.g. different categories of private sector employment, different categories of self-employment and so on).

Table 34: **Social contributions: no. of contributors** (2001)

	EUROMOD estimates	administrative data	ratio
private sector employees	1,617,152	2,014,665	0.80
public sector employees	786,725	460,474	1.71
self-employed workers	832,566	985,090	0.85
farmers	448,219	748,830	0.60
pensioners	2,234,465	2,490,605	0.90
all contributors	**5,919,126**	**6,699,664**	**0.88**

Note: Own elaboration of data collected from social insurance organisations.

Table 35 presents administrative figures and EUROMOD estimates of social contributions in terms of receipts collected. Public sector workers and the self-employed appear in the model to contribute more than in real life (but also more than might be expected on the basis of their number in Table 34). The opposite seems to be the case with private sector employees and farmers: the amount they contribute is lower in the model than official statistics suggest, both in absolute terms as well as *per capita*.

On the whole, such differences cancel each other out to a considerable extent: total receipts as estimated by the model fall short official figures by a mere 4%.

Table 35: **Social contributions: receipts collected** (2001)

	EUROMOD estimates	administrative data	ratio
private sector employees	2,623	3,902	0.67
public sector employees	2,570	1,397	1.84
self-employed workers	1,724	1,688	1.02
farmers	178	343	0.52
pensioners	497	538	0.92
all contributors	**7,592**	**7,868**	**0.96**

Note: Own elaboration of data collected from social insurance organisations.

4.2. Income distribution

As explained earlier, validation of EUROMOD outcomes in terms of income distribution is performed here against estimates derived from the ECHP wave 8 (survey year 2001, incomes earned in 2000). Statistics on poverty and inequality are compared below. The indicators used are mostly selected among the 18 indicators[35] of social exclusion and poverty endorsed at the Laeken European Council meeting in December 2001.

4.2.1. Poverty

Laeken indicator 1a ("at-risk-of-poverty rate") refers, as is known, to a poverty line of 60% of median equivalent income. Laeken indicator 11 ("dispersion around the at-risk-of-poverty threshold") refers to poverty lines of 40%, 50% and 70% of median equivalent income. The resulting estimates are shown in Table 36 on the following page.

With respect to indicator 1a, EUROMOD seems able to reproduce the "central" poverty rate quite accurately (an underestimate of 0.5 percentage point). As one moves to lower poverty lines, the model seems at first to underestimate (50% of median: -1.0 percentage point) and then overestimate (40% of median: +0.3 percentage point) poverty rates as estimated from the ECHP database.

Estimates with respect to Laeken indicator 1b ("incidence of poverty risk by most frequent activity status") are shown in Table 37, also on the following page.

[35] For a list and definitions of all Laeken indicators see CEC (2003).

Table 36: **Poverty rates at different poverty lines** (2001)

percentage of individuals below:	EUROMOD estimates	ECHP data	ratio
40% of median equivalent income	8.8	8.5	1.04
males	8.2	7.6	1.08
females	9.4	9.3	1.01
50% of median equivalent income	13.4	14.4	0.93
males	12.6	13.3	0.95
females	14.2	15.3	0.93
60% of median equivalent income	20.0	20.5	0.98
males	19.1	19.2	0.99
females	20.9	21.8	0.96
70% of median equivalent income	27.3	28.4	0.96
males	26.4	27.1	0.97
females	28.1	29.6	0.95

Note: ECHP data are derived from from wave 8 (survey year 2001, incomes earned in 2000). The OECD modified equivalence scale applies.

Table 37: **Poverty rates by employment status** (2001)

	EUROMOD estimates	ECHP data	ratio
waged / salaried worker	7.7	7.1	1.09
self-employed	20.0	22.1	0.90
unemployed	27.4	32.6	0.84
retired	30.5	31.1	0.98
other inactive	20.6	21.9	0.94

Note: ECHP data are derived from from wave 8 (survey year 2001, incomes earned in 2000). Poverty rates are defined as percentage of population below a poverty line of 60% of median equivalent income. The OECD modified equivalence scale applies.

EUROMOD seems to overestimate the poverty risk of dependent workers (albeit by no more than 0.6 percentage point) and underestimate that of other categories. The margin of error is quite significant in the case of unemployed workers (5.2 percentage points).

The difference must be attributed to two factors. On the one hand, although unemployment benefits are read off the data, family benefits are simulated under the assumption of full take up. This raises recipients' disposable income and hence lowers their estimated poverty risk. On the other hand, the poverty risk difference may also reflect changes in the underlying data. As explained in section 3.4, the updating procedure takes no account of social, demographic and economic changes between 1995 and 2001 other than income growth.

Otherwise, the model seems to perform better as regards the poverty risk of self-employed workers, inactives and those in retirement.

Estimates of Laeken indicator 1c ("incidence of poverty risk by household type") are shown in Table 38 on the following page. Over- or underestimates by a factor of significantly more than 0.10 involve mainly three household types: non-elderly singles, couples with one child and couples with 3 or more children. In the case of non-elderly singles, the discrepancy may simply be caused by small sample size in the relevant population groups, which affects the validity of estimates and the accuracy of sample-to-population projections.

EUROMOD seems to overstate the risk of poverty among couples with one child (and, to a lesser extent, among couples with two children). While the way policies are simulated may be part of the explanation, it seems more likely that the main reason is changes in the underlying distribution not accounted for by the updating procedure. In the case of large families (couples with 3+ children), the vastly reduced poverty rates in the model compared to estimates derived from the ECHP may be partly due to the family benefits simulated. Although, as explained in section 4.1.1, EUROMOD underestimates the take up of large family and 3rd child benefits, it overestimates that of contributory family allowances.

Table 38: **Poverty rates by household type** (2001)

	EUROMOD estimates	ECHP data	ratio
single under 30 years	30.2	37.5	0.81
single 30-64 years	21.6	15.0	1.44
single man 65+	26.7	25.0	1.07
single woman 65+	36.2	41.7	0.87
two adults at least one aged over 65	34.5	35.4	0.97
two adults both aged under 65	17.2	17.4	0.99
two adults 1 child	11.5	8.8	1.31
two adults 2 children	17.0	15.3	1.11
two adults 3 children	12.2	27.3	0.45
two adults 4+ children	9.5	25.6	0.37
single parent 1+ children	44.8	40.9	1.10
3+ adults 1+ children	22.8	23.5	0.97
other households	15.7	16.1	0.98

Note: ECHP data are derived from from wave 8 (survey year 2001, incomes earned in 2000). Poverty rates are defined as percentage of population below a poverty line of 60% of median equivalent income. The OECD modified equivalence scale applies. The estimates for the household type "single under 30 years" rely on less than 50 observations. Children are defined as individuals aged 18 years or less.

On the other hand, the model seems to perform significantly better with respect to household types such as singles over 65, elderly couples, three-generation households, single parents etc.

Table 39: **Poverty intensity** (2001)

		EUROMOD estimates	ECHP data	ratio
relative median poverty gap		28.9	27.6	1.05
	males	28.3	26.8	1.06
	females	29.4	28.9	1.02
relative average poverty gap		32.5	31.5	1.03
	males	32.5	30.9	1.05
	females	32.4	32.0	1.01
FGT index (α=2)		3.19	2.99	1.07
	males	3.08	2.70	1.14
	females	3.30	3.27	1.01

Note: ECHP data are derived from from wave 8 (survey year 2001, incomes earned in 2000). Poverty gaps are defined as the median or average income shortfall of poor households from the poverty line as a percentage of the latter. The Foster-Greer-Thorbecke index (α=2) attaches greater weight to larger poverty gaps, as it simultaneously takes into account the poverty incidence, the poverty gap and the extent of inequality among the poor. The modified OECD equivalence scale is used.

Table 39 on the previous page presents estimates of three indicators of poverty intensity, the first of which is Laeken indicator 4 ("relative median poverty risk gap"). It appears that EUROMOD quite consistently overestimates poverty intensity, even though by a factor of 0.03 to 0.07. Rather interestingly, males seem to suffer larger poverty gaps although were shown earlier to have a lower poverty risk.

4.2.2. Inequality

Finally, validation of EUROMOD outcomes is performed in terms of income inequality. Two inequality indices are examined here. Laeken indicator 2 is "income quintile ratio (S80/S20)", defined as the ratio of total income received by the 20% of the country's population with the highest income (top quintile) to that received by the 20% of the country's population with the lowest income (bottom quintile), where income must be understood as equivalent disposable income. Laeken indicator 14 is the Gini coefficient.

Table 40: **Inequality statistics** (2001)

		EUROMOD estimates	ECHP data	ratio
income quintile ratio (S80/S20)		5.8	5.7	1.02
	males	6.3	6.2	1.02
	females	5.4	5.2	1.03
Gini coefficient		0.329	0.328	1.00
	males	0.328	0.326	1.01
	females	0.330	0.329	1.00

Note: ECHP data are derived from from wave 8 (survey year 2001, incomes earned in 2000).

As Table 40 shows, EUROMOD appears to perform remarkably well with respect to both inequality indices. The model slightly overestimates the income quintile ratio, while it practically reproduces exactly the Gini coefficient estimates derived from the ECHP database.

5. References

Alcock P., Glennerster H., Oakley A. & Sinfield A. (2001) Welfare and well-being: Richard Titmuss' contribution to social policy. Bristol: Policy Press.

Bank of Greece (2002) Annual report of the Director on the year 2001. Athens: Bank of Greece.

CEC (2003) Draft joint inclusion report: statistical annex. Commission Staff Working Paper SEC (2003) 1425 {COM (2003) 773 final}. Brussels: Commission of the European Communities.

Eurostat (2004) European social statistics: social protection expenditure and receipts (data 1992-2001). Luxembourg: Eurostat.

Immervoll H. & O'Donoghue C. (2001) Imputation of gross amounts from net incomes in household surveys. EUROMOD Working Paper 1/01. Microsimulation Unit, University of Cambridge.

Matsaganis M. (2003) Muddling through: trials and tribulations of social security in Greece. Social & Political Studies Working Paper 10/03. Florence: European University Institute.

Ministry of Finance (2000) Report on the State budget for the year 2001. Athens: Ministry of Finance.

Ministry of Finance (2002) Report on the State budget for the year 2003. Athens: Ministry of Finance.

Ministry of Finance (2003) Data file on Personal Income Tax 2002. General Secretariat of Information Systems. Athens: Ministry of Finance.

Ministry of Labour & Social Insurance (2001) The social budget for the year 2001. General Secretariat of Social Insurance. Athens: Ministry of Labour & Social Insurance.

Ministry of Labour & Social Insurance (2003) The social budget for the year 2003. General Secretariat of Social Insurance. Athens: Ministry of Labour & Social Insurance.

National Statistical Service of Greece (1999). Vital statistics: population projections. Athens: National Statistical Service of Greece.

O'Donoghue C., Baldini M. & Mantovani D. (2001) Modelling the redistributive impact of indirect taxes in Europe. EUROMOD Working Paper 7/01. Microsimulation Unit, University of Cambridge.

OECD (2001) Economic Surveys: Greece. Paris: Organisation for Economic Co-operation and Development.

Acknowledgements

The authors of this country report would like to express their gratitude to all those who helped make the Greek module of EUROMOD work. First, the project coordinator Holly Sutherland, now at Essex University. Then, the members of her team at Microsimulation Unit, University of Cambridge, who were unlucky enough to take on the Greek module: Cathal O'Donoghue (now at National University of Ireland at Galway), Patricio Feres – and Christine Lietz, who did her best to correct errors, implement changes and answer queries, always with unwavering commitment. Other members of the Cambridge team, for assistance provided more *ad hoc* but equally efficiently: Daniela Mantovani (now at Prometeia, Bologna) and Herwig Immervoll (now at the OECD, Paris). Last but not least, Fotis Papadopoulos (Athens University of Economics & Business), for his speedy elaboration of ECHP data for validation of the income distribution output. There is no doubt that without the dedicated work of all, this model would have never existed.