Alternative approaches to Long Term Care financing.

Distributive implications and sustainability for Italy

by

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Paper prepared for the *European Conference on Long-Term Care*

Mannheim, October 21-22, 2005

EXTENDED ABSTRACT

During the last decade, many countries have adopted tax schemes specifically aimed at financing programs for Long Term Care (LTC). These mechanisms have important distributional implications both within and across generations. Given the process of demographic ageing, the issue of inter and intra-generational fairness is deeply linked with the problem of the long-term financial equilibrium of an LTC fund.

In this paper we first compare, on a microdata sample of the Italian population, the distributive effects (both on current income and across generations) of six alternative approaches to finance an LTC scheme. In particular, we consider a hypothetical LTC scheme (with a size equivalent to that of the German one) to be introduced in Italy and analyse the distributive implications of the following tax options, taken from the financing mechanisms implemented or under discussion in Germany, Luxembourg, Japan and Italy: i) "*Germany* 1": a 1.7% tax on income with a ceiling; ii) "*Germany* 2": a differentiated tax rate for people with and without children; iii) "*Germany 3"*: a flat rate; iv) "*Luxembourg"*: a tax on income with no ceiling; v) "*Japan"*: a tax on people aged more than 40 with a fixed co-payment; vi) "*Ise Tax"*: a tax proportional to an indicator of the economic situation of the household that depends on both income and wealth. This last option, in particular, allows to reach two different aims: a) since the profile of wealth over the life cycle is steeper than that of income, the "Ise tax" increases the contribution of the elderly, i.e. of those persons who are subject to higher disability risk; b) if we accept the idea that the living standard of a person depends not only on his income but also on his wealth holdings, then the increase in the average contribution of the elderly is motivated also by the fact that they are "richer" than the younger taxpayers.

Of course, we do not claim to offer a full description of the institutional framework of any specific country: our aim is to highlight the distributive implications of few stylised policy options. Even if we discuss these alternatives with reference to Italy, we believe that our analysis can offer a contribution to the international debate by discussing the general properties of alternative financing approaches.

The distributive impacts of the various alternatives, all raising the same revenue, have been evaluated across different income and age classes. The poorest decile of the equivalent income distribution would be exempt from all alternative taxes, and in the "Japanese" case, with an age limit of 40 years, more than one third of households would be exempted. On average, these taxes would have an incidence of about 1-1.5% of disposable income and would be slightly progressive due to the presence of a taxable minimum. The flat tax case, of course, would be regressive in favour of the richest half of the population. The distributive analysis across age classes confirms that the "Japanese" tax and the tax on Ise shift the distribution of total burden towards the elderly: the share of total revenue paid by taxpayers aged more than 65 goes from 16.5% in the "Germany 1" case to 22.3% for the "Japanese" tax, and to 23% in the case of the Ise tax.

In the second part of the paper we move from a static to a dynamic perspective: we study the long-term sustainability of an hypothetical Pay as You Go (Payg) LTC scheme operating in Italy (that is, assuming the Italian projected demographic trends) under scenarios that consider alternative indexation rules, growth rates of GNP, future incidence of disability among age groups.

Given the impossibility for a pure Payg scheme to jointly deliver financial sustainability and inter-generational fairness, we discuss the possibility of introducing a trust fund for the first years of the life of the program in order to "smooth" across generations the effects of ageing. We consider the fact that, when a country starts a Payg scheme, it can benefit from a *una tantum* "free lunch" to distribute;, we suggest that the solution in which all the windfall is unselectively given to the members of the first generation is not the fairest possibility, . In the case of LCT insurance, it can be argued that the principle that everybody contributes to the financing of the scheme according to his/her economic capacity while receives benefits according to the level of individual need is acceptable in the steady state regime while it may be not in the transition to steady state. In particular, we argue that people who are jointly rich and old when the LTC program is started should face a means tested co-payment when they receive benefits in the first years of functioning of the scheme. This temporary co-payment could allow the accumulation of a trust fund during the first period of working of the program. This could make it possible to drain from it in the subsequent period in order to keep both the contribution and benefits constant in real terms for all generations. Of course, this kind of approach implies important problems of public accountability and transparency: the operation of efficient regulatory bodies is necessary in order to insulate the fund management from political interference. Furthermore, the portfolio policies of the trust fund are crucial: the trust fund can add to credibility and sustainability only if its operating is associated with an increase in aggregate saving (see Munnell 2005). As far as LTC is concerned, the collective accumulation of assets is consistent with the principle, at the individual level, that the right to benefits depends only on the size of need, not on past individual contributions.

Our numerical example enables us to discuss the issue of financial sustainability from different perspectives. Indexation to (2%) inflation plays an important role: no indexation implies financial sustainability even with modest GDP growth (about 1% per year on average) since such growth together with the erosion of the real value of the benefit fully offsets the rise in the number of beneficiaries. With indexation to inflation we need to double GDP growth in order to keep the scheme in balance. If we consider the need to provide full indexation not only with respect to inflation but also with respect to a 1.5% increase in unit cost of care, then the picture becomes darker: even a robust GNP growth (about 3% per year on average) cannot deliver financial sustainability. The accumulation of an "LTC trust fund" during the first years of operation of the program significantly improves global sustainability: with full indexation (inflation and unit cost) and a 3% GDP growth a 10 year 20% average co-payment allows sustainability for 23 or 27 years under the assumption of constant or decreasing incidence of disability, respectively. Under a poorer GDP dynamics (1.5% per year on average) the scheme is at higher risk: even with a 30% co-payment for 20 years financial sustainability is to last for about 25 years (for both scenarios of disability incidence). Of course, if we rule out any indexation to unit costs the situation improves even in the low GDP growth scenario (1.5%): under the constant scenario of incidence of disability,, financial sustainability is achieved for almost the whole considered period (2005-2051), provided a 25% average co-payment is introduced for the first 15 years; the scenario of decreasing disability sustainability "only" requires a 10% average co-payment for the first 12 years.

1. Introduction

The need for more public funding of Long Term Care (LTC) policies is widely acknowledged in most industrialized countries. Some of them (in particular Germany, Luxembourg, Japan) have created specific social security programs whose financing rests on specific contributions. In other countries (Italy is one of these) the debate over LTC financing is gaining momentum.

This financing with contributions has important distributive implications both within and among generations. In particular, the issue of intergenerational redistribution is obviously strictly related to the issue of financial sustainability.

The analysis of the distributive effects of taxation among groups defined on the basis of current income is very well established. When taxation is finalized to financing programs with an important intertemporal and insurance content (such as pensions, LTC, etc. ...), also the dynamic analysis of the distributive effects of taxation among age groups becomes topical. In this paper we provide both types of distributive analysis with reference to a hypothetical LTC scheme to be applied and financed in Italy.

We first consider (section 2) six stylised characteristics taken from the financing mechanisms implemented in the three countries mentioned above (Germany, Luxembourg, Japan) and apply them in turn to the Italian data: i) a 1.7% tax on income with a ceiling; ii) a differentiated tax rate for people with and without children; iii) a flat rate; iv) a tax on income with no ceiling; v) a tax on people aged more than 40 with a fixed co-payment; vi) a tax proportional to an indicator of the economic situation of the household that depends on both income and wealth.

Using a tax and benefit microsimulation model (see the Appendix for a brief description), we discuss the distributive implications of each option.

We model the most important characteristics of each reference country without pretending to offer a full description of each institutional framework: our aim is simply to highlight the distributive implications of few stylised policy options. Even if we discuss these alternatives with reference to Italy, we believe that our analysis can offer a contribution to the debate concerning the other countries involved by discussing the general properties of alternative financing approaches.

In the second part of the paper (section 3) we take a generic financing mechanism as given and discuss the sustainability of an LTC scheme with the characteristics of the German one with respect to different options concerning the indexation rules, the growth rate of GNP, the future incidence of disability among age groups and gender. As it is well known, the demographic perspectives of most industrialized countries (Italy is no exception) make it impossible for a pure pay as you go (payg) scheme to deliver both financial sustainability and fairness among generations. We therefore consider the fact that when a country starts a payg scheme, it can benefit from a *una tantum* "free lunch" to distribute, and take this as an important opportunity to be used in order to achieve both sustainability and fairness in a public and universal program. The discussion of this topic leads us to consider the possibility of building up an "LTC trust fund" and to analyse its feasibility for the Italian case.

2. Distributive implications

2.1. Six stylised policy options

In this section we discuss the distributive implications of some alternative policy options for financing an LTC scheme from the point of view of both income distribution and intergenerational fairness. We report the results of simulations on Italian microdata and apply six alternative policy regimes that focus on different stylised characteristics taken from experiences and proposals referred to Germany, Japan, Luxembourg and Italy. The six alternatives can be described ad follows:

i) Germany 1: the 1996-2004 rules
The stylised characteristics of this options are a 1.7% tax on income[1] and a ceiling to contributions (€ 59.28 per month). We set the contribution to zero for taxpayers whose income is below the minimum taxable level.

ii) Germany 2: the post 2005 rules
In this case we consider the increase (from 1.7% to 2% of income) in the contribution rate for taxpayers without children determined by a decision of the German Constitutional Court. The tax rate for those with children remains at 1.7%.

iii) Germany 3: the flat rate proposal
We consider the proposal made by the German Council of Economic Experts (2004): they argue that a flat tax rate could reduce the tax wedge and could boost employment, thus breaking the vicious circle that goes from less employment to lower contribution receipts to higher equilibrium contribution rates; these experts also suggest to establish a "social compensation component" in order to help people on low incomes.
Again, in our simulation we assume that citizens that are exempt from the income tax are also exempt from the flat tax. We assume that no social compensation is provided: this makes the distributive implications more clear cut (and thus gives a hint about the nature and the size of the social compensation that would be needed).

iv) The Luxembourg case
The Luxembourg case is characterised by a composite financing structure: about 43% of total revenue comes from general taxation, 55% from a (1%) contribution on income and about 2% from a special contribution on electricity bills. The stylised characteristic that we model is a tax on income with no ceiling.

v) The Japanese case
The scheme that finances the Japanese LTC program has the following main stylised characteristics: i) a tax on income is levied only on taxpayers aged 40 and above; ii) a 10% co-payment is charged on all benefits: the amount to be financed is therefore reduced by the

[1] Indeed in all Lander but one 50% of the contribution is paid by employers; our simulation model is not suitable for taking into account this aspect, we therefore assume that the whole contribution is levied on personal income.

same percentage. In addition, since only disabled persons aged 40 and above are eligible to benefits (and since in Germany the 10% of beneficiaries are below 40) a further 10% reduction in the amount to be financed is applied.

vi)" Ise tax": taking wealth into the picture

In most industrialized countries there is a growing concern about the share of public welfare resources (pensions, health care and LTC programs) that are currently (and in perspective) targeted towards the elderly. Even if most recognize that the ageing of our societies is inevitably associated with a growing weight of the elderly in welfare programs, there is an increasing number of observers calling for a re-balancing of this process.

Indeed the Japanese solution of a LTC schemes that involves only citizens above 40 is quite drastic: it eliminates universalism and provides a simple but somehow arbitrary way for distributing the cost of LTC on the different generations.

In principle, it seems that it would be interesting to have a criterion that increases the burden on the older generations but keeps a more selective approach, requesting a greater contribution only to those with high ability to pay. In the Italian debate the hypothesis of a tax to finance LTC that is determined taking into account both income and wealth[2] is being considered[3]. As it is well known, wealth increases (on average) with age: therefore under this approach the elderly would pay (on average) more than the young for each level of income. Therefore, under such a rule the older generations pay more *not* in direct relation to an higher level of risk (as in private schemes) but in relation to their economic strength.

There are various theoretical reasons for conditioning access to welfare programmes and setting co-payments in relation with a means testing that considers both income and wealth[4]. We explore this possibility and run an exercise in which the size of the contribution is proportional to the Indicator of Economic Situation (in Italian *Indicatore della Situazione Economica*, Ise), that represents an attempt made by the Italian social assistance system, started in 1998, to take into account, in the evaluation of the economic conditions of the households, not only their income, but also their wealth holdings[5].

In short, Ise is computed according to this formula:

[2] See Beltrametti (2000 and 2002) for a discussion.

[3] The idea that welfare state programs mainly targeted to the elderly should be increasingly financed by taxation of capital income receives theoretical support in political economy models, see Razin and Sadka (2005).

[4] First, the inclusion of wealth appears consistent, in a comparative perspective, with the logic underlying the means-testing rules of many OECD countries, which usually employ asset tests to select those eligible for social assistance (Eardley *et al.*, 1996). A second reason to include wealth is that it could increase individual utility in ways that are different from (and additional to) the simple receipt of capital income: wealth ownership can enter the utility function directly, if its holding generates additional utility, or indirectly, if it provides other benefits (sense of security, economic power and prestige, etc.) which are arguments of the utility function (Musgrave, 1983). A third argument for the direct inclusion of wealth in the evaluation of well-being is associated with tax evasion: since Ise is still mainly based on taxable income, it cannot avoid the distortionary and unfair effects of income tax evasion. However, if stock values are less subject to incorrect statements, then the addition of wealth in Ise may partially correct for these distortions: in this respect, the wealth declared by tax evaders might also be interpreted, at least in part, as the result of the investment of unpaid taxes. Alternatively, it could be argued that the inclusion of wealth in the new means-test may discourage tax evaders from applying for social services, since a significant discrepancy between the declared amounts of wealth and income may stimulate inspections from fiscal authorities.

[5] After nearly eight years since its introduction, Ise is currently used by many local authorities (especially the municipalities) for evaluating the economic conditions of households applying for social services (kindergarten, public transport, cash subsidies, etc.). It is used by very few cash transfers administered at the central level.

$$Ise = \frac{Y + rFW + 0{,}2(RW + FW - D)}{scale},$$

Where Y is the tax base of the personal income tax, r is the average rate of return of State bonds (defined every year by a government decree), FW is the value of financial wealth, RW is the value of real wealth, and finally D indicates some basic deductions that can be applied to stock holdings[6]. Finally, *scale* is an equivalence scale necessary to make the values of the numerator comparable for households with different composition; the formula for the computation of this scale will be described below.

2.2 Effects on income distribution

In this paragraph we analyse the distributive implications of the six stylised options described above. We use a sample survey representative of the distribution of income and wealth among the Italian households, and apply on these data the six alternative stylised methods for financing an LTC program. The data used come from the Bank of Italy survey on household income and wealth for 2002, that currently represents the best available source of this type of information in Italy. The original data refer to post-tax incomes; pre-tax incomes are reconstructed with an imputation process, using a tax-benefit microsimulation model that allows also to impute to each sample household all the main taxes and monetary transfers present in the Italian system. The main characteristics of this tax-benefit model are described in the Appendix.

The distributive implications of the various alternatives are evaluated on disposable equivalent income, obtained dividing household disposable income by an equivalence scale that makes incomes of households with different compositions comparable. The scale adopted is given by the number of family members raised to the power 0,65; this scale corresponds to that used in the Italian social assistance system for the computation of Ise, the indicator of economic situation already described.

Disposable income is therefore given by the following expression: $Yeq=Y/scale$, where Y is monetary disposable income, and $scale = (number\ of\ family\ members)^{0,65}$.

We consider the distributive impact of the alternative tax hypotheses and verify how their burden would be distributed across different income classes.

Before studying the distributive implications of the various schemes, a preliminary problem concerns the definition of the tax unit: while the German, Luxembourg and Japanese forms of taxation are defined at the individual level, the definition of the relevant reference unit for a tax on Ise is more problematic, because the Ise is a measure of living standard defined at the family level. Each family member has in common the same level of this indicator. From an administrative point of view, it appears however logical to convert Ise into an in individual measure, because the reference unit for taxation in Italy is the individual, not the family. It is therefore necessary to define who, in a given household, must pay this tax, and which is his/her share of the total Ise of the household that he/she

[6] It is possibile to deduce up to 56000 euro from the value of the home, and up to 15500 euro from the value of financial activities.

must pay. We have chosen to define as taxpayers for this hypothetical tax all persons who are income recipient (i.e. that are subject to the income tax): their tax base is computed by adding to their personal income tax base (divided by the equivalence scale) a share of the wealth component of Ise, divided equally among all the personal income taxpayers present in the household[7].
In short, for the i-th family member:

$$Ise_i = \frac{Y_i}{scale} + \frac{rFW + 0{,}2(RW + FW - D)}{scale} * \frac{1}{Ntaxpayers}.$$

Where *Ntaxpayers* is the number of the family members who pay the personal income tax. In this way the Ise tax is made individual, and no burden is imposed on persons without income like children, students, housewives. All monetary values are expressed at 2005 prices.
We consider the six following alternatives, described above: Germany 1, Germany 2, Germany 3, Luxembourg, Japan, Ise. As already discussed, the introduction of a maximum payable amount in the first three cases may be justified, under an insurance perspective, with the aim of avoiding that very rich taxpayers may face an unreasonably large burden, when compared to the actual risk of falling into long term disability. This possibility is also consistent with the presence of ceilings in the structure of social security contributions. On the other hand, if a relevant importance is attributed to redistributive considerations, then a possible alternative is not to impose upper limits to payments, like in the Luxembourg case. This choice would also have the effect of reducing, for a given revenue, the burden on low and middle incomes. The introduction of an age threshold, below which one is exempt, strengthens the insurance character of the tax, imposing a contribution only to those persons with a non negligible risk. All simulations are conducted imposing the same total revenue of the first simulation (€9.2 bn or 0.68% of GDP)[8], thus making *ceteris paribus* comparisons of their distributive effects. Indeed, in order to carry out the simulations under the constraint of equal revenue, we cannot apply the six alternatives described above with their original tax rates, because they would generate different revenues, making it impossible to compare the average incidences produced by the various alternatives. So, we search for each alternative the tax rate that guarantees the same revenue of the first case, "Germany 1". However, all the other stylised differences among the six cases are

[7] Obviously, the shares of family wealth owned by the various members may be very uneven. Our hypothesis of equal sharing could overestimate the individual Ise of the younger, if they still live in the original family but do not own any asset. Also opposite cases may of course be possible (elderly without assets living with a son). Given that in the Bank of Italy survey there are no data about the distribution of financial wealth, our simplifying assumption seems reasonable. Indeed, the dominant component in the definition of Ise (on average 75%) is represented by income, which is attributed to the individual recipient. An alternative approach could split household real wealth to each individual in proportion to his/her personal income, or in proportion to his/her real wealth. But these would in any case be ad hoc assumptions, that would not change significantly the results. For example, by dividing total wealth in proportion to income, the average Ise of those younger than 40 would decrease by only 1.5%.

[8] This is the estimated cost of a LTC scheme with the characteristics of the German one hypothetically introduced in Italy (see Beltrametti 2005). Of course, since in Italy LTC programs are currently operating both at the national and the regional level, €9.2 bn is the gross cost of an LTC scheme. The net cost to be actually financed with new taxation (or cuts in other public expenditure) should be obtained by deducting all current expenditures that would be ended should the new LTC program be introduced. For the purposes of this analysis of distributive effects and financial sustainability it seems interesting to consider the whole cost to be financed (not the additional one).

preserved, so that each case can be interpreted as a partial shift from the previous one; for example, the "Germany 2" system is very similar to the "Germany 1" case, with the only shift to differentiated tax rates for persons with or without children, but originating the same revenue; the "Luxembourg" alternative is very similar to the "Germany 1" case, with the only difference of the absence of a maximum ceiling, and also the "Japanese" case differs from the first alternative because of the exemption for the younger taxpayers. Finally, the tax on Ise differs from the first option for the presence of a different tax base, that mixes income and wealth.

Table 1 contains, for all simulations, some basic information, in particular the tax rate necessary, in each case, to realize the level of total revenue of the first case, i.e. Germany 1. The table shows also the share of taxpayers (here defined as all persons with a positive personal income tax base, even if they do not pay any income tax) who are not subject to any payment, and the average burden for those who pay. The last two columns contain the same information, computed on households[9].

The first five cases are simulated as if they were simple surcharges to the personal income tax. We have therefore applied the basic rule that governs any tax of such kind in Italy, in particular the surcharges that regions and municipalities can impose: if a person does not pay the income tax, because his/her income falls in the exemption range, then s/he is exempt also from any surcharge on it. This means that in the basic simulation about a third of all those with positive incomes are exempt, i.e. all who possess an income lower than around 8.000 euro (more in the presence of family burdens or deductible expenditures). In the final case of the tax on Ise, without the imposition of a taxable minimum all taxpayers would end up with a positive tax. In order to make this simulation comparable to the others, we have introduced a taxable minimum of 6.000 euro of income, so that the share of exempt taxpayers is the same of the basic case of the tax on income[10].

The average yearly amount for each taxpayer is obviously the same in all the simulations (235 euro), while the average sum paid by those who are actually exposed to the tax is 345 euro, except in the Japanese case, where the higher number of exempt taxpayers increases the average burden to 512 euro per year. Considering the same measures but at the household level, the average payment on all households is 420 euro, which becomes 517 in most cases on households which actually pay, and 660 in the Japanese hypothesis, where more than 1/3 of households do not pay at all.

[9] Note that a household is exempt if none of its members pays a positive tax. The share of exempt households is therefore always lower than that of exempt individual taxpayers.

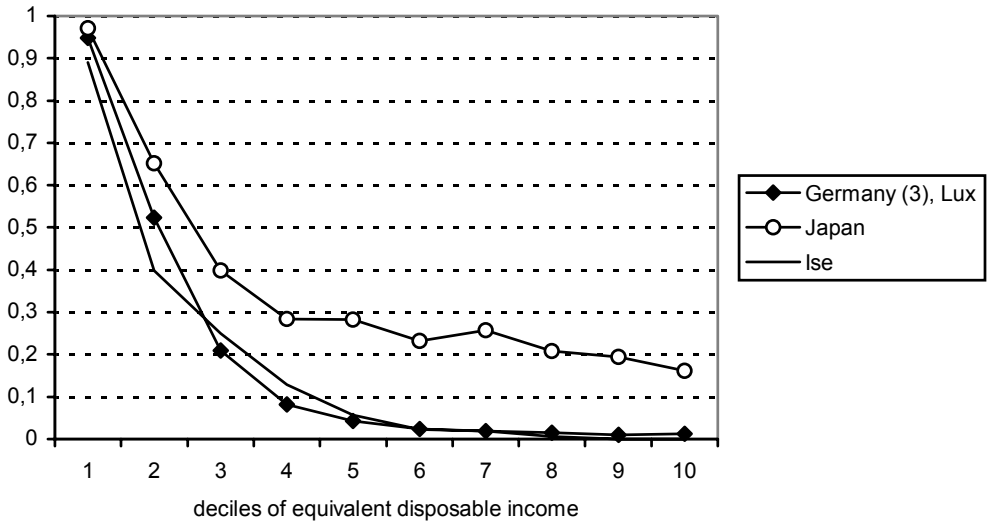
[10] Of course the two sets do not necessarily coincide: a taxpayer may be exempt from the tax on income, but may be subject to the tax on Ise.

Table 1 Some basic characteristics of the simulated contributions

	Rate	Ceiling	% exempt taxpayers	Average amount paid for taxpayers with positive tax (€)	% exempt households	Average amount paid for households with positive tax (€)
1) Germany 1	1.70%	€711/year	32%	345	19%	517
2) Germany 2	1.54% with children 1.81% no children	€711/year	32%	345	19%	517
3) Germany 3	345 euro/year	/	32%	345	19%	517
4) Luxembourg	1.49%	No	32%	345	19%	517
5) Japan	2.18%	No	54%	512	36%	660
6) Ise	2.31%	€711/year	32%	345	18%	511

Chart 1 shows, for deciles of equivalent disposable income, the share of exempt households, i.e. where no member is subject to a positive payment. In four of the six alternatives under examination the distribution of the households which do not pay any tax is similar, because among these hypotheses there are only differences in the level of the rate and in the presence of ceilings, but the basic rule for exemption (not paying the income tax) is the same. The poorest decile is actually exempt in all six cases; the share of households which pay the tax then increases rapidly. A significant share of the richest 50% of the population is exempt only in the "Japanese" case, since young households, irrespectively of their income, do not pay. The two curves of the "German" and Ise cases are very similar; the difference is that some poor households in terms of disposable income aren't so poor in terms of Ise, and therefore are subject to the tax. Conversely, some middle-income households may have low levels of Ise (because of the presence of one or more of the characteristics that reduce the level of the indicator, like the number of family members, being tenants, etc.).

Chart 1: Share of households which do not pay the tax, by deciles of equivalent disposable income



As is well known, a proportional tax becomes progressive if it is coupled with well designed forms of exemption or deduction. Charts 2.1 and 2.2 show that this is what generally happens in the six cases here examined. These graphs present the average incidence of the tax on disposable incomes of all households of the various deciles. The small dots and crosses represented above and below each line are the extremes of the 95 per cent confidence interval around the mean incidence, computed using 100 bootstrap replications for each tax and for each decile. The first decile, as already noticed in Chart 1, does not pay any tax, then the curve of average incidence rises rapidly. In all three "German" versions, the incidence curve declines for the richest part of the distribution; in the "Germany 1" and "Germany 2" cases the incidence falls only for the richest decile, due to the presence of the ceiling on contributions. In the flat tax case, however, the decline starts at much lower income levels, so that the average incidence on the tenth decile would be lower than that on the second income decile. Considering the other three alternatives (Chart 2.2), their

Chart 2.1 Average incidence by deciles of equivalent disposable income – all households

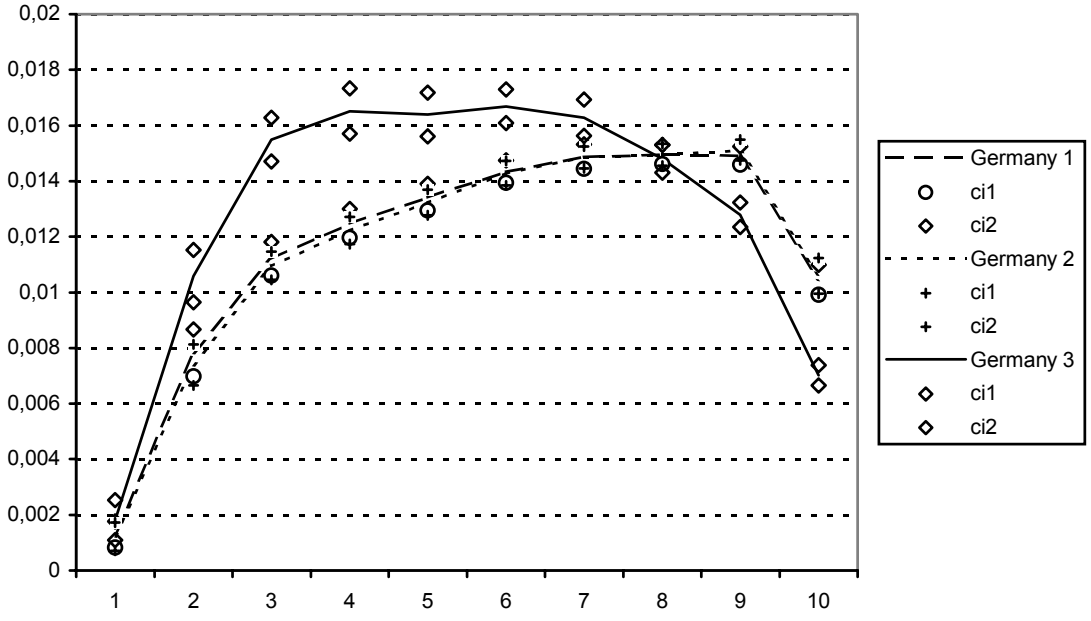
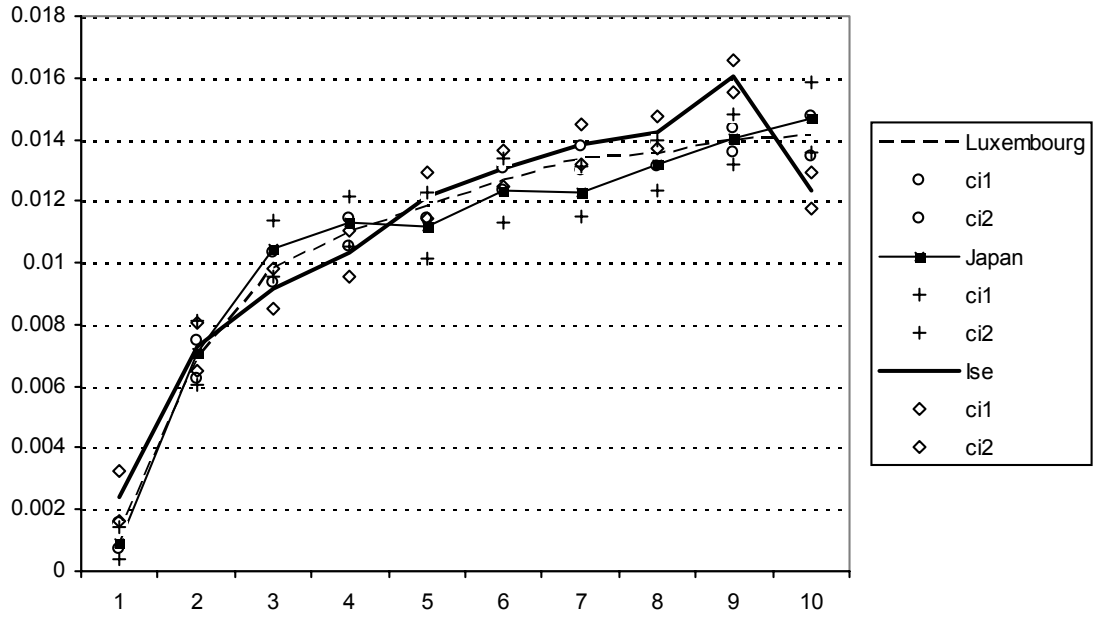


Chart 2.2 Average incidence by deciles of equivalent disposable income – all households



incidence curves are very close, and often not statistically different; average incidence increases monotonically both in the "Luxembourg" and in the "Japanese" case, while that of the "Ise" case is higher in the middle of the distribution, and falls for the richest decile.

2.3 Intergenerational implications

The design of a tax devoted to the financing of an LTC program should take account of two distributional considerations. First, the tax should satisfy the distributional judgements prevailing in a community, in terms of its different impact on the various parts of the distribution of current disposable income, in particular on the rich and the poor. Second, since the LTC financing scheme has an important insurance content, some observers suggest that there should be a relationship between the amount that each person pays and the degree of risk actually characterising each person. In other words, from a pure actuarial perspective it could be correct to extract a greater share of revenue from those that are more subject to the LTC risk, i.e. the elderly. This is probably the rationale behind the Japanese scheme, where however the tax base is still a variable, personal income, which follows a typical inverted-U shape over the life cycle; this means that the elderly, i.e. those that are more exposed to the risk, end up paying a lower share of total revenue than other age classes with lower risk. An alternative to the imposition of an age limit is to look for a tax base that does not decrease as rapidly as income when one ages. The Indicator of the economic situation, Ise, has exactly this characteristics, because it is a

linear combination of income and wealth, and it is well known that the typical age curve of wealth holdings is still increasing when that of income is not[11]. The adoption of Ise as the tax base would therefore have a distributional impact similar to the Japanese variant, with the important difference that the elderly would be required – on average - a greater payment not just because they are elderly, but because they have more wealth, and therefore are "rich" according to this mixed indicator. The simulation results confirm this intuition: the adoption of Ise increases the contribution of the elderly to total tax receipts. Table 2 shows the distribution of total revenue among the taxpayers classified by age classes. For instance, the taxpayers younger than 20 years are 1.3% of the total and pay 0.5% of total revenue according to the "Germany 1" scheme, they would be exempted under the Japanese version, and would pay 0.2% of total with a tax on Ise.Taxpayers younger than 40 (31.5% of the total) pay 32.4% of total revenue according to the "Germany 1" scheme and would pay 27.9% under the Ise tax. The reduction of the tax rate on those with children (from "Germany 1" to "Germany 2") has the effect of reducing the contribution from the age classes from 36 to 55 years, and increasing the share for the youngest and the oldest. Also the flat rate variant would produce a redistribution toward the oldest age classes, but has, as already seen, many limits from the point of view of distributive justice. The abolition of a ceiling ("Luxembourg") obviously raises the share of the central and richest age classes, and reduces significantly the contribution of the elderly. While the effect of the Japanese variant is in line with expectations, it is interesting that the tax on Ise produces an even greater contribution from the elderly than the Japanese case.

Table 2: Percentage composition of taxpayers by age classes and contribution of each class to total revenue

Age class	% taxpayers	Germany 1	Germany 2	Germany 3	Luxembourg	Japan	Ise
<20	1.3	0.5	0.6	0.8	0.5	0.0	0.2
21-25	4.2	3.1	3.3	4.1	2.9	0.0	2.3
26-30	6.6	6.6	6.8	7.2	6.2	0.0	5.4
31-35	9.0	10.3	10.4	10.0	10.4	0.0	9.5
36-40	10.4	11.9	11.5	10.6	11.6	0.0	10.4
41-45	10.6	13.1	12.6	11.5	13.5	19.8	11.3
46-50	9.4	11.8	11.4	9.9	12.2	17.8	10.2
51-55	9.0	11.0	10.7	9.2	11.7	17.0	10.4
56-60	7.5	8.1	8.2	7.8	8.8	12.9	8.4
61-65	7.8	7.1	7.3	7.7	6.9	10.1	8.9
66-70	7.8	5.7	5.9	7.1	5.6	8.2	7.3
71-75	6.6	4.6	4.8	5.9	4.2	6.2	6.4
76-80	5.1	3.2	3.4	4.2	2.9	4.2	4.7
80+	4.7	2.9	3.1	4.0	2.6	3.8	4.6
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*
<40	31.5	32.4	32.6	32.7	31.6	0.0	27.9
41-65	44.3	51.1	50.2	46.1	53.1	77.7	49.2
65+	24.2	16.5	17.3	21.3	15.3	22.3	23.0

[11] This is particularly true in the more generous payg pensions systems, like the Italian one, where the elderly are not compelled to run down their financial and real assets to preserve a satisfactory living standard.

Before ending this section, it is useful to remember that the presence of a non self-reliant person affects also the lives of other family members, who must provide informal care and/or must contribute to pay for the costs of assistance. The introduction of an LTC scheme has therefore many relevant consequences not only on those who are called to pay the tax and on the beneficiaries of the expenditure: if we consider also the voluntary transfers of resources within the households, then the distributive implications of the fund are probably more complex than those that have been shown by our analysis.

3. Financial sustainability

3.1 Financial sustainability under a pure Pay As You Go scheme

Of course, when we address the issue of inter-generational distribution, we must take not only a static perspective but also a dynamic one. In particular, financial sustainability is strictly associated with intergenerational fairness: when financial sustainability is not guaranteed under the current parameter values, contributions need to be raised through time and/or benefits must decrease in real terms.

The growth of LTC expenditure is driven by 4 major factors: 1) the demographic change increases the number of the elderly: since the incidence of disability is positively correlated with age, the ageing of population implies – other parameters being constant – an increase in the number of people eligible to LTC; 2) the evolution of disability incidence for each age group and gender changes the number of beneficiaries (in each level of need) for any given demographic composition: as a result, the number of beneficiaries can be lower for any given number of elderly; 3) the real increase in per unit cost of care implies an increase in expenditure for any given number and distribution of beneficiaries; 4) for any given number of beneficiaries, changes in their distribution across different disability levels have an impact on expenditure.

A numerical example can be useful in order to assess the magnitude of the underlying trends. We refer to Italy and assume that expenditure growth is driven only by the first 3 of the 4 factors recalled above (demography, disability incidence and unit cost dynamics).

Since official data for Italy about disability incidence per age and gender are not available, we have proceeded as follows: we have taken the German data about the number of beneficiaries of the LTC benefit scheme by age group and gender, and have calculated the ratios to the total German population in each age group and gender. These ratios have then been applied to the Italian official projections of population by age groups and gender up to 2051.

Therefore, the following numerical example consists in a deterministic simulation of the operation of a German-type LTC scheme hypothetically introduced in Italy[12].

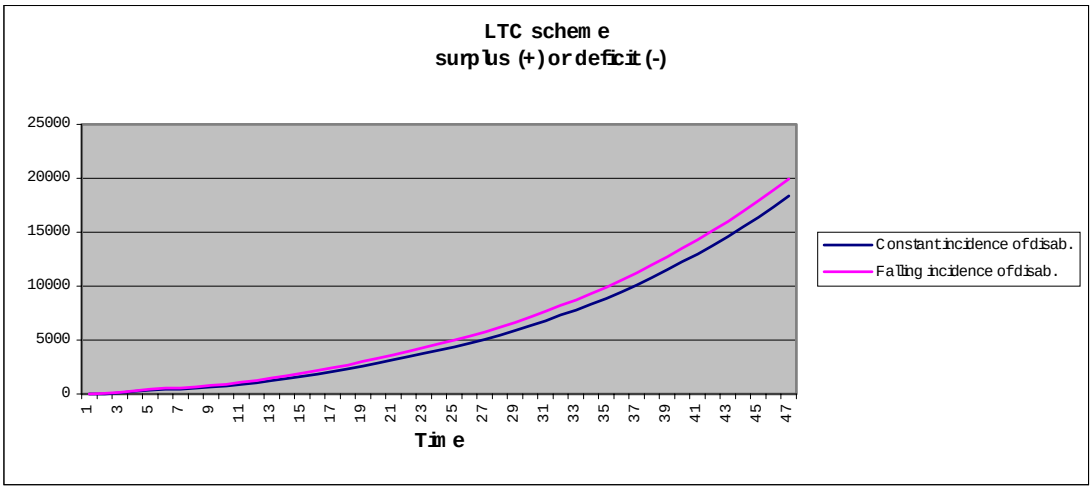
We run simulations over the period 2005-2051 with the following set of common parameter values:

- Initial number of beneficiaries =100
- Initial benefit (the same for all beneficiaries) =100

[12] We have not simulated the Japanese case because of lack of data about the distribution of beneficiaries.

- Initial expenditure is therefore 10,000
- Initial tax revenue is 10,000 and is set to grow at the alternative projected growth rates of GNP
- When a decrease in the disability incidence is considered, we assume that the number of beneficiaries decreases (in a compounded way) with respect to the number determined by the pure demographic trend by 0.08% per year and 0.2% per year[13], respectively, for beneficiaries in the 65-74 and 75+ age group[14].
- Inflation rate is set at 2% per year.

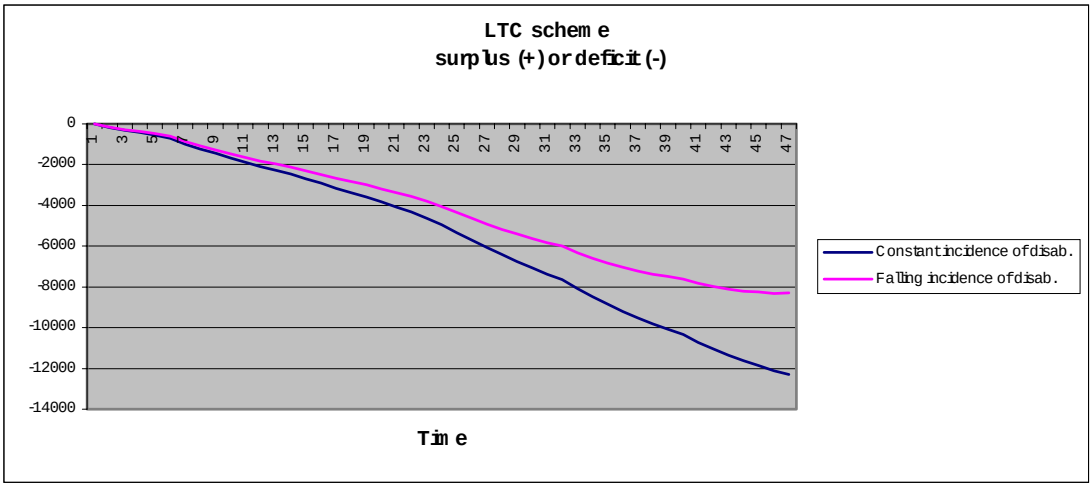
Chart 3.1: No indexation of benefits, 1% GDP growth (year 1=2005, year 47=2051) .



[13] These figures (0.08% and 0.2%) are obtained from empirical evidence relative to the USA: Manton et al (1997) find that the incidence of people unable to perform 3 or more Activities of the Daily Living (ADL) decreased from 1982 to 1994 by 1,6 percentage points. This improvement has affected mainly the elder groups of citizens: the reduction has been 1, 2.5 and 2,4 points for the age groups 65-74, 75-84, 85+, respectively. Such reductions over the period of 12 years correspond to an average yearly decline of 0,08% and about 0,2% for age groups 65-74 and 75+, respectively.

[14] For instance, the 2015 figure is obtained by dividing the projected number of beneficiaries aged 75+ for that year by $(1{,}002)^{10}$.

Chart 3.2: Indexation of benefits to inflation, 1% GDP growth (year 1=2005, year 47=2051)



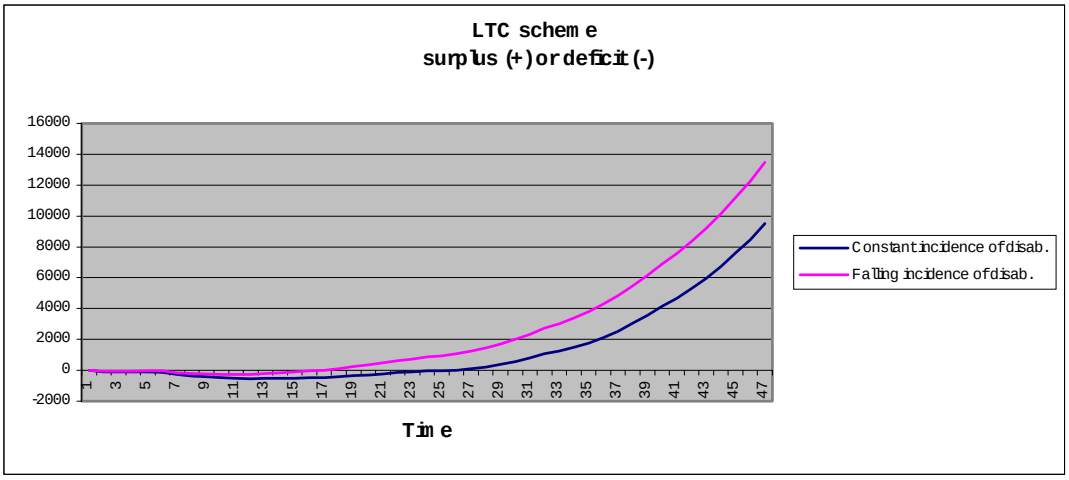
In the case of no indexation of benefits to inflation, financial sustainability is guaranteed (Chart 3.1) even in a scenario in which GDP growth is modest (1%): the real increase in available resources together with the decrease in the real value of the benefit outpace the rise in expenditure associated with a larger number of beneficiaries. However, the program is very unfair from the point of view of future generations: the benefit is reduced in real terms by almost 10% in 5 years, by almost 20% in 11 years, and halved in 35 years.

On the contrary, in this scenario indexation of benefits to inflation (Chart 3.2) is associated with important financial unbalances: under the relatively optimistic scenario of declining disability incidence, the scheme runs a deficit in percentage of the scheme's revenues that is more than 10% by 2013 and more than 20% by 2022.

If we refer to the case (see ch. 3.2) in which an LTC scheme with the same characteristics of the German one operates in Italy (whose estimated cost for 2004 is €9.2bn) then such deficits correspond to 0.08% or 0.16% of projected GDP[15]. The program is unfair since additional contributions have to be raised through time in order to face the growth of expenditure. With indexation of benefits we need a more robust (2%) GNP growth (Chart 4) in order to achieve sustainability.

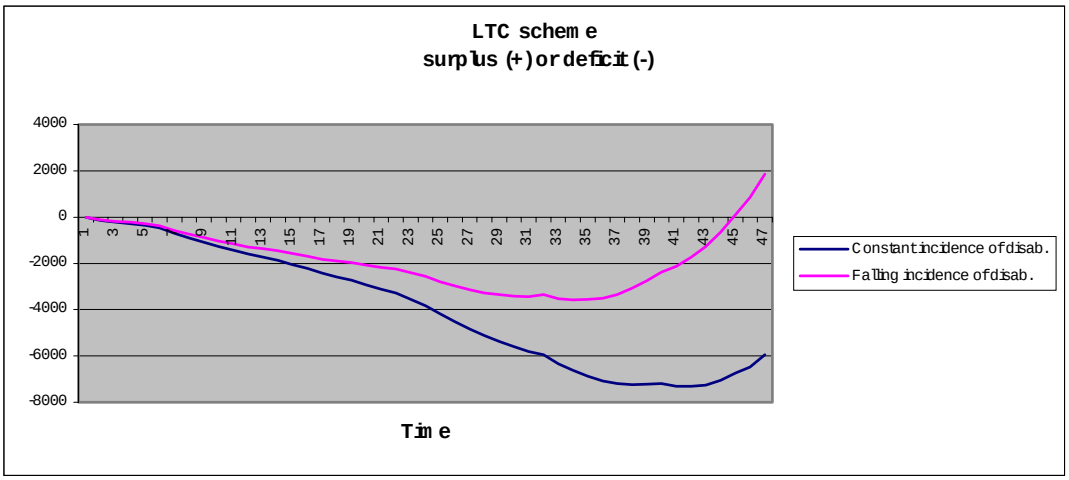
[15] This result, (and those quoted in the following pages) is obtained by letting the actual Italian GNP grow at the rate assumed in each simulation and by taking the current hypothetical expenditure of €9.2bn as the starting point for the dynamics of expenditure.

Chart 4: Indexation of benefits to inflation, 2% GDP growth (year 1=2005, year 47=2051)



If full indexation of benefits is provided (inflation + unit cost of care), financial sustainability is obviously more at risk. For instance, a 1.5% year increase in unit costs [the rate empirically observed by the Royal Commission on Long Term Care (1999) in the UK over the period 1980-99] implies that even a robust 3% average growth of GDP cannot prevent a prolonged and substantial deficit in the LTC program (Chart 5).

Chart 5: Full indexation of benefits (inflation +1.5% growth of unit costs of care); 3% GDP growth (year 1=2005, year 47=2051).



3.2 Would a trust fund be useful?

To sum up, our numerical exercise suggests that, even under optimistic macroeconomic scenarios, it is difficult to jointly achieve financial sustainability and intergenerational fairness within a pure payg program: future generations bear the weight of unfavourable demographic trends and of a possible increase in the cost of care.
However, as it is well known, when a Payg scheme is started, the first generation receives a *una tantum* transfer: we believe that the size, fairness and political viability of such a transfer should be assessed; the solution in which all the windfall is unselectively given to the members of the first generation is just one possibility, probably not the fairest one. For instance, when a Payg pension scheme is started, it can be argued that the first generation of beneficiaries has already contributed to the building of both the human and the physical capital stock: consider as an example the case of the generations coming out of world war II that had their funded pension schemes swiped away by post war inflation.
In the case of LCT insurance, however, it can be argued that the principle that everybody contributes to the financing of the scheme according to his/her economic capacity while receives benefits according to the level of need is acceptable in the steady state regime, while it is not in the transition to steady state. In particular, it can be argued that people who are jointly rich and old when the LTC program is started should face a means tested co-payment when they receive benefits in the first years of functioning of the scheme. This could be particularly the case when the society as a whole is already transferring a lot of resources from the young to the elderly through generous pension schemes and health care programs.
It seems worth considering the hypothesis of the accumulation of a trust fund during a first period of working of the program, so that it is possible to drain from it in the subsequent period in order to keep both the contribution and benefits constant in real terms for all generations. In other words, we consider the possibility to use a funded component within a Payg program in order to smooth the effects of demographic transition[16]. Of course, this kind of approach implies important problems of public accountability and transparency: the operation of efficient regulatory bodies is necessary in order to insulate the fund management from political interference. Furthermore, the portfolio policies of the trust fund are crucial: the trust fund can add to credibility and sustainability only if its operating is associated with an increase in aggregate saving (see Munnell 2005): in particular, investment of the trust fund assets in Treasury bonds casts doubts on this latter point.
It is important to notice that, as far as LTC is concerned, the collective accumulation of assets preserves the principle, at the individual level, that the right to benefits depends only on the size of need, not on past individual contributions.
In our numerical exercise, we figure out a situation in which:

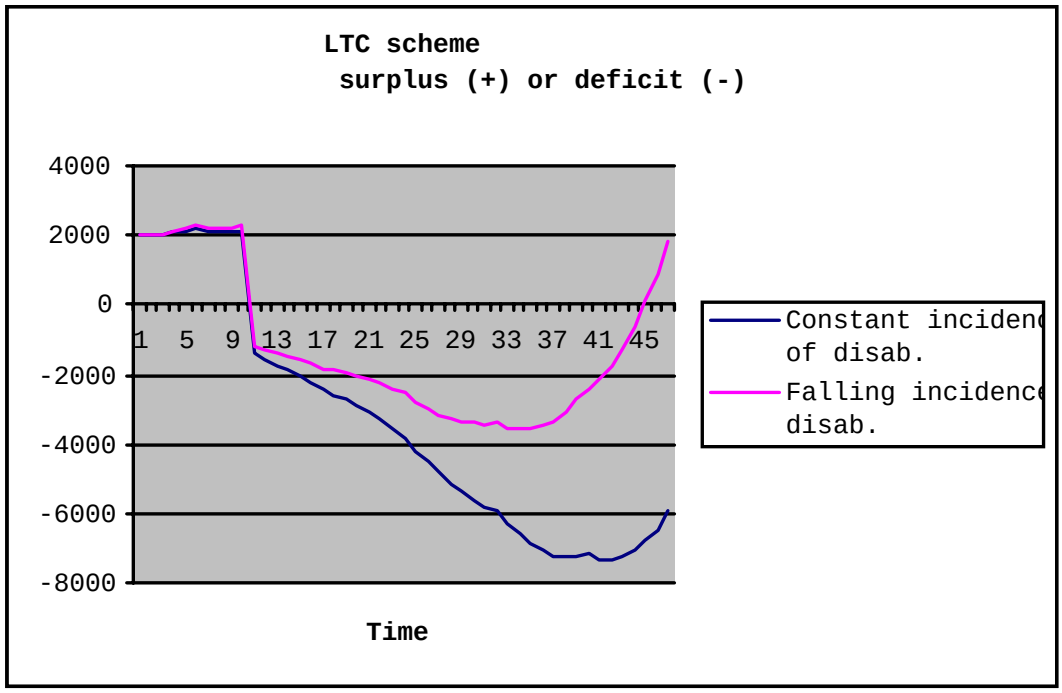
- Beneficiaries in the first x years of working of the scheme are subject to a means-tested co-payment that covers y% of total expenditure.
- In case total contributions exceed current expenditures (thanks to the first years co-payment) the surpluses go to a trust fund that yields a 1.5% real interest rate.

[16] This principle has been applied in several public pension schemes, notably in the U.S. (where it currently holds $1,7 trillion in Special Treasury Bonds), Canada, Ireland, Japan, New Zealand and Sweden. See Palacios (2002) for a discussion.

- In case expenditure exceeds current contributions, the deficit is financed by taking from the trust fund (as long it is sufficient to) or by issuing debt at a 1.5% real interest rate.

In Charts 6.1 and 6.2 we show, with reference to an optimistic macro scenario, (3% GDP growth) but a pessimistic unit cost dynamics (1.5%) – the same as the one considered in Chart 5 – how a trust fund could smooth the burden of LTC across generations by focusing on the fairness of the initial distribution of the "cake" coming out of the initiation of a payg scheme: the initial surpluses arising from the co-payment (see Chart 6.1) are capitalised in order to finance later deficits. Under this scenario, in particular, the scheme runs a surplus up to 2015 and is financially sustainable (trust fund positive) up to 2028 or 2032 in case of constant or decreasing incidence of disability, respectively[17]. Under this scenario and declining disability incidence the LTC trust fund would amount to 1.3% of GDP by 2015.
Unfortunately, under a more realistic, slower, GDP growth (1.5%), the outlook is darker: even with a bigger average co-payment (30%) for a longer period of time (20 years), financial sustainability could be guaranteed only up to 2029-2030 (see Chart 7.1 and 7.2).

Chart 6.1: Net balance of LTC scheme with: full indexation of benefits (inflation + 1.5% growth of unit costs of care), 3% GDP growth, 20% average co-payment for the first 10 years (year 1=2005, year 47=2051).



[17] Chart 6.1 does not include the amount accumulated in the trust fund.

Chart 6.2: Trust fund: full indexation of benefits (inflation + 1.5% growth of unit costs of care), 3% GDP growth, 20% average co-payment for the first 10 years (same as in chart 6.1) (year 1=2005, year 47=2051).

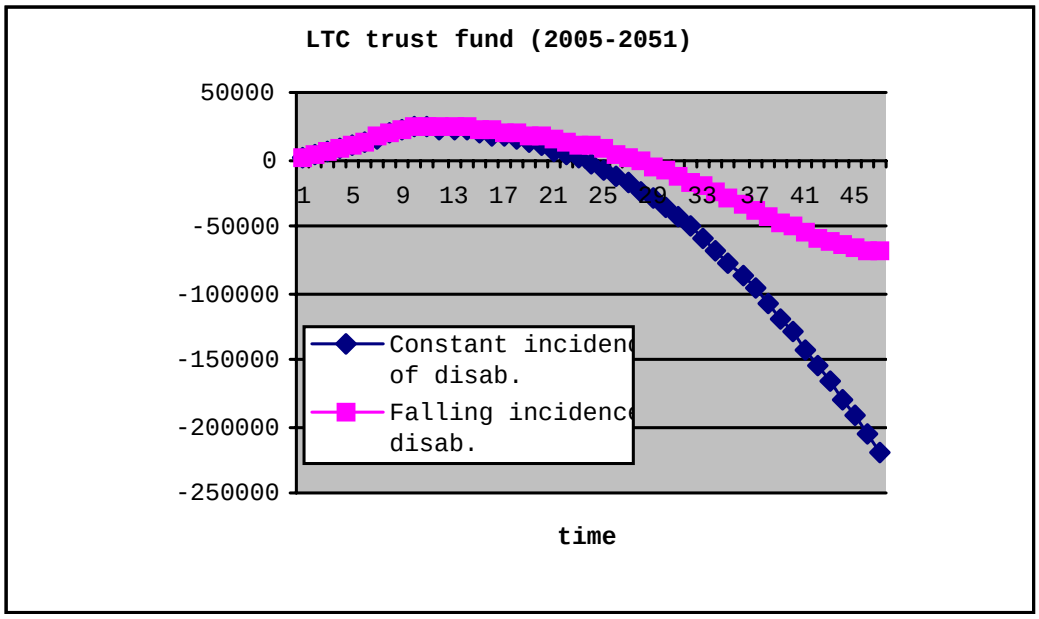


Chart 7.1: Net balance of LTC scheme with: full indexation of benefits (inflation + 1.5% growth of unit costs of care), 1.5% GDP growth, 30% average co-payment for the first 20 years (year 1=2005, year 47=2051).

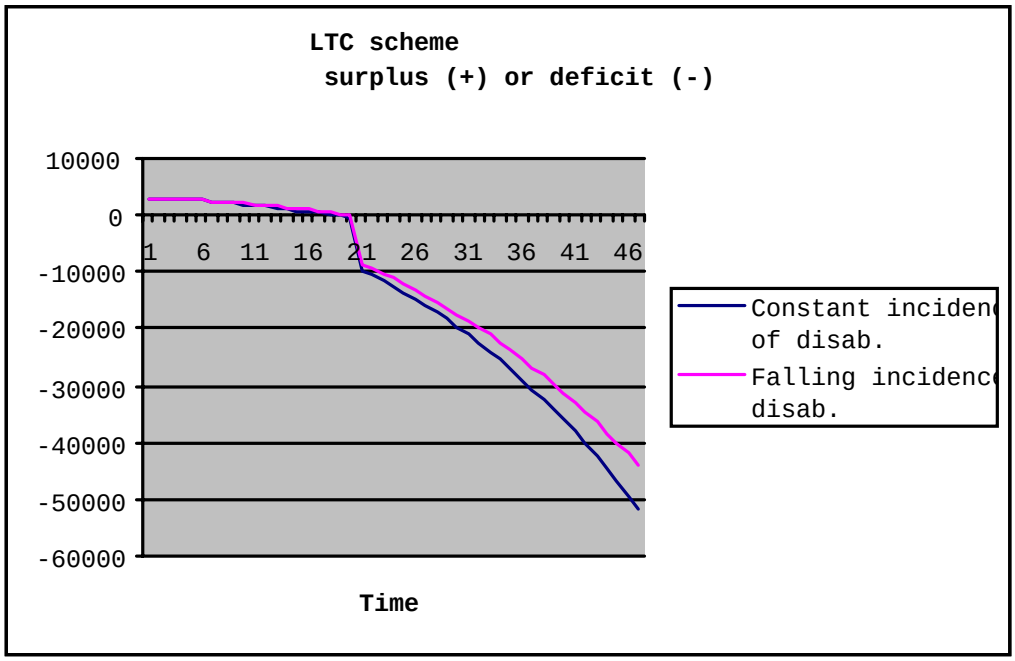
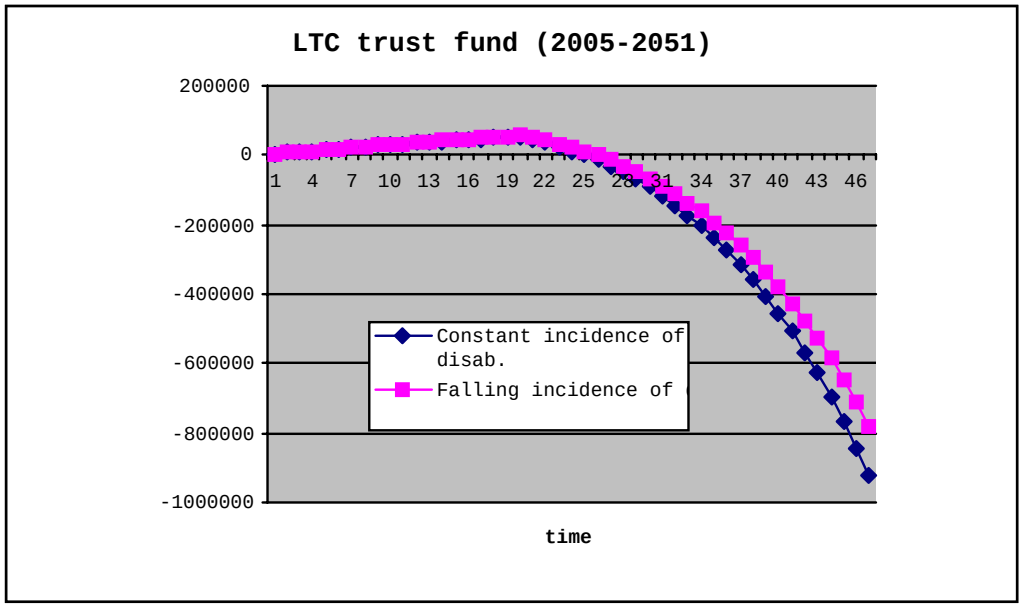


Chart 7.2: LTC trust fund with: full indexation of benefits (inflation + 1.5% growth of unit costs of care), 1.5% GDP growth, 30% average co-payment for the first 20 years. (same as in Chart 7.1) (year 1=2005, year 47=2051).



Of course, if we assume no increase in per unit costs (or indexation only with respect to the general price index), even the modest growth scenario of Chart 7 appears more positive (see Chart 8.1 and 8.2). In such a scenario we would actually need – in the constant incidence of disability case - a lower co-payment (25%) for a shorter period (15 years) in order to have long term sustainability (see Chart 8.3). If the incidence of disability decreases the outlook is even better: we need a 20% co-payment for "only" 12 years (see Chart 8.4); in this latter case the trust fund hypothetically associated to a German type LTC scheme operating in Italy would amount to 1.7% of GDP in the period 2016-2018

Chart 8.1: Net balance of LTC scheme with: indexation of benefits to inflation, 1.5% GDP growth, 30% average co-payment for the first 20 years (year 1=2005, year 47=2051).

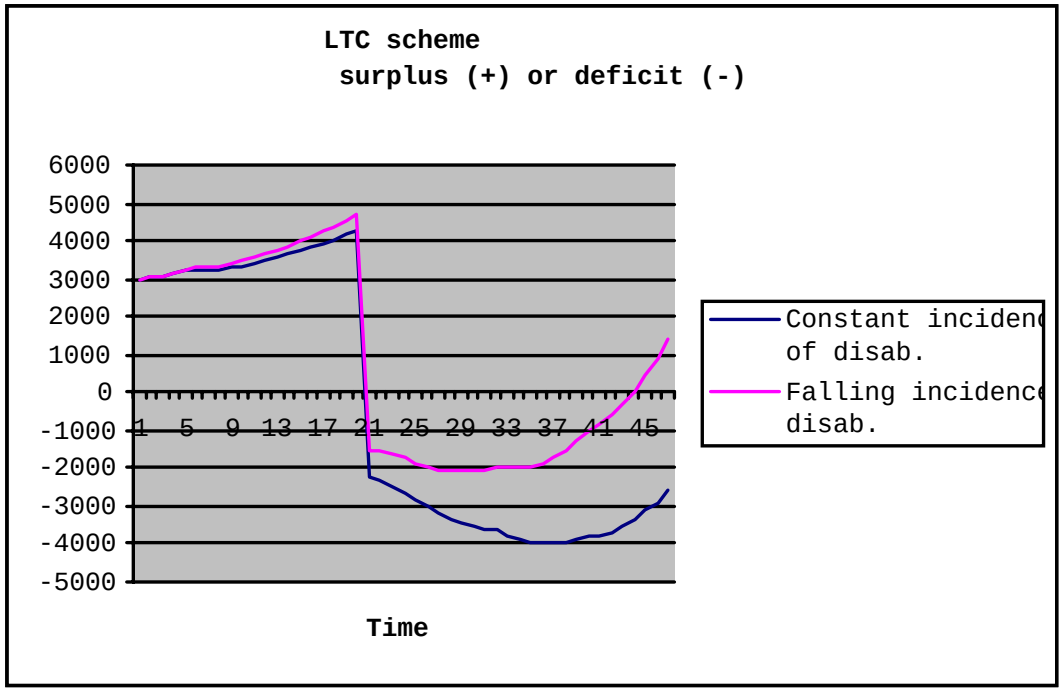


Chart 8.2: Trust fund with: indexation of benefits to inflation, 1.5% GDP growth, 30% average co-payment for the first 20 years (same as in chart 8.1) (year 1=2005, year 47=2051).

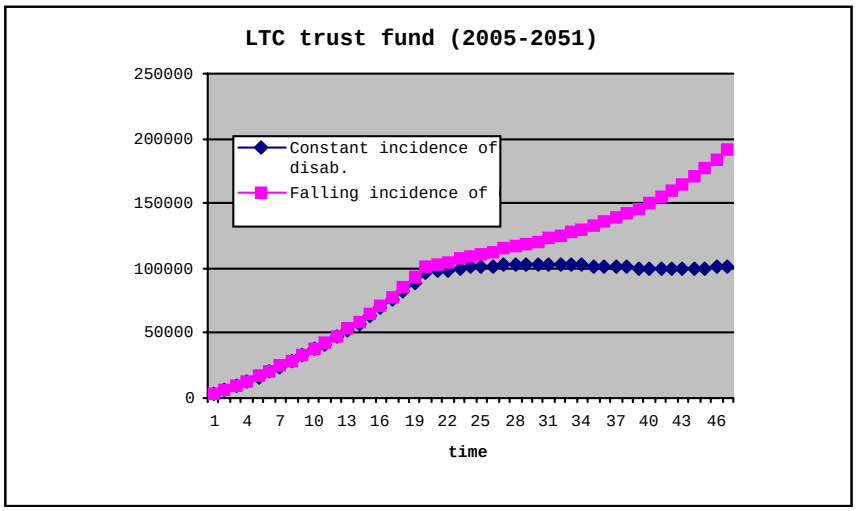


Chart 8.3: Trust fund with: indexation of benefits to inflation, 1.5% GDP growth, 25% average co-payment for the first 15 years (year 1=2005, year 47=2051).

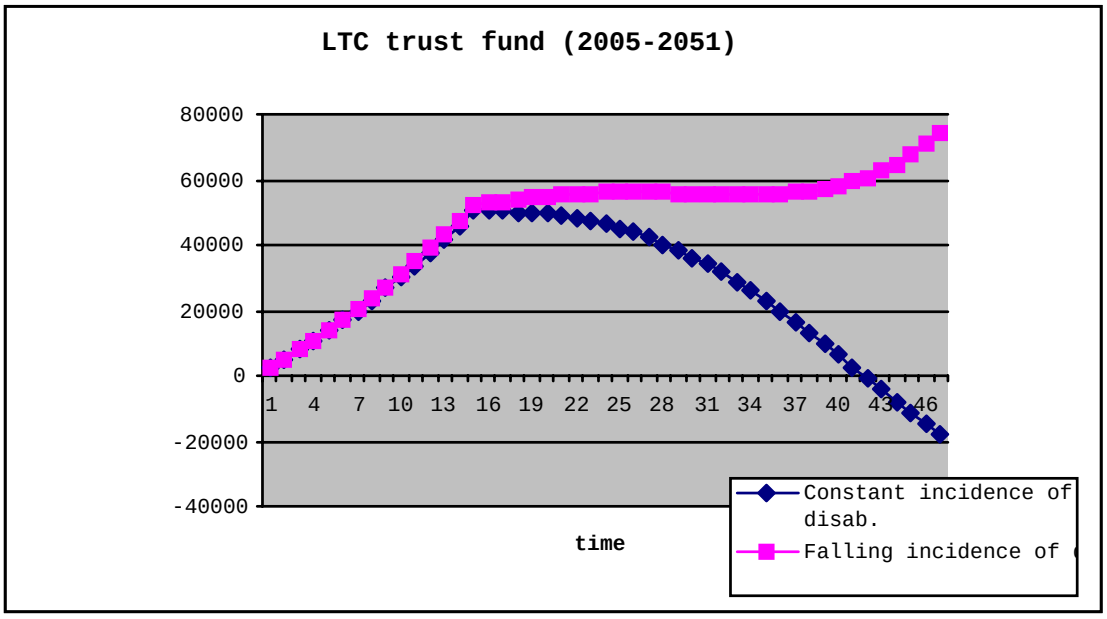
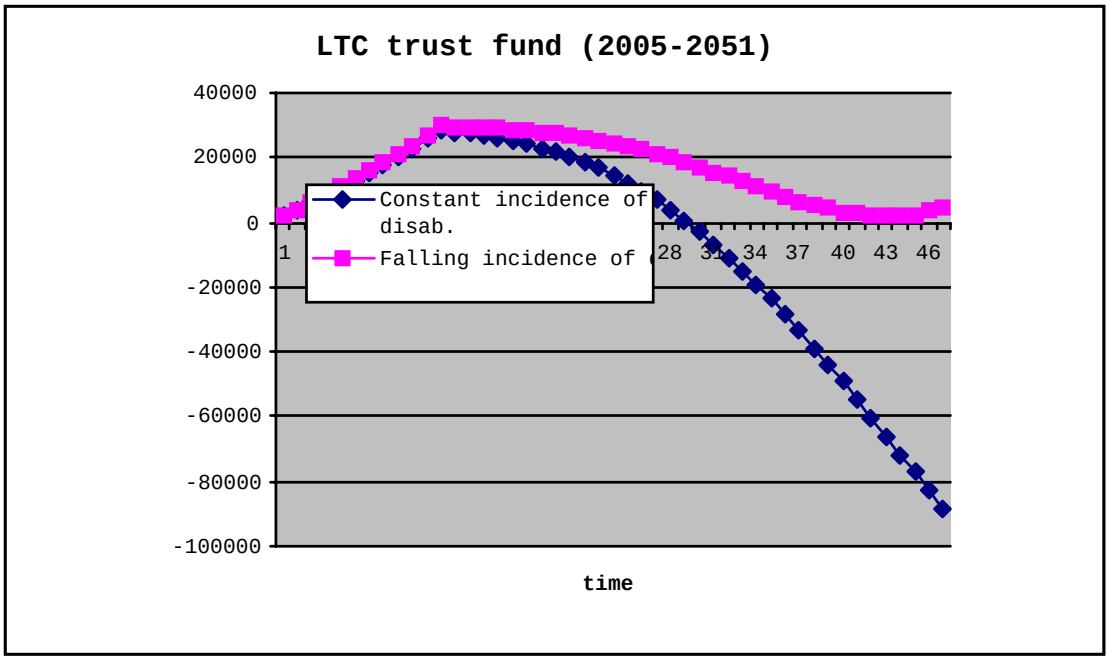


Chart 8.4: Trust fund with: indexation of benefits to inflation, 1.5% GDP growth, 20% average co-payment for the first 12 years (year 1=2005, year 47=2051).



4. Conclusions

Our analysis of six alternative options for financing an LTC scheme shows that the differences in terms of distributive implications are important. In particular, we have considered the effects on the Italian households of the application of some of the most relevant schemes applied in the international experience. The basic alternatives regard a contribution proportional to personal income, with or without ceilings, a flat tax, a tax that exempt the younger taxpayers, and finally a tax proportional to a measure ("Ise") which combines income and wealth. This last option, in particular, allows to reach two different aims: a) since the profile of wealth over the life cycle is steeper than that of income, such a tax would increase the contribution of the elderly, i.e. of those who are more subject to the need of LTC; b) if we accept the idea that the living standard of a person depends not only on his/her income but also on his/her wealth holdings, then the increase in the contribution of the elderly is motivated also by the fact that they are "richer" than the younger taxpayers.

The distributive impacts of the various alternatives, all raising the same revenue, have been evaluated across different income and age classes. The poorest decile of the equivalent income distribution would be exempt from taxation under all alternative options; in particular, in the "Japanese" case, with an age limit of 40 years, more than one third of the households would be exempt.

On average, these taxes would have an incidence of around 1-1.5% of disposable income, and would be slightly progressive due to the presence of a taxable minimum. The flat tax case, of course, would be regressive in favour of the richest half of the population.

The distributive analysis across age classes confirms that the "Japanese" tax and the tax on Ise shift the distribution of total burden against the elderly: the share of total revenue paid by taxpayers aged more than 65 goes from 16.5% in the "Germany 1" case to 22.3% for the "Japanese" tax, and to 23% in the case of the "Ise" tax.

Our numerical example enabled us to discuss the issue of inter-generational fairness and financial sustainability taking into account an hypothetical situation in which an LTC scheme with the actual characteristics of the German one operates in Italy. In particular, our analysis shows that indexation to (2%) inflation plays an important role: no indexation implies financial sustainability even with modest GDP growth (about 1% per year on average) since such growth together with the erosion of the real value of the benefit fully offset the rise in the number of beneficiaries (demography). With indexation to inflation we need to double the GDP growth in order to keep the scheme in balance. If we consider the need to provide full indexation not only with respect to inflation but also with respect to a 1.5% increase in unit cost of care, then the picture becomes darker: even a robust GNP growth (about 3% per year on average) cannot deliver financial sustainability.

We therefore move (par. 3.2) to a different perspective in which a temporary means tested co-payment allows the accumulation of an "LTC trust fund" during the first years of operation of the program. Such a tool significantly improves global sustainability: with full indexation (inflation and unit cost) and a 3% GDP growth a 10 year 20% average co-payment allows sustainability for 23 or 27 years under the assumption of constant or decreasing incidence of disability, respectively. Under a poorer GDP dynamics (1.5% per

year on average) the scheme is at higher risk: even with a 30% co-payment for 20 years the financial sustainability is to last for about 25 years (for both disability incidence scenarios).
If we rule out any indexation to unit cost increases the situation obviously improves even in the low GDP growth scenario (1.5%): under the constant incidence of disability scenario, financial sustainability is achieved for almost the whole considered period (2005-2051) provided a 25% average co-payment is introduced for the first 15 years; under the decreasing disability scenario sustainability "only" requires a 20% average co-payment for the first 12 years.
Of course the actual implementation of an LTC trust fund implies difficult problems regarding political viability, regulation, public accountability and asset management. We nevertheless believe that such an option should be discussed.

Appendix: The tax and benefit model

Section 2 has described the distributive impacts on current disposable incomes of six alternative scheme designed for financing an LTC fund. These distributional effects have been computed using a tax and benefit microsimulation model, called MAPP2002[18], that simulates the main tax and transfer schemes involving Italian families.

The structure of this microsimulation model is very similar to those of other tax and benefit models currently used by many research centres, for example Taxben at the Institute for Fiscal Studies (see for example Adam et al. 2005 for a recent application), Stinmod at the Natsem center (Harding 1996), or Euromod, a more general model belonging to the same family, simulating all the tax and benefit systems of the EU-15 countries (Immervol et al., 1999).

It is a static model because it is based on a cross-sectional sample survey, that contains information on incomes and demographic characteristics of Italian households observed in a single year. Further, it is static also because it does not contemplate possible behavioural reactions of the agents with respect to changes in exogenous parameters (like prices, hourly wages, tax rates). The base record file is the Bank of Italy survey on household incomes and wealth of 2002 , with 8011 households and 21148 individuals (See Brandolini (1999) for a detailed description of the main characteristics of this survey). Carried out every other year, this survey is the best Italian source of microdata for the study of the distribution of incomes at the household level. It also contains detailed information on the assets held by households, and on the labour and demographic characteristics of each member. The income data refer to post tax values, so it has been necessary to impute to each income recipient a value for gross income. After this imputation, all main taxes and monetary benefits have been simulated for each person. The key economic variable obtained after all the modules have been executed is personal disposable income, i.e. income after social security contributions and direct taxes have been paid. The following are the main tax and benefit schemes that are simulated: social security contributions, personal income tax, municipal estate tax, regional tax on value added, taxes on financial interests, value added tax, main excise taxes, family allowance, supplementary pension, social pension, invalidity pension, unemployment benefit, indicator of economic situation. All monetary values are updated at 2005 prices.

Prior to the simulations, two main corrections have been carried out on the original data: first, the values of the stocks of financial wealth, typically underestimated with respect to the national accounts statistics due to under-reporting and non-reporting behaviour, and particularly relevant for a proper computation of the indicator of economic situation, have been corrected using more reliable surveys on saving behaviour; second, income tax evasion has been imputed to individual taxpayers following the results of Marenzi (1996), who compared average incomes from the Bank of Italy survey and from tax administrative data, under the assumption that the "true" income is that declared in the Bank of Italy survey. The propensity to evade turned out to be mainly concentrated among the self-employed and non corporate firms, and to be inversely correlated with disposable income.

[18] MAPP is the acronym of Modello di Analisi delle Politiche Pubbliche, i.e. Model for the Analysis of Public Policies. See Baldini (2000) for a full description of the model, and Baldini et al. (2002) for a paper based on it.

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