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# THE ANNUITY MARKET IN AN EVOLVING PENSION SYSTEM: LESSONS FROM ITALY

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**Abstract.** We describe the main characteristics of the Italian annuity market in a comparative perspective. We present for the first time a comprehensive dataset concerning annuity prices in Italy, and compute indicators of actuarial fairness (money's worth ratios). It turns out that annuities sold in Italy are quite expensive with respect to the ones sold in other countries and to the ones offered by the public pension system. On the basis of the evidence gathered, we discuss the adequacy of current practices and regulation, and propose policies to increase efficiency and to speed-up the development of the market.

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## Index

1) Introduction

2) Annuities: definitions and functions

3) The development of the annuity market

4) The actuarial fairness of Italian annuity products

  4.1) International evidence

  4.2) A survey of Italian annuities

  4.3) *Money's Worth Ratios* in Italy

5) An extension: comparing private and publicly-provided annuities

6) Conclusions and policy implications

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## 1) Introduction

In the first half of the nineties, Italy has experienced quite significant changes in the rules of its public pension system. Reforms improved its financial outlook, through a significant tightening of benefit rules. In particular the 1992 reform, legislated in the aftermath of a severe balance-of-payments and fiscal crisis, cut the implicit pension debt by at least one quarter[2].

As a consequence of the new rules, which involve a very slow phase-in, in the future one expects a significant reduction in the pension income of Italian retirees. According to official estimates (*Ministero dell'economia e delle finanze*, 2007), in the 2011-2050 period the ratio between the average pension and the average wage will decrease by 30%. The average replacement rate (the ratio between an individual's first pension and his/her last wage) is expected to decrease from 70 to 50 per cent.

To reconcile financial sustainability in the face of ageing with adequate pension incomes, a quick development of the funded pension pillar is clearly required. Reforms meant to encourage retirement savings through individual accounts has been enacted together with those directed to the public PAYGO scheme. The rules concerning the governance of pension funds and prudential requirements has been strengthened, tax incentives have been legislated. In 2007, an automatic enrolment provision has been introduced (cfr. Cesari et. al, 2007).

The issue of post-retirement de-cumulation of pension savings has been touched only marginally by reform debates and efforts. At present, those subject to the new pension regime are still few. However, in a few years' time the number of pensioners for which private pensions will represent a significant fraction of income is bound to increase. The law mandates that at least half of a worker's pension fund capital has to be annuitized at retirement. Therefore, the demand of annuity products is likely to take-off. The next few years represent a window of opportunity to improve products and regulations concerning the pay-out stage.

In this paper we focus on the Italian annuity market. To evaluate the adequacy of current annuity prices we provide for the first time a dataset collecting prices and other characteristics of annuity products, covering most of the Italian market. We believe that a thorough examination of annuity prices is useful to explain (at least partly) the very small size of the Italian market today and, perhaps most importantly, to assess the adequacy of actual practices and regulations in view of the likely take-off of demand.

We calculate the ratio between the actuarially fair value of each product and its price (the so-called money's worth-ratio). As in Mitchell et al. (1999), we measure the importance of adverse-selection problems (as it is well-known, annuitants tend to live significantly longer than the average individual in the population) using mortality tables for annuitants and for the population at large. In this way, we are able to decompose the price into a first component due to the cost of adverse-selection and a second component due to administrative costs and profit margins. It turns out that the extent of the adverse selection problem, while significant, is in line with other annuity markets. The weight of administrative costs and profits is disproportionately high, instead. Overall, Italian products are quite expensive with respect to the international experience and to the ones offered by the public pension system.

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[2] Beltrametti (1995). An in-depth analysis of Italian public pension reforms can be found in Franco (2002) and Franco and Sartor (2006).

We also compare the price of private annuities with the annuity component implicit in the public PAYGO pension scheme: public annuities turn out to be significantly cheaper than private ones.

To conclude, based on the available evidence, we advance some policy proposals.

## 2) Annuities: definitions and functions

An annuity is a contract in which, in exchange of a premium upfront, the insurer pays to the client a stream of payments which stops only if the insured dies.

Annuities are either bought individually or collectively, i.e. through the investor's pension fund.[3] Annuities can also be directly provided by the pension fund itself (Italian laws only admit this solution in exceptional cases). In some countries, such as Sweden, the State is the only annuity provider.

There are several types of annuities. Products may differ for example with respect to: (i) the way in which the premium is paid (a single payment or a series of regular payments); (ii) the moment in which the pay-out of benefits starts (immediately after the premium is paid, or after some time); (iii) the rights recognized to survivors (in some contracts payments go on until the survivor is alive)[4].

Availability and adequacy of annuities are important because they enable individual investors and pension funds to transform any amount of pension wealth at retirement into a regular stream of payments, that ceases only upon the annuitant's death.

Indeed, each worker at retirement has to choose the level of consumption for the subsequent years, given the wealth accumulated so far. Without annuities, he would be exposed to longevity risk: if he lives longer than expected, he could outlive his resources; if on the contrary his lifespan turns out to be shorter than expected, a fraction of resources is wasted. Buying an annuity, both risks are shifted onto the insurance company. As companies have a wide pool of clients, they can diversify away the idiosyncratic component of the longevity risk. They only have to bear the aggregate component of the longevity risk, i.e. the risk of unpredicted changes in the *average* lifespan. This is why they can offer annuities at a price which is convenient for the investor.

## 3) The development of the annuity market

At present, the Italian annuity market is quite underdeveloped. The amount of annuity purchases, either by individuals or by pension funds, is small. While exact figures concerning single-premium immediate annuities are not available, the number of deferred annuities which are in the pay-out phase[5] was just about 15,000 in 2006 (ANIA, 2007).[6] Even if this number is increasing (almost a third of outstanding contracts have been signed in 2005), in the 2003-05 period, out of 1,940,000 deferred annuities contracts which became due, only 11,000 investors preferred the annuity to the lump sum.

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[3] In Italy, and in other countries as well, there is an "open market option" that allows pension fund participants to choose whether to accept the conditions proposed by the fund or to buy the annuity individually.

[4] A taxonomy of annuity products can be found in Mackenzie (2006).

[5] Deferred annuities are contracts in which at the end of the accumulation phase the investor is given the option of choosing between an annuity and a lump sum

Even if there are no fully comparable cross-country data concerning the size of annuity markets, the available evidence indicates that the Italian market is quite small in a comparative perspective.

In the UK in 2004 annuity premiums amounted to 7,5 billions of pounds. Almost 300,000 annuities started paying benefits in 2005. The number of outstanding contracts tripled with respect to 1991 (HM Treasury, 2006).[7]

Moreover, British investors can choose among a wide range of annuity products (HM Treasury, 2006). In particular, some products allow the possibility to postpone the acquisition of the annuity after retirement, and to choose among several investment options during the de-cumulation phase. Such instruments have the same favourable tax treatment granted to more standard contracts, as long as the moment of the annuitization is not postponed after the seventy-fifth year of life.

In the USA annuity premiums paid by occupational pension funds are equal to 0,9 per cent of GDP (American Council of Life Insurers, 2007), individual demand is at about 0,1 per cent of GDP (Reno et al., 2005). Premiums for variable annuities (financial vehicles with an accumulation phase at the end of which capital can either be withdrawn as a lump sum, or annuitized) are equal to another 0,2 of GDP.[8]

Other case studies show that annuities play an important role also in some non Anglo-Saxon countries, such as Switzerland, Denmark, Sweden and Chile. In particular, the latter has been studied extensively, as it was the first country to fully privatize its pension system. According to the most recent data, the yearly amount of annuity premium in Chile is at about 1,5% of GDP; 520,000 annuities enter the payment phase each year. Most of Chilean annuities guarantee an inflation-indexed stream of benefits. Insurers can provide more easily price-indexed products because many borrowers, including the State, issue inflation-indexed bond.

## 4) The actuarial fairness of Italian annuity products

Annuity prices can be decomposed into three main determinants:

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[6] Social security pensioners in the same year were 18 millions (1,2 millions originated in the same year).

[7] The British pension system has a non-contributory, flat-rate, means-tested first pillar. This component is indexed to prices, so that its relative importance is going to decrease due to the increase of real wages. The second pillar is a more standard “bismarkian” PAYGO scheme, from which workers are given the option to opt out, redirecting their contributions towards pension funds. In the latter case, they have to annuitize at least 75% of capital. They can either choose the annuities provided by the pension fund itself, or buy an annuity on the market (this is the so-called open market option; about 30% of new retirees uses this option).

[8] Individual pension plans, which are gradually replacing employer-sponsored plans, do not provide annuities (Poterba, 2001a, 2001b). This is cause of some concern, given that individually purchased annuities are not frequent.

1. Adverse selection costs. Indeed, annuitants have a higher-than-average life expectancy. Mortality tables used by insurers to convert pension capital into an annuity payment take this fact into account.
2. A premium to compensate the insurer for aggregate longevity risk, that is the risk of unexpected changes in *average* life expectancy.[9]
3. Administrative costs and profit margins.

The relative weight of the above factors is of course an empirical question. Most existing studies show that adverse selection costs are quite significant.

The most used indicator to evaluate the actuarial fairness of an annuity is its *money's worth ratio* (MWR). It is defined as the ratio between the present value of annuity payments – discounted to take into account both expected interest rates and expected longevity patterns – and the price of the annuity (i.e. the premium paid to the insurer).

### *4.1) International evidence*

For the UK, Cannon and Tonks (2004, 2006) indicate that annuities are basically fairly priced, from an actuarial viewpoint (i.e. the MWR is near100%), if one uses annuitants' mortality tables; if the calculation uses mortality tables for the whole population, the MWR goes down by about 3 percentage points. Finkelstein and Poterba (2004) provide a significantly higher estimate of the adverse selection costs for the UK: according to their calculations, the MWR is not far from 100% when annuitants' mortality tables are used; however, if population tables are used, the MWR goes down by about 14 p.p.[10]

Studies concerning the US annuity market (cfr. Brown et al., 1999, 2001) estimate a MWR at about 90 per cent, significantly lower than in the UK. The MWR goes down by 10 p.p. if one just considers life tables for the whole population.

James e Song (2002)[11] analyze eight countries (US, UK, Canada, Switzerland, Australia, Israel, Chile e Singapore) and show that the MWR is always above 95% if one uses annuitants' tables, and goes down by 6-12 p.p if one uses population tables.

The above results must be interpreted with caution. They are sensitive to different hypotheses concerning the expected path of interest rates and the differences between annuity products' characteristics. In particular, annuity payments could be subject to inflation risk and/or financial market risk.

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[9] In the last decades, there have been significant increases in longevity. A sizable fraction of these increases turned out to be unexpected (cfr. Visco, 2006). In Italy, life expectancy increased on average by 2.4 years in each decade between 1960 and 2000 (0.4 years more than the European average). According to the most up-to-date official projections, life expectancy is bound to increase by further 1.8 years up to 2050 (0.6 more than the European average).

[10] Price dispersion on the British market can be easily assessed by looking at the FSA website, where customers can easily confront the insurers' offers (http://www.fsa.gov.uk/tables). At the beginning of 2008 the standard error among the prices of the 11 main companies was quite small (3 per cent of the average price).

[11] See also James and Vittas (2000).

Results for a selected group of countries and studies are reported in table 1.

### *4.2) A survey of Italian annuities*

To evaluate price level and price dispersion on the Italian market, we made a survey of 10 major insurance companies. Together, they represent most of the Italian annuity market.

We asked to each company the benefits granted by an immediate single-premium annuity to a 65-years-old man in exchange of a premium worth 200,000 euros, both with and without a reversibility clause in favour of a 60-years-old woman.[12] To evaluate the weight of fixed costs, the question has been also asked for a 100,000 and a 400,000 euros premium. It turned out however that fixed costs are negligible.

Immediate single-premium annuities sold on the Italian market share some common features. The amount of the first payment is computed discounting a flow of constant payments with a "technical rate of return" (*tasso di rendimento tecnico*) fixed in advance. The benefits increase at a rate equal to the rate of return realized by a portfolio of assets (*gestione separata*), net of fees, minus the technical rate of return.[13] There is also a guarantee that the change in the annuity payment cannot be negative. *Coeteris paribus*, the first payment is therefore a function of three factors: the technical rate of return, the amount of fees,[14] and the mortality table adopted. In table 2 we report details concerning a typical annuity for a 65-years-old man, without reversibility.

The first monthly payment in exchange of a premium of 200,000 euros ranges from a minimum of 902 euros to a maximum of 1,040 euros in the non reversibility case, and from a minimum of 679 euros to a maximum of 761 euros if a full reversibility clause is included (table 3).

On average, benefits are equal to 957 euros without reversibility and to 704 euros if reversibility is allowed. The standard deviation is 40 euros without reversibility, and 27 euros with reversibility: in both cases it is equal to about 4% of the average benefit.

The insurer which offers the highest benefit, equal to 1,040 euros (761 euros with reversibility) uses a mortality table that is different from the one used by the other companies, reflecting life expectancy of its own annuitants. At present, summing up individually and collectively purchased contracts, this company pays about 5,000 annuities.

### *4.3)* **Money's Worth Ratios** *in Italy*

To evaluate the degree of actuarial fairness of the annuities offered on the Italian market, we proceed to compute their money's worth ratios.

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[12] As Italian pension funds are in their infancy, just a tiny minority of their participants entered the pay-out phase. Only few pension funds have already signed a purchase convention with an insurance company (Covip, 2007). For these reasons, we focus here on individual purchases.

[13] Returns on the *gestione separata* are taxed with a 12,5% tax rate. Annuity benefits are not taxed.

[14] Some fees are paid once-and-for-all, when the contract is signed; other fees are paid periodically, as a fraction of the realized returns and/or as a fraction of the annuity payment.

Formally, the annuity's MWR can be written as:

$$MWR = \frac{\sum_{t=0}^{T} A(t)p(t)R(0,t)}{P}$$

$$R(t',t'') = \prod_{s=t'+1}^{t''} (1+r(s))^{-1} \text{ with } R(t',t'') = 1 \text{ if } t' = t''$$

$$p(t) = \prod_{s=0}^{t} (1-q(s))$$

Where A(t) is the benefit paid by the company to the insured at date t, P is the initial premium, p(t) is the probability that a 65-year-old man will survive until year t, q(s) and r(s) are the period probability of dying, and the period interest rate, respectively.

We assume that annuities are paid for a maximum of 45 years (i.e. all annuitants die before they reach the age of 110).

We get: A(0) from the insurance companies that we interview; p(t) from mortality tables; r(t) from the term structure of interest rates prevailing when the annuity was "purchased" (at the beginning of 2008).

### *4.3.1) Mortality tables*

Mortality tables can be either "period" tables or "cohort" tables. In the first case, the probability to die at a certain age is taken from the latest observed mortality record at that age. Therefore, cohort effects are not taken into account. In the second case, cohort-specific death probabilities at various ages are estimated by means of statistical models.

For our baseline calculations, we use two different life tables. The first is a cohort table which refers to a 1943-born individual. It is taken from official population projections (cfr. Istat, 2002).

Most of the companies (and most of the companies in our sample) use instead another table built by the National association of insurers (ANIA), called IPS55.[15] It is built starting from the above-mentioned official projections, adjusted to take into account the adverse selection problem.

As it is well known, annuitants' tend to live longer than the average individual in the population, because buying an annuity is obviously relatively more convenient for long-lived individuals. In 2007 life expectancy for a 65-year-old man was 18 years in the overall Italian population but it was 21 among annuitants. The IPS55 table tackles this problem by applying to the death probabilities of the overall population a correction taken from British annuitants' tables (cfr. Institute of Actuaries and Faculty of Actuaries, 1999).

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[15] IPS55 originally refers to a 1955-born individual; a cohort-specific correction is then applied to compute death probabilities for other cohorts.

Italian laws allow the companies to further correct the death probabilities of IPS55, in order to adapt them to their own annuitants' characteristics.

The difference between the MWR computed using IPS55 and the one computed using projections referring to the whole Italian population gives a measure of the adverse selection costs.

As the choice of the life table is a crucial element in the computation of the MWR, we perform sensitivity analyses using two other tables:

- The RG48 table, produced by ANIA in 1998 using official projections (cfr. *Ragioneria Generale dello Stato*, 1996). It was used by insurance companies before the adoption of IPS55. It corrects for adverse selection using data taken from the British annuitants' population. It is not fully a cohort table, as it is based on a 1948-born individual, and companies apply it to cohorts born in the 1942-1951 period without correction.
- A new table, not yet public, produced by the *Nucleo di osservazione sulla durata di vita dei percettori di rendite* (a technical body with experts from INPS and ANIA). Differently from IPS55 and RG48, correction to take adverse selection into account is computed using data from the *Italian* population of annuitants.[16]

Death probabilities from the four life tables for the 1943-born cohort are reported in table 4.

### *4.3.2) Expected payments and discount rates*

As we already remarked, the contracts sold on the Italian market are of the variable annuity kind, so the payment depends on the performance of an underlying portfolio of assets (*gestione separata*).

To evaluate the MWR of a contract, one has to make hypotheses concerning the expected return of the portfolio, which is typically mainly composed by low-risk government and corporate bonds. In our baseline scenario, we set it equal to expected interest rates on government bonds (as taken from the term structure at the time of the exercise) plus a premium equal to the average spread observed in the last five years between the return of the *gestione separata* and the interest rate on government bonds.

As Italian annuities embed a minimum return guarantee of 2% (it corresponds to the *tasso tecnico di rendimento* used by most companies in the computation of the first payment), the value of such covenant should be added to the present value of the annuity, raising its MWR. However, given that the variance of past returns of the *gestione separata* is quite small, the value of the guarantee can be assumed to be negligible.

To compute the MWR one last ingredient is needed, namely the discount rates. In line with the previous literature, we put it equal to the expected interest rates as implicit in the term structure of government bonds. As a robustness check, we also use a proxy for the expected return on insurance companies' bonds.[17]

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[16] This life table refers to a 1955-born individual; a correction is then applied to compute death probabilities for other cohorts.

[17] We obtain such proxy by summing to the expected interest rates on government bonds the average observed spread between government and insurers' bonds in the 1999-2007 period. Such spread is about 65 basis points. Some studies use the spreads relative to corporate bonds with investment grade rating.

As a further sensitivity test, we also consider a scenario in which the payment stays constant throughout the life of the insured, and the discount rate is equal to 2% (the *tasso di rendimento tecnico*).

MWRs for Italian annuities under different scenarios are reported in table 5-7. The baseline scenario is shown in tables 5 and 6 (in table 5 discount rates are equal to the interest rate on government bonds, in table 6 they are assumed equal to the return on insurers' bonds). Table 7 shows results under the alternative scenario in which the annuity is constant through time, and payments are discounted at the *tasso di rendimento tecnico*.

### *4.3.3) MWR estimates*

In the baseline case the average MWR, computed using the IPS55 table, is equal to 87%. It varies between a minimum of 81% and a maximum of 95%. The average MWR appears lower than the one observed in other countries with more developed annuity markets. Using returns on insurers' bonds as the discount rate, the average MWR goes down to 82%.

Using the life tables relative to the overall Italian population, instead of those relative to the subgroup of annuitants, the average MWR declines by 10%. As remarked above, the gap captures the adverse selection costs. They seem broadly in line with the estimates for other countries. The IPS55 corrects for adverse selection using factors taken from British data. However, the gap is similar if we use the new life tables for Italian annuitants, built by the *Nucleo di osservazione sulla durata di vita dei percettori di rendite* (see last column of table 5).

In the alternative scenario in which the annuity payments stay constant and the discount rate is set equal to the *tasso di rendimento tecnico*, the average MWR is equal to 92%, with a minimum value of 87% and a maximum value of 100%.

In line with the available international evidence, our results suggest that adverse selection costs are a significant component of annuity prices. Therefore, measures which increase the degree of mandatory annuitization should help in keeping prices low, as they widen the population of annuitants and make it more similar to the population at large.

Summing up, our results suggest that: i) annuity prices in Italy are relatively high with respect to other countries in which the market is more developed; ii) adverse selection costs are also high, but in line with other countries.

It is important to emphasize that we do not believe that high prices alone can explain the present underdevelopment of the Italian annuity market. As a matter of fact, several other factors may discourage annuitization:

1. Annuities are an illiquid asset. If one is afraid to incur large expenditures during the years of retirement (such as out-of-pocket expenditures for health care), one may want to retain a liquid buffer of resources.
2. Investors' choices may be distorted by cognitive and/or behavioural biases, such as the systematic underestimation of one's longevity. The price of some annuity products (for example variable annuities, such as those which are typically offered in Italy) is often difficult to assess.

3. As the value of an annuity typically becomes zero when the annuity-bearer dies, the presence of a bequest motive may counter-balance the costs of bearing the longevity risk.
4. A sizable public pension pillar may crowd-out the private market for annuities (pension wealth accumulated in the public pillar is typically 100% annuitized). As contributions to public schemes are mandatory, it may well be the case than some individuals are actually over-annuitized.

While there is no reason to argue that the first three factors are stronger in Italy than elsewhere, it is true that a generous social security system is a distinguishing features of the Italian institutional set-up.

Our main point is indeed that, just as we will witness in the next few years a retrenchment of social security and an increasing role for the funded pension pillar, it is urgent to address the inefficient practices and regulations that are behind today's high prices.

## 5) An extension: comparing private and publicly-provided annuities

In this section we compare the annuities sold on the Italian market with the ones granted by the Italian social security system. This is made possible by the rules governing the new Italian PAYG scheme, introduced with the 1995 reform. The reform transformed the system into a so-called notional defined contribution (NDC) scheme.[18] In particular, workers' contributions are credited into individual accounts. These contributions are not invested in financial markets (the scheme retains its "unfunded" nature). However, they are granted a rate of return equal to the growth rate of GDP. At retirement, the initial pension benefit is set equal to the "notional" capital accumulated thus far, times an age-specific "transformation coefficient", meant to capture residual life expectancy.

Therefore, the system mimics a market-based system, in which the capital accumulated in a pension fund is used to buy an annuity at the moment of retirement. Contrary to a traditional PAYG system, in an NDC system the rules concerning "accumulation" are kept separate from the rules concerning the "pay-out" phase.

State-provided annuities are inflation-indexed (contrary to currently available private annuities) and partially reversible.[19]

One can apply the MWR methodology to public pensions as well (Geanakoplos et al., 2000). In the case of social security, the price of the annuity is given by the present value of past payroll contributions:

$$\sum_{t=-L}^{-1} \tau w(t) R(t,-1)^{-1}$$

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[18] On the economics of NDC pension systems, see the papers collected in Holzmann and Palmer (2006).

[19] If the only survivor is a spouse, he/she is entitled to 60% of the pension benefits; if there is also a dependent child, they are entitled to 80%; if there is more than one dependent child, they are entitled to 100%. The benefit is reduced if survivors have other incomes. In particular, it is cut by 25% if annual incomes are above 17.009 euros, by 40% if they are above 22.679 euros, 50% if they are above 28.349 euros.

where w(t) is wage at time t, τ is social security contribution rate, L is the length of the working life. The value of the annuity at retirement is given as before by:

$$\sum_{t=0}^{T} A(t)p(t)R(0,t),$$

but A(t) is now the annual public pension benefit and p(t) takes into account partial reversibility of benefits. In the Italian NDC scheme, A(t) is constant in real terms and is given by

$$A(t)=\left[\prod_{s=0}^{t}(1+\pi(s))\right]\alpha\sum_{s=-L}^{-1}\tau w(s)G(s,-1)^{-1},$$

where α is equal to 6,136% for a 65-years-old man (after 2010 it will become 5,260%), π(s) is period inflation and

$$G(t',t'')=\prod_{s=t'+1}^{t''}(1+g(s))^{-1},$$

with g(s) equal to the growth rate of the economy. One can write the overall MWR of an NDC social security system for a 65-year-old man (with a 60 y. o. wife) as:

$$MWR=\left(\frac{\sum_{t=0}^{T}A(t)p(t)R(0,t)}{\sum_{t=-L}^{-1}\tau w(t)R(t,-1)^{-1}}\right)=\left(\frac{\sum_{t=-L}^{-1}\tau w(t)G(t,-1)^{-1}}{\sum_{t=-L}^{-1}\tau w(t)R(t,-1)^{-1}}\right)\left(\frac{\sum_{t=0}^{T}A(t)p(t)R(0,t)}{\sum_{t=-L}^{-1}\tau w(t)G(t,-1)^{-1}}\right)=$$

$$=\left(\frac{\sum_{t=-L}^{-1}w(t)G(t,-1)^{-1}}{\sum_{t=-L}^{-1}w(t)R(t,-1)^{-1}}\right)\left(\alpha\sum_{0}^{T}p(t)R(0,t)\prod_{s=0}^{t}(1+\pi(s))\right)$$

In the steady state of dynamically efficient economies the first term, which relates to the notional accumulation component of the scheme, is strictly less than 1. In NDC systems, however, this component is kept separated from the annuity component. In particular, the second term in the above expression can be interpreted as the MWR of the annuity component of the public scheme, and can be compared with the MWR of annuities purchased on the market.

Under our demographic assumptions, and with a constant inflation equal to 2%, the MWR of the annuity component of the social security is equal to 103%, much higher than the average MWR of private annuities, which is 77% in our baseline scenario. This remains true even if we use in the calculation the transformation coefficients that should be applied starting from 2010 (in this case, the MWR goes down to 88%).

All in all, it seems that at present the market for annuities is not able to provide a flow of benefits comparable to that guaranteed by the State. Social Security can offer cheaper annuities for various reasons. First, its administrative costs are lower (due to economies of scale) and there are no marketing costs; second, as social security participation is mandatory, adverse selection problems are by far less severe; third, the State can obviously manage aggregate longevity risk much better than any private entity.

However, the relatively high MWR of public annuities is also due to the fact that survival probabilities embedded in social security transformation coefficients are outdated: they were established in 1995, when the NDC reform was passed, and never changed since then (the first update was due in 2005, but it never took place), while life expectancy has considerably increased.[20]

## 6) Conclusions and policy implications

At present, the Italian annuity market is quite under-developed. A sizable public PAYG pension pillar surely discourages demand. High prices are likely to be a second relevant factor, as well, as our calculations show that annuities are significantly more expensive in Italy than in other advanced countries.

In the next few years, however, the retrenchment of social security and the increased importance of the funded pension pillar will increase the demand for annuities. An efficient and well-functioning annuity market will become soon a priority for Italian pension policy.

To this aim, farsighted policies are necessary. In particular, the government should:

1. Guarantee a higher degree of transparency, both about prices and about product characteristics (for example, in the UK, the FSA hosts a web platform in which the different products are compared. A similar system has been recently adopted in Chile).
2. Promote the timely release of accurate life tables, for different segments of the population as well as for the population as a whole.
3. Facilitate the asset liability management of insurance companies, by providing adequate amounts of very-long-term and indexed bonds (the latter could encourage companies to offer inflation-indexed annuities). Issuance of longevity bonds could help insurance companies in managing aggregate longevity risk (G10, 2005).
4. The minimum fraction of pension wealth which has to be annuitized at retirement could increase (at present it is 50%). However, such policy entails costs, as some individuals could turn-out to be over-annuitized.
5. Regulation should foster the development of simpler and safer products, such as inflation-indexed annuities. Products could also be tailored to the needs of particolar subgroup of the population, with shorter-than-average expected life spans (in the UK, for example, more favourable contract terms are offered to smokers – so called enhanced annuities).

It remains open the issue of the relative weight of public and private annuity provision. As to a certain degree the market failures highlighted in the paper are bound to remain, a strong role of the public sector in the provision of the annuities, independently of its role in the accumulation phase, could be efficiency-enhancing. For example, in Sweden the State is the monopoly provider of annuities both for individual investors and for pension funds.

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[20] Moreover, coefficients are based on period life tables, not on cohort life tables. Therefore, they tend to underestimate longevity gains (Morcaldo, 2007).

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## Table 1
## Money's Worth Rate in selected countries

| Study | UK | | US | | Canada | | Australia | | Switzerland | | Germany | | Chile | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pop | Ann | Pop | Ann | Pop | Ann | Pop | Ann | Pop | Ann | Pop | Ann | Pop | Ann |
| Cannon-Tonks (2004) | 95,6 | 98,5 | | | | | | | | | | | | |
| Finkelstein-Poterba (2002) | 86,5 | 98,8 | | | | | | | | | | | | |
| Mitchell et al. (1999) | | | 81,4 | 92,7 | | | | | | | | | | |
| James-Song (2001) | 91,2 | 98,3 | 85,8 | 97,4 | 91,4 | 98,1 | 91,1 | 101,0 | 91,6 | 108,2 | | | | |
| von Gaudeker-Weber | | | | | | | | | | | 88,7 | 98,0 | | |
| Thorburn et al. (2007) | | | | | | | | | | | | | | 106,7 |

Note: without reversibility, for a 65 y.o. man; computed using the risk-free rates

## Table 2
## Immediate single-premium life *annuities*: projected benefits in the first 20 years

| | |
|---|---|
| - Projected financial rate of return [1] (a) | 4.00% |
| - Fees (b) | 1.20% |
| - Effective rate of return (a) – (b) | 2.80% |
| - Technical rate of return (Tasso tecnico) (c) | 2.00% |
| - Benefit revaluation rate ((a) – (b) – (c))/(1+(c)) | 0.78% |
| - Age of the policyholder | 65 |
| - Sex of the policyholder | Male |
| - Premium paid by the policyholder | 200,000 |
| - Annual benefit in the first year | 10,826 |
| - Payment frequency | Monthly |

| Years | Guaranteed annual benefit | |
|---|---|---|
| | Gross of taxes | Net of taxes |
| 1 | 10,826 | 10,534 |
| 2 | 10,910 | 10,608 |
| 3 | 10,995 | 10,682 |
| 4 | 11,081 | 10,757 |
| 5 | 11,167 | 10,833 |
| 6 | 11,254 | 10,909 |
| 7 | 11,342 | 10,986 |
| 8 | 11,431 | 11,063 |
| 9 | 11,520 | 11,141 |
| 10 | 11,610 | 11,220 |
| 11 | 11,700 | 11,299 |
| 12 | 11,791 | 11,379 |
| 13 | 11,883 | 11,459 |
| 14 | 11,976 | 11,540 |
| 15 | 12,070 | 11,622 |
| 16 | 12,164 | 11,705 |
| 17 | 12,259 | 11,788 |
| 18 | 12,354 | 11,871 |
| 19 | 12,451 | 11,956 |
| 20 | 12,548 | 12,041 |

(1) The supervisory authority (ISVAP) requires insurance companies to use a 4% financial rate of return in the informative documents.

## Table 3
## Immediate life *annuitiy* in exchange of a premium worth 200,000 euro (1)

| Insurance company | Monthly amount | |
|---|---|---|
| | Without reversibility | 100% reversibility |
| A | 902 | 679 |
| B | 924 | 681 |
| C (3) | 934 | 683 |
| D | 939 | 703 |
| E | 940 | 684 |
| F | 958 | 706 |
| G | 962 | 691 |
| H | 969 | 714 |
| I | 1,003 | 734 |
| L (2) (4) | 1,040 | 761 |
| *Average* | *957* | *704* |

(1) The benefit is paid monthly; the policyholder is 65-years-old man; reversibility is granted to a 60-years-old female beneficiary.
(2) The insurance company uses a life table different for the one used by the other companies, reflecting life expectancy of its own annuitants. The beneficiary is a 62-years-old female.
(3) The benefit is paid quarterly.
(4) The benefit is paid annually.

## Table 4: Life tables
(mortality rates; percentage values)

| **Age** | **ISTAT** (1) | **RG48** (2) | **IPS55** (3) | **Age** | **ISTAT** (1) | **RG48** (2) | **IPS55** (3) |
|---|---|---|---|---|---|---|---|
| 65 | 1.56 | 0.73 | 0.71 | 88 | 10.24 | 12.09 | 9.34 |
| 66 | 1.69 | 0.82 | 0.79 | 89 | 11.27 | 13.53 | 10.42 |
| 67 | 1.84 | 0.92 | 0.88 | 90 | 12.33 | 14.94 | 11.62 |
| 68 | 1.98 | 1.04 | 0.98 | 91 | 13.61 | 17.19 | 13.05 |
| 69 | 2.14 | 1.17 | 1.10 | 92 | 14.94 | 19.59 | 14.62 |
| 70 | 2.32 | 1.33 | 1.22 | 93 | 16.36 | 22.14 | 16.34 |
| 71 | 2.51 | 1.49 | 1.35 | 94 | 17.89 | 24.84 | 18.32 |
| 72 | 2.71 | 1.67 | 1.47 | 95 | 19.62 | 27.70 | 20.36 |
| 73 | 2.92 | 1.88 | 1.62 | 96 | 21.50 | 29.82 | 22.56 |
| 74 | 3.13 | 2.12 | 1.79 | 97 | 23.50 | 31.97 | 24.95 |
| 75 | 3.37 | 2.40 | 2.03 | 98 | 25.63 | 34.15 | 27.49 |
| 76 | 3.65 | 2.71 | 2.32 | 99 | 27.86 | 36.37 | 30.20 |
| 77 | 4.00 | 3.06 | 2.68 | 100 | 30.20 | 38.61 | 32.66 |
| 78 | 4.43 | 3.44 | 3.08 | 101 | 32.66 | 40.56 | 35.35 |
| 79 | 4.89 | 3.85 | 3.49 | 102 | 35.35 | 42.51 | 38.14 |
| 80 | 5.34 | 4.30 | 3.91 | 103 | 38.14 | 44.46 | 40.98 |
| 81 | 5.77 | 4.90 | 4.33 | 104 | 40.98 | 46.41 | 43.86 |
| 82 | 6.19 | 5.59 | 4.77 | 105 | 43.86 | 48.35 | 46.75 |
| 83 | 6.66 | 6.37 | 5.36 | 106 | 46.75 | 50.30 | 49.64 |
| 84 | 7.22 | 7.25 | 5.94 | 107 | 49.64 | 52.25 | 52.51 |
| 85 | 7.87 | 8.26 | 6.66 | 108 | 52.51 | 54.20 | 55.34 |
| 86 | 8.59 | 9.41 | 7.43 | 109 | *55.34* | 56.15 | 58.11 |
| 87 | 9.33 | 10.70 | 8.31 | 110 | *58.11* | . | . |

(1) The mortality table is based on ISTAT official population projection (cfr. Istat, 2002). Projections extend to year 2028; for subsequent years we used rates of the last available table.

(2) Table RG48 was produced by ANIA in 1998 using official projections (cfr. Ragioneria Generale dello Stato, 1996). It was used by insurance companies before the adoption of IPS55. It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1948-born individual; companies apply it to cohorts born in the 1942-1951 period without correction.

(3) Table IPS55 was produced by ANIA using Istat projections (cfr. Istat, 2002). It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1955-born individual.

# Table 5
## Money's Worth Rate of life annuities in the Italian market
(revaluation linked to expected portfolio returns; discount based on expected Government bonds rates)

| Insurance company | Benefit (1) | Moneys' Worth Rate (2) | | | |
|---|---|---|---|---|---|
| | | ISTAT (3) | RG48 (4) | IPS55 (5) | ANIA 2008 (6) |
| A | 902 | 0,71 | 0,77 | 0,81 | 0,79 |
| B | 924 | 0,78 | 0,84 | 0,89 | 0,87 |
| C | 934 | 0,75 | 0,81 | 0,85 | 0,84 |
| D | 939 | 0,74 | 0,80 | 0,83 | 0,82 |
| E | 940 | 0,76 | 0,82 | 0,86 | 0,84 |
| F | 958 | 0,76 | 0,82 | 0,86 | 0,84 |
| G | 962 | 0,78 | 0,84 | 0,88 | 0,86 |
| H | 969 | 0,78 | 0,84 | 0,88 | 0,87 |
| I | 1,003 | 0,81 | 0,87 | 0,92 | 0,90 |
| L | 1,040 | 0,84 | 0,90 | 0,95 | 0,93 |
| *Average benefit* | *957* | *0,77* | *0,83* | *0,87* | *0,86* |
| *Average life expectancy of a 65-years-old policyholder* | - | *18.3* | *19.9* | *21.1* | *20.7* |

(1) Immediate single-premium annuity paid monthly to a 65-years-old men in exchange of a premium worth 200,000. Company C pays a quarterly annuity, company L an annual annuity. Company L uses a mortality table that is different from the one used by the other companies, reflecting life expectancy of its own annuitants.

(2) *Money's Worth Rate* is defined as the ratio between the present value of annuity payments - discounted to take into account both expected interest rates and expected longevity patterns – and the price of the annuity.

(3) The mortality table is based on ISTAT official population projection (cfr. Istat, 2002). Projections extend to year 2028; for subsequent years we used rates from the last available table.

(4) Table RG48 was produced by ANIA in 1998 using official projections (cfr. Ragioneria Generale dello Stato, 1996). It was used by insurance companies before the adoption of IPS55. It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1948-born individual; companies apply it to cohorts born in the 1942-1951 period without correction.

(5) Table IPS55 was produced by ANIA using Istat projections (cfr. Istat, 2002). It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1955-born individual.

(6) A new table, not yet public, produced by the "Nucleo di osservazione sulla durata di vita dei percettori di rendite" (a technical body with experts from INPS and ANIA). Differently from IPS55 and RG48, correction to take adverse selection into account is computed using data from the Italian population of annuitants.

# Table 6
# Money's Worth Rate of Italian annuities

(revaluation linked to expected portfolio returns; discount based on expected corporate bond rates)

| Insurance company | Benefit (1) | Moneys' Worth Rate (2) | | | |
|---|---|---|---|---|---|
| | | ISTAT (3) | RG48 (4) | IPS55 (5) | ANIA 2008 (6) |
| A | 902 | 0,67 | 0,72 | 0,76 | 0,74 |
| B | 924 | 0,73 | 0,79 | 0,83 | 0,81 |
| C | 934 | 0,71 | 0,76 | 0,80 | 0,78 |
| D | 939 | 0,69 | 0,75 | 0,78 | 0,77 |
| E | 940 | 0,71 | 0,77 | 0,80 | 0,79 |
| F | 958 | 0,71 | 0,77 | 0,80 | 0,79 |
| G | 962 | 0,73 | 0,79 | 0,82 | 0,81 |
| H | 969 | 0,73 | 0,79 | 0,83 | 0,81 |
| I | 1,003 | 0,76 | 0,82 | 0,86 | 0,84 |
| L (1) | 1,040 | 0,79 | 0,85 | 0,89 | 0,87 |
| *Average benefit* | *957* | *0,72* | *0,78* | *0,82* | *0,80* |
| *Average life expectancy of a 65-years-old policyholder* | - | *18.3* | *19.9* | *21.1* | *20.7* |

(1) Immediate single-premium annuity paid monthly to a 65-years-old men in exchange of a premium worth 200,000. Company C pays a quarterly annuity, company L an annual annuity. Company L uses a mortality table that is different from the one used by the other companies, reflecting life expectancy of its own annuitants.

(2) *Money's Worth Rate* is defined as the ratio between the present value of annuity payments, discounted to take into account both expected interest rates and expected longevity patterns – and the price of the annuity.

(3) The mortality table is based on ISTAT official population projection (cfr. Istat, 2002). Projections extend to year 2028; for subsequent years we used rates of the last available table.

(4) Table RG48 was produced by ANIA in 1998 using official projections (cfr. Ragioneria Generale dello Stato, 1996). It was used by insurance companies before the adoption of IPS55. It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1948-born individual; companies apply it to cohorts born in the 1942-1951 period without correction.

(5) Table IPS55 was produced by ANIA using Istat projections (cfr. Istat, 2002). It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1955-born individual.

(6) A new table, not yet public, produced by the "Nucleo di osservazione sulla durata di vita dei percettori di rendite" (a technical body with experts from INPS and ANIA). Differently from IPS55 and RG48, correction to take adverse selection into account is computed using data from the Italian population of annuitants.

## Table 7
## Money's Worth Rate of Italian annuities
(constant annuity; discount rate based on *tasso di rendimento tecnico*, 2%)

| Insurance company | Benefit (1) | Moneys' Worth Rate (2) | | | |
|---|---|---|---|---|---|
| | | ISTAT (3) | RG48 (4) | IPS55 (5) | ANIA 2008 (6) |
| A | 902 | 0,76 | 0,83 | 0,87 | 0,85 |
| B | 924 | 0,78 | 0,85 | 0,89 | 0,87 |
| C | 934 | 0,79 | 0,85 | 0,90 | 0,88 |
| D | 939 | 0,80 | 0,86 | 0,90 | 0,89 |
| E | 940 | 0,80 | 0,86 | 0,90 | 0,89 |
| F | 958 | 0,81 | 0,88 | 0,92 | 0,91 |
| G | 962 | 0,81 | 0,88 | 0,93 | 0,91 |
| H | 969 | 0,82 | 0,89 | 0,93 | 0,92 |
| I | 1,003 | 0,85 | 0,92 | 0,96 | 0,95 |
| L (1) | 1,040 | 0,88 | 0,95 | 1,00 | 0,98 |
| *Average benefit* | *957* | *0,81* | *0,88* | *0,92* | *0,90* |
| *Average life expectancy of a 65-years-old policyholder* | - | *18.3* | *19.9* | *21.1* | *20.7* |

(1) Immediate single-premium annuity paid monthly to a 65-years-old men in exchange of a premium worth 200,000. Company C pays a quarterly annuity, company L an annual annuity. Company L uses a mortality table that is different from the one used by the other companies, reflecting life expectancy of its own annuitants.

(2) *Money's Worth Rate* is defined as the ratio between the present value of annuity payments, discounted to take into account both expected interest rates and expected longevity patterns – and the price of the annuity.

(3) The mortality table is based on ISTAT official population projection (cfr. Istat, 2002). Projections extend to year 2028; for subsequent years we used rates of the last available table.

(4) Table RG48 was produced by ANIA in 1998 using official projections (cfr. Ragioneria Generale dello Stato, 1996). It was used by insurance companies before the adoption of IPS55. It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1948-born individual; companies apply it to cohorts born in the 1942-1951 period without correction.

(5) Table IPS55 was produced by ANIA using Istat projections (cfr. Istat, 2002). It corrects for adverse selection using data taken from the British annuitants' population. It is based on a 1955-born individual.

(6) A new table, not yet public, produced by the "Nucleo di osservazione sulla durata di vita dei percettori di rendite" (a technical body with experts from INPS and ANIA). Differently from IPS55 and RG48, correction to take adverse selection into account is computed using data from the Italian population of annuitants.

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