

IMF Working Paper

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WP/97/18

INTERNATIONAL MONETARY FUND

European I Department

The Reform of the Pension System in Italy

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February 1997

Abstract

Italy's pension system was reformed in August 1995. The new system has various desirable long-run properties and, overall, it represents an improvement over earlier systems. However, it fails to address two longstanding problems: extremely high contribution rates, and a lack of provisions for dealing with the substantial deterioration in demographic ratios expected over the next 30-40 years.

JEL Classification Numbers:H55

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¹This paper has benefited from comments by Alessandro Leipold, Alessandro Prati, Massimo Rostagno and Tim Lane. Any remaining errors are my sole responsibility.

The Reform of the Pension System in Italy

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SUMMARY

A fundamental reform of the Italian pension system was enacted in August 1995 with the approval of Law 355. The law modified substantially the mechanism for computing retirement benefits, merged the old-age and seniority pension schemes into a single scheme that still allows, but also penalizes, early retirement, and introduced measures aimed at closing various loopholes.

This paper argues that the reform--commonly referred to as the Dini Reform--put in place a system with much improved long-run properties: actuarial soundness, an incentive, albeit modest, to postpone retirement, a closer link between contributions and benefits, and a less heterogeneous treatment of different categories of workers. The new system also represents an improvement over the previous one by being more transparent and by being cast in terms of a clear set of parameters that can be modified without need for a full-fledged reform.

Nevertheless, the Dini reform still leaves in place a comparatively generous system of benefits financed by high contribution rates for dependent workers and does not address the problem posed by the demographic transition in prospect during the first half of the next century. Moreover, by adopting the same calendar as the previous (Amato) reform for the gradual phasing-in of the new system, Law 355 missed an important opportunity to lessen the large generational imbalance embedded in Italy's public finances.

I. INTRODUCTION

Pension systems in many industrial countries need to be restructured. The case for reform documented in numerous studies rests upon two pillars: (i) the generosity of a pension system, financed, at least in part, through high payroll contributions that place a distortionary burden on labor markets, and (ii) the prospect of a deterioration in key demographic ratios, which would put additional strain on pension system finances. On both counts Italy had long been singled out as country whose pension system was in dire need of reform: pension-related contribution rates are among the highest in the world, and the elderly dependency ratio is expected to experience the most dramatic increase among OECD countries. More generally, the generational imbalance of Italian public finances had been shown to be the largest among countries for which generational accounts are available, and the generosity of the Italian pension system was shown to account for an important part of this imbalance.

A fundamental reform of the Italian pension system was enacted in August 1995 with the approval of Law 355. The law, usually referred to as the Dini Reform, modified substantially the mechanism for computing retirement benefits; merged the old-age and seniority pension schemes into a single one that still allows, but also penalizes, early retirement; and introduced measures aimed at closing loopholes that had effectively narrowed the base on which contributions were computed. This paper reviews the main features of the new system and assesses its merits against those of the previous (Amato) reform which, although not yet fully in place, would have been phased in gradually over the next two decades.

The paper argues that the Dini reform put in place a system with much improved long-run properties: actuarial soundness; an incentive, albeit modest, to postpone retirement; a closer link between contributions and benefits; and a less heterogeneous treatment of different categories of workers. These properties, together with tighter eligibility criteria for survivors' pensions, will eventually lead to a lower ratio of pensions to GDP than would have been the case under the Amato system. The Dini system also improves on the previous one by making it more transparent and casting it in terms of a clear set of parameters which can be modified without need for a full-fledged reform. Nevertheless, the Dini system still leaves in place a comparatively generous system of benefits financed by high contribution rates for dependent workers and does not address the problem posed by the demographic transition expected over the first half of the next century. In addition, by essentially adopting the same calendar for the phasing-in of the new system than the Amato reform, Law 355 missed an important opportunity to lessen the large generational imbalance embedded in Italy's public finances.

The paper is organized as follows: section 2 discusses briefly the need to amend the pension system in Italy prior to the 1995 reform; section 3 describes the main features of the new system; section 4 examines its long-run properties; section 5 discusses the effects of the demographic transition on the new system; and section 6 puts forward some conclusions. Four appendices contain some supporting technical material.

II. THE CASE FOR REFORM

As has been widely documented, most industrial countries are likely to experience a relatively rapid deterioration in elderly dependency ratios in the first half of the next century, with complex social and economic consequences. This “demographic transition” is expected to lead to a deterioration of those countries’ public finances, with public pension systems being hit particularly hard: to the extent that public pension systems operate on a pay-as-you-go basis, the evolution of the dependency ratio will imply a similar profile for pension outlays as a percentage of GDP. The result will be an increased strain on the public finances of these countries. Most studies of the effects of the demographic transition on industrial countries’ fiscal accounts tend to coincide in their recommendations: benefits must be reduced and eligibility criteria tightened. The magnitude and scope of the adjustment needed, however, will depend on country-specific existing arrangements and financial pressures.²

The case for reform has long been apparent in Italy.³ On the one hand, the Italian pensions system is particularly generous and has been adding a heavy burden on one of the most strained public finances among industrial countries (Table 1 and Chart 1). On the other hand, Italy’s elderly dependency ratio is expected to increase faster, or reach a higher peak, than in most industrial countries during the first half of the next century (Chart 2).⁴ In order to illustrate the likely effect of the demographic transition on the finances of Italy’s public pension system, a simple simulation exercise was carried out. The exercise is based on a general set assumptions regarding production technology and labor market structure, which are discussed in Appendix I.⁵ Under those assumptions two important results are obtained: (i) that the ratio of total pensions to GDP (ψ) evolves according to:

$$\dot{\psi} = \hat{r} - (1 - \phi) \hat{A} \quad (1)$$

where \hat{r} represents the change in the elderly dependency ratio, \hat{A} denotes total factor productivity growth and ϕ is the degree of responsiveness of the average real pension to changes in real wages; and (ii) that the “equilibrium contribution rate” (viz. the rate that would equate current contributions to current pensions) is proportional to the pensions-to-GDP ratio:

$$\tau_t = \zeta \psi_t \quad (2)$$

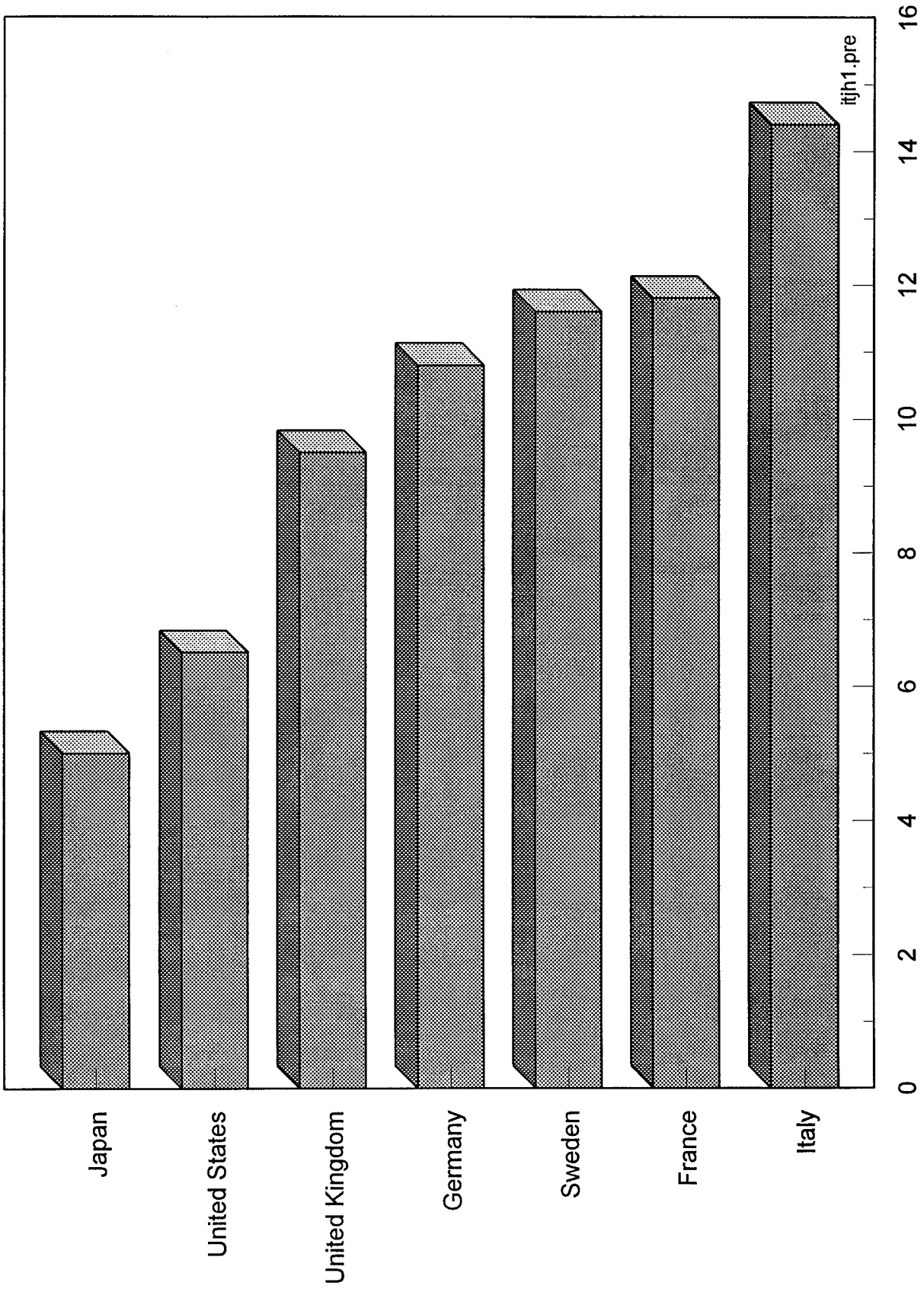
²OECD (1988b), p. 75.

³See, for example, Canziani and Demekas (1995) and Van den Noord (1993).

⁴See also chapter 3 of OECD (1988a).

⁵Appendix I contains a detailed derivation of the equations used in this section.

Chart 1
Public Pension Expenditures in Selected Industrial Countries
(In percent of GDP)



Source: World Bank (1994)

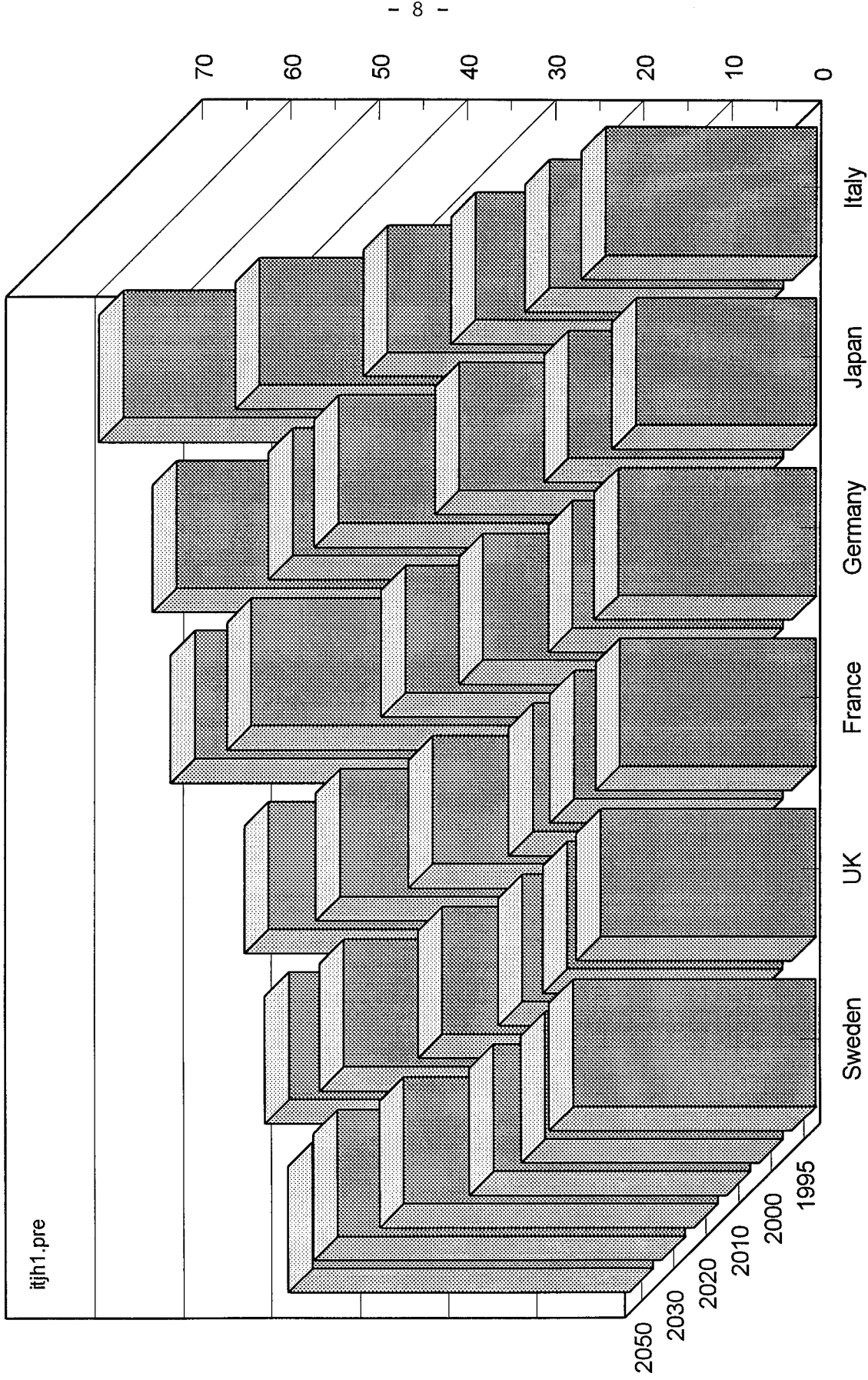
Table 1. Pension Systems: International Comparisons

Country	Retirement age		Payroll tax for pensions		
	Women	Men	Worker	Employer	Combined
Austria	60	65	10.3	12.6	22.9
Belgium	65	65	7.5	8.9	16.4
Denmark	67	67	—	—	—
Finland	65	65	0.0	16.8	16.8
France	60	60	10.0	9.8	19.8
Germany	65	65	8.9	8.9	17.8
Greece	60	65	5.3	10.5	15.7
Ireland	65	65	5.5	12.2	17.7
Italy	57	57	12.0	20.0	32.0
Luxembourg	65	65	8.0	8.0	16.0
Netherlands	65	65	15.2	0.0	15.2
Portugal	62	65	11.0	24.5	35.5 1/
Spain	65	65	2.8	13.9	16.7
Sweden	65	65	8.0	13.0	21.0
UK	60	65	8.3	10.5	18.8
US	65	65	6.2	6.2	12.4
Japan	65	65	14.6	2.3	16.9

Source: World Bank (1994); figures for Italy were updated in line with the August 1995 reform.

1/ Includes contributions for programs other than old age.

Chart 2
 Projected Elderly Dependency Ratios
 in Selected Countries



Source: Bos et. al. (1994)

where the factor of proportionality (ζ) depends on technological parameters. Notice that if pensions were fully indexed to wages ($\phi = 1$), both the pension-to-GDP ratio and the equilibrium contribution rate would simply mimic the movements in the elderly dependency ratio. If, more realistically, $0 < \phi < 1$ then productivity growth tends to reduce the fluctuations in the equilibrium contribution rate induced by changes in the elderly dependency ratio.⁶

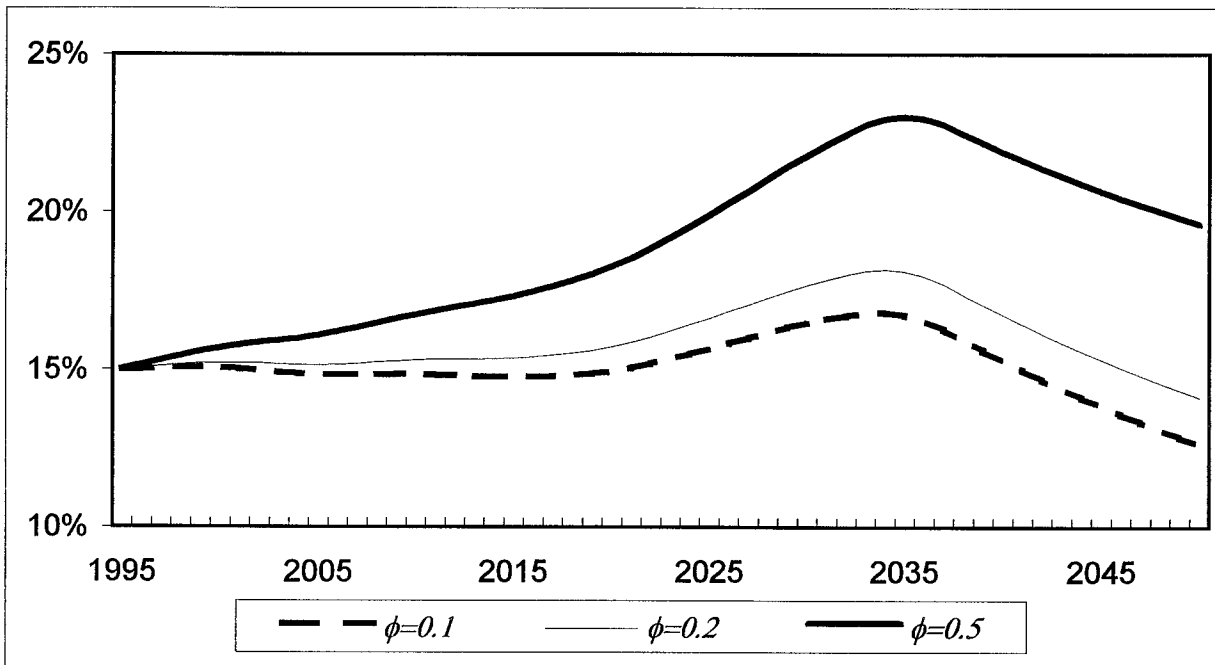
Chart 3 shows the results of a “passive” projection of ψ and τ , combining “realistic” starting values (15 percent for ψ and 32 percent for τ) with demographic projections for Italy contained in Bos et al. (1995). Three hypothetical values were used for ϕ (0.1, 0.2 and 0.5), and annual productivity growth was set at 2 percent. The top panel of Chart 3 shows the evolution of the pensions-to-GDP ratio and the bottom panel shows the associated values of the equilibrium contribution rate. The hump exhibited by both curves at around 2030 reflects the deterioration of the elderly dependency ratio. Notice that while relatively low values of ϕ keep the equilibrium contribution rate at or below 40 percent, a value of 0.5 percent pushes it up to implausibly high levels (a pension-related contribution rate of 50 percent would bring total social security contributions to over 60 percent). These projections are broadly consistent with those prepared with a more elaborate demographic model by Antichi (1995). Antichi’s simulations also show that as a result of the substantial increase expected in the elderly dependency ratio in Italy by the year 2030, equilibrium contribution rates would have risen to economically unfeasible levels even if the Amato system had been in place.

The case for reform of the pension system prior to the Dini Reform is made stronger by taking into account the large generational imbalance embedded in Italy’s fiscal policy. A study by Franco and others (1994) showed that Italians born after 1990 were likely to face a tax burden almost three times as high as that shouldered by generations alive in 1990. The imbalance reflected the government’s commitment to make very large payments to currently alive generations arising from both explicit liabilities (the official debt) as well as implicit liabilities (mostly future pension-related and health care-related outlays), with the latter becoming increasingly onerous as a result of the demographic transition. As an illustration of the magnitude of the problem, the authors showed that an immediate permanent reduction of 20 percent in pensions would have only reduced the generational imbalance by half.⁷ Updated simulations of generational accounting using 1993 as the base year were produced by OECD (1995), confirming

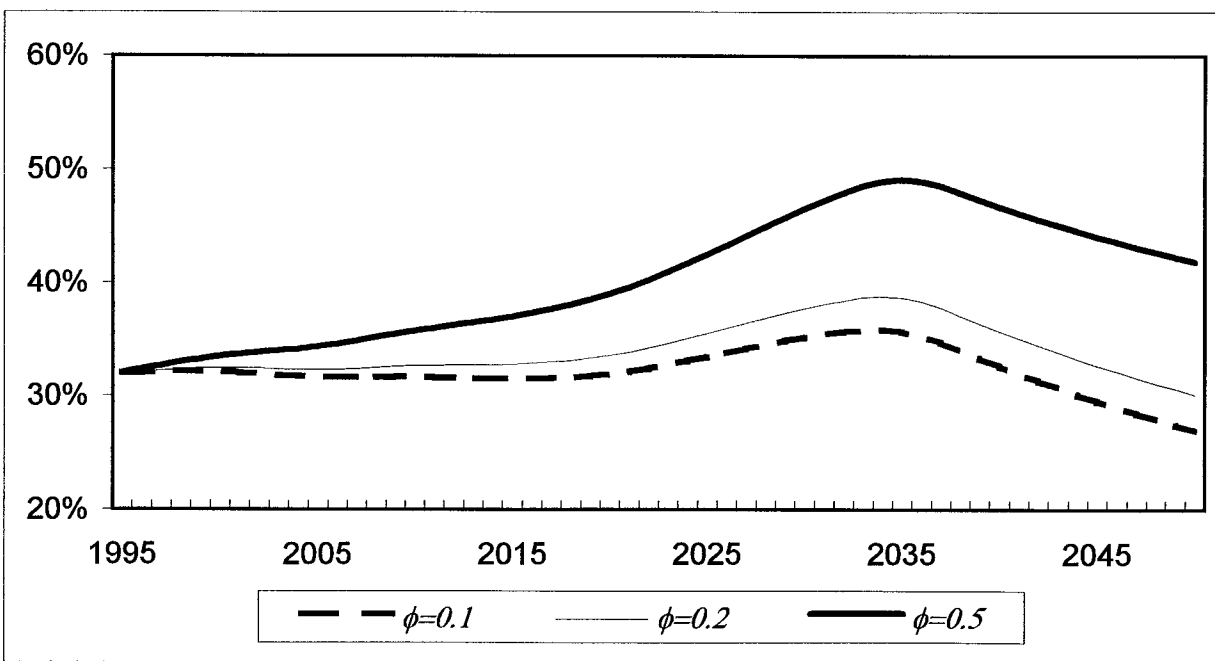
⁶Even in the absence of formal indexation, ϕ tends to be positive: new entrants to the pool of retirees typically have higher lifetime earnings and pensions than those exiting the pool, as a result of economic growth. Thus, productivity growth and demographic forces determine the value of ϕ . In the simulation exercise described below ϕ was, for simplicity, set exogenously.

⁷The numerical simulations were carried out before the 1992 Amato Reform. However, the authors argue that the effect of the Amato Reform would have been smaller than those of the simulated reduction of 20 percent in pensions.

Chart 3
Pensions-to-GDP Ratio



Equilibrium Contribution Rate



the findings of Franco et al., and showing that Italy's generational imbalance was the largest among the group of countries for which comparable generational accounts were available.⁸

Generational accounting also highlights the importance of time in the analysis of pension reform. In the absence of any generational imbalance it is quite easy to make the case for a gradual phasing in of a reform entailing higher contributions and/or lower benefits. Among other things, gradualism would allow affected individuals to adjust their individual consumption and saving decisions. However, when the starting point is a skewed generational distribution of tax burdens, time is of the essence. Franco et al. showed, for example, that if policies aimed at restoring fiscal balance in Italy were not put in place in 1991 but instead 10 years later, future generations would face a tax burden 4 times, rather than three times as large as that of currently alive generations. Thus, if a generational imbalance exists, the benefits of gradualism must be weighed against the increase in the generational imbalance arising from delaying implementation of the reform. In Italy, the magnitude of generational imbalance provides a strong argument in favor of a swift reform.

It must be stressed that, while in 1995 Italy's pension system was in need of reform, the Amato Reform of December 1992 had gone a long way in correcting an explosive situation. The Amato reform increased the minimum retirement age for old-age pensions, lengthened the reference period for calculating pensionable earnings, increased the minimum number of years of contributions required for seniority pensions, began a gradual elimination of special rules for public sector employees, and replaced wage indexation of pensions by price indexation. As shown above, the latter had a powerful dampening effect on the prospective evolution of the pensions-to-GDP ratio in the first half of the next century. However, the system introduced by the Amato reform was to be phased in very slowly and left two key problems unsolved: (i) contribution rates remained excessively high, and (ii) the system would not have been able to cope with the effects of the demographic transition. The remainder of the paper examines the extent to which the Dini Reform of 1995 addressed these issues.

III. THE 1995 REFORM

A. The New System

The 1995 reform law replaced an income-based system with a contribution-based system that will nonetheless continue to operate on a pay-as-you-go basis. The two main changes introduced by the reform in the area of retirement benefits are: (i) the introduction of a link between benefits and lifetime contributions, and (ii) the abolition of the system of seniority pensions that allowed early retirement without penalties. Under the new system, early retirement will still be possible, but under more stringent conditions and with penalties. The principal elements of the new law are:

⁸ That group includes, in addition to Italy, Germany, Norway, the United States and Sweden.

- To qualify for retirement, a worker will have to meet one of the following criteria: (i) 57 years of age and at least five years of contributions, or (ii) 40 years of contributions. In both cases, a minimum amount of lifetime contributions is also needed.

- A retiree's first year pension will be computed by multiplying (i) the value of accrued lifetime contributions capitalized at a rate equal to the 5-year moving average of nominal GDP growth (the pensioner's "capital") by (ii) a "transformation coefficient" stipulated in the law, which will depend on the age of retirement.⁹ A peculiarity of the system, however, is that the pensioner's "capital" is computed using contribution rates that are higher than those actually paid: for dependent workers the system recognizes a rate of contribution of 33 percent, although total contributions (employer and employee) amount to 32 percent; self-employed workers are recognized a contribution rate of 20 percent, but actually pay 15 percent. Pensions will be indexed only to inflation.

- Rules governing invalidity and survivors' pensions have been tightened. Benefits will now be linked to the level of income of the invalid and/or survivor. As a result, recipients of these pensions may see their benefits reduced by up to 50 percent.¹⁰

In addition, the law contains various other measures aimed at correcting existing distortions and closing tax loopholes, effectively broadening the base of contributions. These include:

- Some categories of self-employed workers exempt from social security contributions until recently will now be required to make contributions on the basis of their work-related income.¹¹

- Contributions of civil servants, until now calculated only on a fraction of their income, will now be based on their total remuneration.

⁹The coefficients increase from 4.7 percent at age 57 to 6.1 percent at age 65; the increasing profile of these coefficients is intended to account for residual life expectancy. The law also stipulates that these coefficients will be adjusted every ten years in line with prevailing life expectancy. Appendix II contains a detailed description of the formulae used by the present and previous systems.

¹⁰In particular, survivors' benefits have been reduced by rates of 25, 40 and 50 percent, depending on the survivor's overall level of income.

¹¹This group, known as *lavoro para-subordinato*, includes free-lancers and other semi-autonomous workers. The measure was challenged in court and, as a result, subsequently modified to exclude (i) self-employed workers aged 65 and above, and (ii) self-employed workers under 65 who have made contributions to other pension funds and are eligible for a pension.

- An income-based contribution to a fund for public housing (*contributo GESCAL*) scheduled to expire at end-1995 has been made permanent and the proceeds have been earmarked to finance pensions.

The reform also relabels as pension contributions part of the contributions to other welfare funds. Thus, although the overall contribution rate will remain unchanged, the contributions earmarked to finance pension funds will increase from 27 to 32 percent. In addition, the law stipulates that if the estimated savings through 1998 do not materialize, key parameters of the system could be revised.

B. Transitional Arrangements

The new system will be immediately in force for all individuals who begin to work on or after January 1, 1996, but will not at all affect workers with more than 18 years of contributions as at December 31, 1995.¹² Workers with at least one year but no more than 18 years of contributions as at December 31, 1995 will have their pensions computed as a weighted average of the benefits generated by the old and new formulae, with weights given by the number of years of contribution before and after 1995 respectively. They will also, however, have the option of shifting entirely to the new system. As a result, new retirees will have their pensions computed partially on the basis of the new system only beginning in 2013; only from 2036 onwards will all new pensions be calculated entirely on the basis of the new system; and pensions computed under the new rules will not reach an important share of total pensions before the second half of the next century.

For those not affected by the new system, early retirement with a full pension will still be feasible, although under conditions that will become increasingly stringent over the next decade; these conditions will be tightened faster for self-employed than for dependent workers (Table 2). In addition, civil servants will be eligible for early retirement with less than a full pension if they meet softer eligibility criteria in terms of minimum age or a minimum number of years of contribution; these criteria will also be tightened gradually.

IV. THE NEW SYSTEM IN THE LONG RUN

This section examines the long-run properties of the new system and compares them with those of the Amato system.¹³ Under the Amato system, pensions were computed as a fixed percentage (2 percent) of lifetime average earnings, adjusted by the number of years of

¹²This group was also grandfathered by the 1992 Amato Reform and will have its pensions computed on the basis of their income during the last 10 years of contribution.

¹³Although the Amato system was never fully in place, it would have been phased in over the same period as the Dini system. Thus, for the purpose of long-run comparisons, the Amato system constitutes the relevant benchmark.

Table 2. Dini Reform: Eligibility Criteria for Early Retirement

(for workers with at least 18 years of contributions at end-1995)

Year	WITH A FULL PENSION		WITH LESS THAN A FULL PENSION	
	Dependent workers (private and public) 35 years of contribution and minimum age of:	OR Any age and minimum number of years of contribution:	Self-employed workers 35 years of contribution and minimum age of:	Public sector workers only Any number of years of contribution and minimum age of: 1/ Any age and minimum number of years of contribution: 2/
1996	52	36	56	52
1997	52	36	56	52
1998	53	36	57	53
1999	53	37	57	53
2000	54	37	57	54
2001	54	37	57	54
2002	55	37	57	55
2003	55	37	57	55
2004	56	38	57	56
2005	56	38	57	56
2006	57	39	57	57
2007	57	39	57	57
2008 and later	57	40	57	57

1/ The penalties range from 1 percent for those retiring with 34 years of contribution to 35 percent for those retiring with 20 years of contribution.

2/ The pension is reduced proportionately to the number of years needed to reach 35 years of contribution.

contribution. Real past earnings were revalued at the rate of 1 percent annually. Thus, the pension of an individual retiring in year T with n years of contributions (at least 35) would have been given by:

$$P_T^A = 0.02 * n * \left[\frac{1}{n} \sum_{t=T-n}^{T-1} w_t (1.01)^{T-t} \right] \quad (3)$$

As explained earlier, under the new system pensions are given by the product of a transformation coefficient β which depends on age at retirement (e), and the accrued value of lifetime contributions:

$$P_T^D = \beta^e * \left[\sum_{t=T-n}^{T-1} \tau w_t \gamma_t \right] \quad (4)$$

where τ is the contribution rate stipulated for the computations and γ is an accrual factor.¹⁴ Both formulas can be re-written as the product of two factors: (i) a coefficient denoting the yield per year of contribution; and (ii) a measure of the accrued value of lifetime earnings, computed using arbitrary accrual rates:

$$P_T^D = [\beta^e \tau] \left[\sum_{t=T-n}^{T-1} w_t \gamma_t \right] \quad (5)$$

$$P_T^A = [0.02] \left[\sum_{t=T-n}^{T-1} w_t (1.01)^{T-t} \right] \quad (6)$$

In the new system, the first factor, or "yield" coefficient, is the product of the contribution rate and the transformation coefficients stipulated by the law; under the Amato regime the yield coefficient was 2 percent irrespective of age. As for the second term, the main difference is that while under the Amato regime the accrual rate was 1 percent, under the new system it is a moving average of rates of growth of GDP.

A. Generosity

A comparison of equations (3) and (4) reveals that, given an individual's history of lifetime earnings, the two systems could generate different levels of pensions as a result of two factors:

¹⁴See Appendix II for the detailed derivations.

different yield coefficients and different accrual rates. The table below compares the yields per year of contribution implied by the Amato and Dini systems, taking into account differences in age at retirement and contribution rates.

<u>Age</u>	<u>Amato</u>	<u>Dini</u>	
		<u>Self-employed($\tau=20\%$)</u>	<u>Dependent($\tau=33\%$)</u>
57	2.00	0.94	1.56
58	2.00	0.97	1.60
59	2.00	1.00	1.65
60	2.00	1.03	1.70
61	2.00	1.07	1.76
62	2.00	1.10	1.82
63	2.00	1.14	1.88
64	2.00	1.18	1.95
65	2.00	1.23	2.02

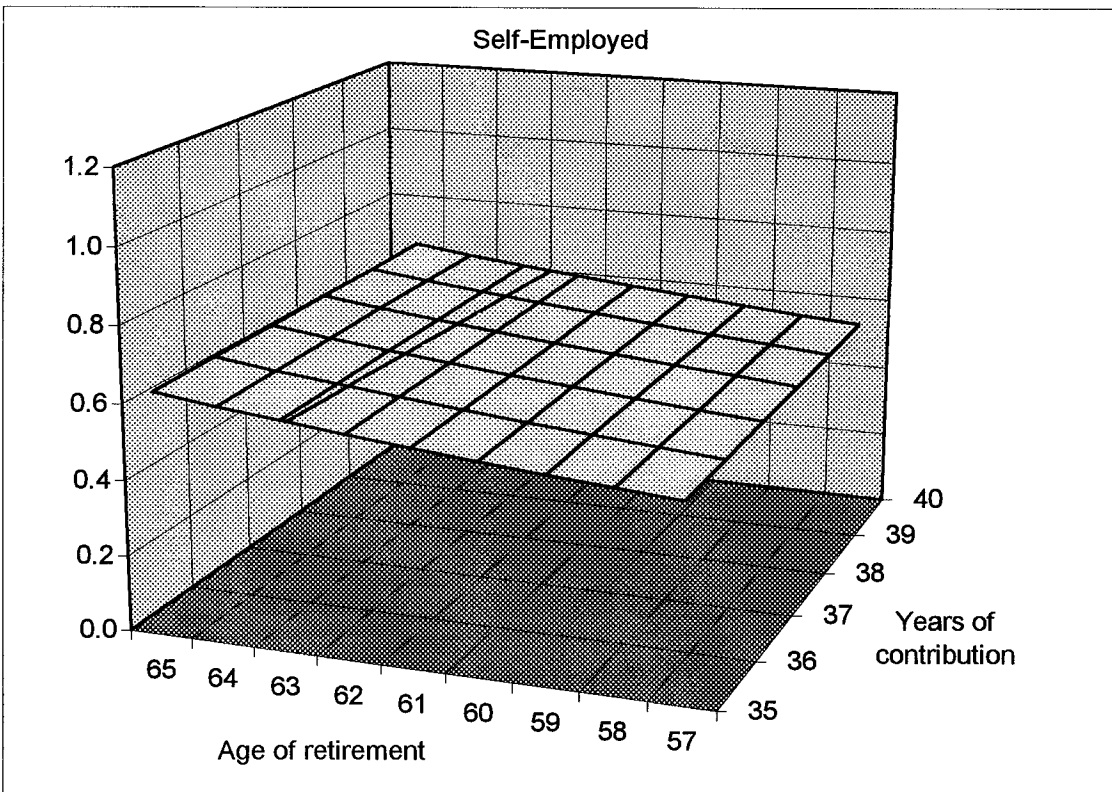
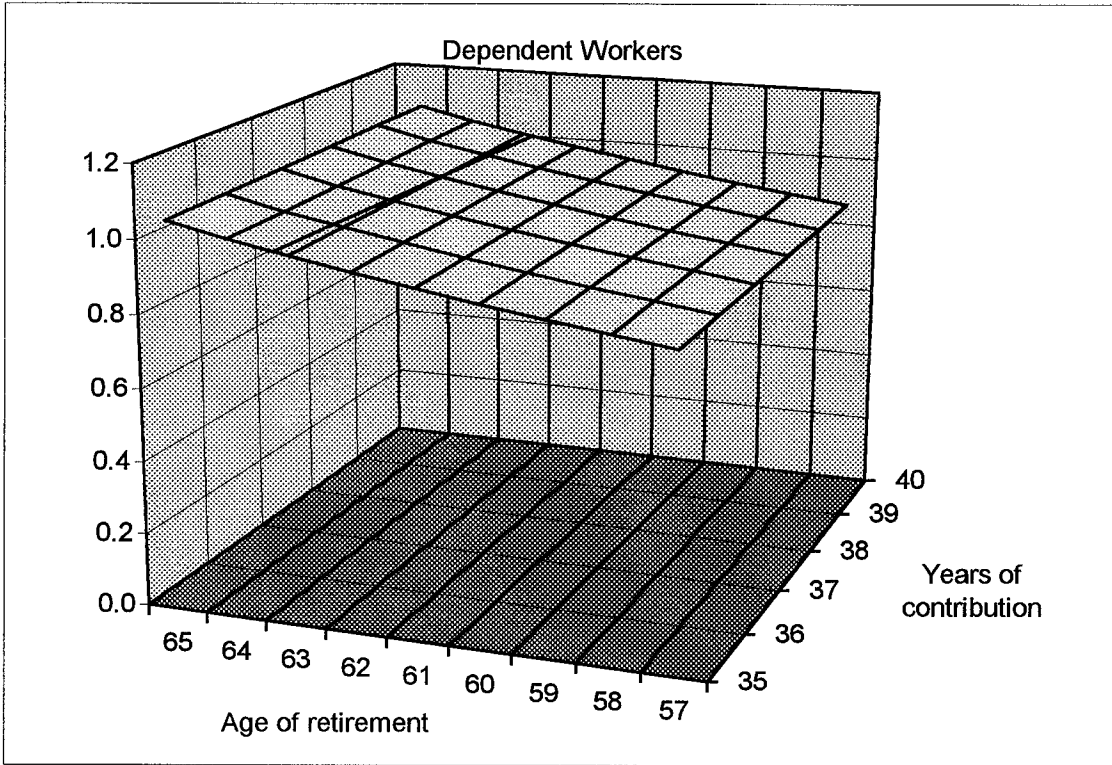
Clearly, from the point of view of the yield coefficients, the Dini system is less generous than the Amato system for all self-employed workers and all dependent workers retiring before the age of 65. Moreover, whereas under the Amato system a self-employed and a dependent worker with the same lifetime income profile would have received identical pensions, under the Dini system the pension of the self-employed would be 40 percent lower, reflecting the fact that contribution rates of the self-employed are less than half of those of dependent workers. Thus, the Dini system introduces an important change in the structure of pension benefits in Italy.

While the yield coefficients are in general lower under the Dini system, GDP growth rates above 1 percent would tend to render the Dini system more generous than the Amato system. The net result of combining these effects under the assumption of real GDP and earnings growth rates of 1.5 percent (the scenario underlying the parameters stipulated by law) is shown in Chart 4. The Chart plots the ratio of Dini to Amato pensions, for different combinations of age and seniority at retirement.

For dependent workers, the new system generates higher pensions (ratios higher than one) only for individuals retiring at 63 with at least 39 years of contributions, or for individuals retiring at higher ages. On average, individuals retiring at age 65 would get a pension about 6 percent higher than under the Amato system. At the other end, individuals retiring at age 57 would get a pension about 15 percent lower under the Dini system. For self-employed workers, who account for about 10 percent of the pensions paid by the social security institute (INPS), pensions are one-half to one-third lower than under the Amato system, depending on retirement age. Since self-employed workers will contribute at a rate of 15 percent but will be recognized a contribution rate of 20 percent, the reduction in benefits of the self-employed referred to above represents a substantial cutback but not a complete elimination of the implicit subsidy provided under the Amato system.

Chart 4

Ratio of Dini to Amato Pensions



The estimated overall savings generated by the reform in the case illustrated in Chart 4 (i.e., based on the assumption of GDP and earnings growth of 1.5 percent) is of the order of 9 percent of the level of pension outlays under the Amato system.¹⁵ If growth of 1 percent were assumed, the Dini system would generate lower pensions in almost all cases (with the exception of dependent workers retiring at age 65). If GDP growth of 2 percent is assumed, benefits under the Dini system become relatively more generous for dependent individuals retiring at ages 61 or above. Still, however, the estimated savings for all workers (dependent and self-employed) would be of the order of 3 percent.

Savings are likely to be even larger if the reduction in survivors' pensions envisaged in the law is taken into account. The new system reduces the average fraction of a deceased retiree's pension that a surviving spouse and/or children receive, by linking it to the survivor's income. As shown in Appendix II, the tightening of the conditions for survivor's benefits stipulated in the reform law may lead to an average reduction in pension outlays of some 6 percent.

B. Solvency

Whereas faster growth tends to increase the average pension generated by the Dini system relative to the Amato system, this would not compromise the new system's solvency. In fact, in the Dini system, economic growth above 1.5 percent generates pensions that are less than actuarially fair for the pensioner. Weaker growth generates a lower level of pensions because contributions accrue at a lower rate and, thus, generate a lower pensioner's capital. However, for a given capital, slower growth renders the coefficient of transformation, the rate at which this "capital" is eroded after retirement, too high.¹⁶

To illustrate this point, it may be useful to liken the new system to a simple annuity system: for the present value of the stream of pension benefits to equal the pensioner's capital at the time of retirement, the coefficient of transformation must be a function of the relevant interest rate (in this case the rate of growth of the base of contributions, or earnings) and the number of payments to be made (which depends on the individual's residual life expectancy at the time of retirement). The coefficients given by the law have been derived on the basis of an "interest rate" of 1.5 percent and the existing information on life expectancy. Thus, if earnings grow more slowly or if retirees live longer than expected, the present value of benefits will exceed the pensioner's capital.

C. Retirement Incentives

Another important change introduced by the new system relates to the incentives to delay retirement. As noted in subsection A, under the Amato system the yield per year of contribution

¹⁵This is under the conservative assumption of a uniform distribution of retirees by age and seniority.

¹⁶An increase in life expectancy would have the same effect.

was fixed at 2 percent, independently of age at retirement or seniority. Under the new system, the yield per year of contribution rises with retirement age, reflecting the decline in residual life expectancy arising from postponing retirement. Thus, relative to the Amato system, the Dini system introduces an incentive to postpone retirement.

Chart 5 illustrates the effect of delaying retirement on the level of the pension under the Dini and Amato systems, for an individual eligible for retirement at the age of 57 under either system.¹⁷ In order to focus exclusively on the effect of postponing retirement, the pension that the individual would have obtained under each system if retiring at 57 has been normalized to 100. Given the fixed yield coefficient, the positive slope of the curve under the Amato system reflects exclusively the increase in accrued lifetime income as a result of remaining one extra year in the labor force. The Dini system, which adjusts the transformation coefficients for retirement age, provides almost twice as large an incentive to postpone retirement.

The higher incentive to postpone retirement provided by the new system would further improve the finances of the social security institute. For example, with steady state population growth of 0.5 percent a year, a one-year increase in the average retirement age from 56 to 57¹⁸ could reduce the ratio of pensions to GDP by almost 1 percentage point.¹⁹

D. The Contribution-Benefit Link

As discussed earlier, Italy's new pensions formula establishes, at least nominally, a one-to-one link between contributions and benefits. The possibility of establishing a close link between contributions and benefits in a pay-as-you-go system has often been questioned, because in such a system there is no assurance that every year the flow of contributions would suffice to pay actuarially fair benefits to all retirees. As a result, there is always the possibility that changes in fiscal policy variables may be necessary. Nevertheless, as Auerbach and Kotlikoff (1987, p. 155) explain, individuals making consumption and labor supply decisions have no reason to take account of the fact that their benefits are being financed by members of the next generation.

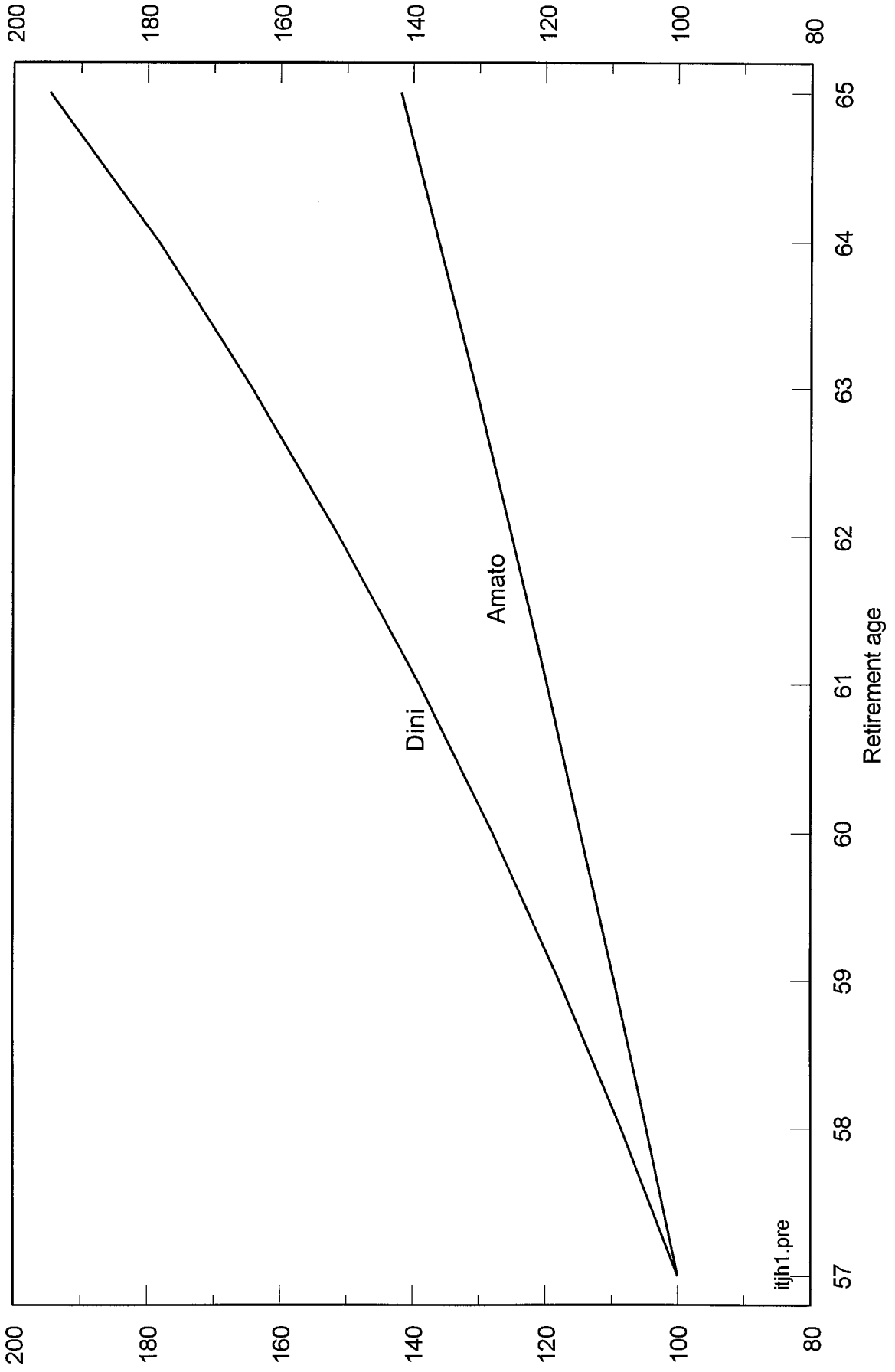
In any case, even considering the possibility that the actual amount of benefits may not be identical to the accrued value of lifetime contributions due to changes in the state of the economy or in policy variables, it could be argued that the new regime establishes a substantial marginal link between contributions and benefits. This implies that, to some extent, social security

¹⁷The simulations are based on the case of an individual reaching the age of 57 with 35 years of contributions, and real GDP and earnings growth of 1.5 percent.

¹⁸The average age of male pensioners (old age and seniority pensions) active as of December 1991 was 57.5. At the same time, more than 80 percent of women receiving an old-age pension had retired at 55.

¹⁹This assumes unchanged labor participation and unemployment rates, and takes account of the fact that pensions are currently about 15 percent of GDP.

Chart 5
Italy
Incentives to Postpone Retirement



contributions are not perceived as a tax but as deferral of earnings: contributions paid now are in part offset by future benefits. As a result, the distortionary effect of labor income taxation is effectively reduced.²⁰ As shown by Auerbach and Kotlikoff (1985), the efficiency gains from such a link can be substantial: using a model calibrated for the U.S. economy, they find that switching from a no-link situation to one characterized by a one-to-one marginal link (although still in a pay-as-you-go system) could lead to efficiency gains equivalent to a permanent increase of 1 percent in the level of GNP. Thus, while there are at present no estimates of the likely efficiency gains from linking benefits to contributions for Italy, estimates for the U.S. would suggest that this issue should not be overlooked.

V. THE NEW SYSTEM AND THE DEMOGRAPHIC TRANSITION

Although the new system links benefits to contributions, aiming at providing actuarially fair pensions, the fact that retirees' benefits will continue to be paid by younger generations implies that the solvency of the system will depend on the combined behavior of GDP, labor force, and population growth rates. Appendix IV derives two key results regarding the finances of the social security institute under the new system:

(1) since the rate of capitalization of contributions equals the rate of growth of GDP in the new system, the cash flow of the social security institute will be zero only if the share of labor income in GDP remains constant. The logic behind this condition is that, while pension liabilities will grow with GDP, contributions will grow in line with the product of (i) average earnings and (ii) employment. Balanced growth between contributions and outlays thus requires that total labor earnings and GDP grow at the same rate;

(2) even in the case where each individual is getting an actuarially fair pension, it is possible that the cash flow of the social security institute could temporarily be in deficit. This can happen if birth rates fall: growth in the labor force would then decelerate before growth in the elderly population, implying a delayed temporary increase in elderly dependency ratios before the age structure of the population fully adjusts to the new birth rate. The effect of this "demographic transition," which in practice could take decades, is a direct hit at the finances of the social security system, which would face a slower growth in revenues than in pension-related outlays.

Thus, whereas an actuarially fair pay-as-you-go system would exhibit a balanced cash-flow in steady state with a constant population growth rate, it would still run deficits during a demographic transition. Therefore, the Dini system is not explicitly equipped to deal with one of the most pressing issues of Italy's public finances over the next four to five decades: a significant deterioration in elderly dependency ratios. However, it should be mentioned that despite its inability to absorb the effects of the demographic transition, the new system would still generate some savings in relation to the expenditures that the Amato system would have implied, mainly as a result of the adjustment in transformation coefficients every ten years--Antichi (1995).

²⁰This point is illustrated in detail in Appendix III.

VI. CONCLUSIONS

The reform has put in place a system with better steady-state economic properties than the Amato system: individual actuarial soundness, a modest incentive to postpone retirement, a closer link between contributions and benefits, and a less heterogeneous treatment of different categories of workers. Also, the law has redefined the system in terms of a clear set of parameters that could be adjusted without requiring a new reform.

The new system is likely to produce a lower ratio of pensions to GDP in the long run relative to the one that would have resulted from the system introduced by the 1992 reform. Savings will come from various fronts: a moderate reduction in benefits of dependent workers, a substantial reduction in benefits of self-employed workers, a reduction in survivors' benefits, and a reduction in the ratio of pensioners to contributors as a result of increased incentives to postpone retirement. In addition, the new system, by linking contributions to benefits, is likely to produce efficiency gains stemming from a dampening of the distortionary effects of labor income taxation. These gains have been found to be substantial in a study for the U.S. economy and, because of its higher marginal income tax rates, could be even higher in Italy.

On the other hand, the new system leaves in place high contribution rates and remains vulnerable to demographic changes. The provision allowing for 10-year adjustments of the transformation coefficients for changes in life expectancy is an important feature, necessary to limit to the growth of pensions to what is sustainable from a steady-state point of view; but these adjustments will not prevent a deterioration of the finances of the social security institute in the face of a demographic transition. In addition, the law does not provide for an automatic adjustment of the parameters, but instead calls upon the social partners to meet every 10 years to negotiate the necessary adjustments.

Fully addressing the problems of high rates and the approaching demographic transition would require an across-the-board reduction in the level of benefits and contributions. Moreover, given Italy's large generational imbalance, it may be necessary to adjust the system promptly so that an important part of the negative effect of the surge in retirements expected by the year 2040-50 is borne by current generations. Among the measures that could be implemented in order to achieve this objective are: (i) a reduction in the transformation coefficients and a steepening of their age profile--including possibly an increase in the minimum retirement age; this would generate savings that would exceed the proportional reduction in the average coefficients, as the steeper profile would induce delayed retirement; and (ii) computing the present value of lifetime contributions on the basis of the contribution rates actually paid and not the notional rates.

THE PENSIONS-TO-GDP RATIO

This appendix presents a simple model for the evolution of the pensions to GDP ratio.

- *Demographics and the labor market*

Total population (N) is comprised of individuals of working age (L), all of whom are employed, and the elderly (R):

$$N_t = L_t + R_t \quad (1)$$

It is assumed that all employed individuals are contributors to the pension plan, and that the elderly are all retired.²¹

- *Production*

GDP (Y) is assumed to be generated through a simple Cobb-Douglas technology:

$$Y_t = A_t (K_t/L_t)^\alpha L_t \quad (2)$$

where A denotes total factor productivity and K is the stock of capital. It can be easily shown that (2) implies that both GDP per employed worker and the real wage rate will grow in line with productivity:

$$\hat{w}_t = \hat{Y}_t - \hat{L}_t = \hat{A}_t \quad (3)$$

- *The ratio of pensions to GDP*

Total pensions outlays can be expressed as the product of the average real pension (P) and the number of retirees (R). Thus, the pensions-to-GDP ratio (ψ) can be written as:

$$\psi_t = \frac{P_t (R_t/L_t)}{(Y_t/L_t)} \quad (4)$$

²¹As reported in Van den Noord and Herd (1993), the ratio of old-age retirement beneficiaries to the number of people of 60 years and over (the "eligibility ratio") is nearly 1 in Italy.

Denoting by r the ratio of retirees to workers and recalling from equation (3) that output per worker grows in line with productivity implies that ψ will evolve according to:

$$\hat{\psi}_t = \hat{P}_t + \hat{r}_t - \hat{A}_t \quad (5)$$

Equation (5) shows that without productivity growth and with a constant real average pension, the pension-to-GDP ratio will simply mimic the evolution of the demographic ratio r .

In practice, however, the average pension increases with real wages, as dying retirees are replaced by new ones whose pensions are higher as a result of productivity growth. Therefore, it can be generally stated that P is a proportion ϕ of the average real wage and, thus, equation (5) can be written as:

$$\hat{\psi} = \hat{r} - (1 - \phi) \hat{A} \quad (6)$$

which shows that the evolution of the pension-to-GDP ratio depends on three variables: the demographic dependency ratio, the rate of growth of productivity, and the degree of implicit indexation of the average pension to the real wage rate.

• *The equilibrium contribution rate*

The equilibrium contribution rate is the rate that balances the cash flow of the social security institute. With total pension outlays given by the product of P and R , and the contribution base given by the economy's wage bill (wL), the equilibrium rate would be:

$$\tau_t^* = \frac{P_t R_t}{w_t L_t} \quad (7)$$

Dividing numerator and denominator of (7) by GDP and recalling that the Cobb-Douglas technology implies a constant share of labor in value added, (7) can be written as:

$$\tau_t^* = \frac{\psi_t}{1 - \alpha} \quad (8)$$

Thus, the equilibrium contribution rate is proportional to the pensions-to-GDP ratio.

PENSION BENEFITS IN THE OLD AND NEW SYSTEMS

This Appendix provides a formal comparison of retirement and survivor benefits under the new and old systems.²²

• *Retirement pensions*

Under the Amato regime, pension benefits of an individual retiring in year T with n years of contributions (n ≥ 35) would have been given by:

$$P_T^A = 0.02 * n * \bar{w}_T \tag{1}$$

where \bar{w} represents the average pensionable income, defined as the average wage over the contribution period, with real wages revalued at an annual rate of 1 percent:

$$\bar{w}_T = \frac{1}{n} \sum_{t=T-n}^{T-1} w_t (1.01)^{T-t} \tag{2}$$

Under the new system, pensions are given by:

$$P_T^D = \beta^\epsilon M_T \tag{3}$$

where β^ϵ is a coefficient that depends on the age of retirement, and M is the present value, as at the time of retirement, of lifetime contributions:

$$M_T = \sum_{t=T-n}^{T-1} (\tau w_t) (\gamma_t) \tag{4}$$

where γ is a cumulative accrual factor given by:

²²For a detailed mathematical description of the Dini and Amato systems, see Peracchi and Rossi (1995).

$$\gamma_t = \prod_{j=t}^T (1 + \mu_j) \quad (5)$$

and μ_t is the 5-year moving average (ending in t) of the annual rates of growth of real GDP.

After substituting (2) in (1), and (4) and (5) in (3), the ratio of new to old pensions can be written as:

$$\frac{P^D}{P^A} = \frac{[\beta^c \tau] \left[\sum_{t=T-n}^{T-1} w_t \gamma_t \right]}{[0.02] \left[\sum_{t=T-n}^{T-1} w_t (1.01)^{T-t} \right]} \quad (6)$$

• *Survivors' benefits*

Survivors' benefits can be thought of as a premium received by the pensioner over his retirement years. Consider the case of an individual that retires at $t=T$ with a pension P , lives until year T^* , and is survived by a spouse who receives a fraction δ of his pension until year T^{**} . The present value (PV) of the retirement and survivors' pensions is:

$$PV = P_T \left[\sum_{t=T+1}^{T^*} \rho^{-t} + \sum_{t=T^*+1}^{T^{**}} \delta \rho^{-t} \right] \quad (7)$$

The value of a (higher) pension P' received only during retirement (i.e. not transferable), that would generate the same PV of benefits as (7) would be given by:

$$P' = P \left[1 + \delta \frac{\sum_{t=T^*+1}^{T^{**}} \rho^{-t}}{\sum_{t=T+1}^{T^*} \rho^{-t}} \right] \quad (8)$$

Equation (8) shows that survivor's benefits are equivalent to a premium over the retirement pension that depends positively on the fraction δ and the number of years that the

spouse survives the pensioner ($T^{**}-T^*$) and inversely on the retiree's residual life expectancy at retirement (T^*-T).

The table below shows the savings that can be derived from reductions in the coefficient δ from its pre-reform value of 0.6 to 0.50, 0.40, and 0.30. As explained in the text, the reform law has linked the value of δ to the survivor's overall level of income, effectively creating four categories with values of δ ranging from 0.3 to 0.6. Since in Italy female residual life expectancy is about 5 years longer than that of the male at the age of 60, the table shows the results for three different scenarios: (i) same ages for husband and wife, (ii) wife three years younger, and (iii) wife 5 years younger.

<u>Age of husband and wife</u>	<u>Savings (in percent of P' with $\delta=0.6$)</u> ²³		
	δ reduced from 0.60 to:		
	<u>0.50</u>	<u>0.40</u>	<u>0.30</u>
Same age	2.05	4.09	6.14
Wife three years younger	3.00	5.99	8.99
Wife five years younger	3.54	7.09	10.63

²³The estimates in the table assume that the male worker retires at 60 with residual life expectancy of 18 and that the wife's life expectancy is 83.

ECONOMIC CONSEQUENCES OF LINKING BENEFITS TO CONTRIBUTIONS

In this Appendix, a simple analytical model is used to illustrate the effects of the introduction of a link between contribution and benefits.

- *A simple overlapping generations model*

The model assumes no population growth; thus in every period there is only a single young and a single old individual. Lifetime preferences are assumed to be given by:

$$U(c^y, c^o, L) \tag{1}$$

where U is a well-behaved utility function, and c^y and c^o represent consumption in the first and second years of life respectively. The individual is endowed with L units of time in each period but works only in the first period. Thus, the utility function (1) includes only leisure in the first period of life. During his first year the individual pays an income tax (τ) and, in the second year, he gets a pension with a present value of P . Therefore, the lifetime budget constraint faced by this individual is:

$$c^y + \frac{c^o}{\rho} = [\bar{L} - L]w(1 - \tau) + P \tag{2}$$

- *No contribution-benefits link*

If the individual perceives no link between contributions and benefits, he will maximize (1) subject to (2) taking P as a lump-sum transfer. The first order conditions for the solution of the problem would be:

$$\frac{U_L}{U_{c^y}} = w(1 - \tau) \tag{3}$$

$$\frac{U_{c^y}}{U_{c^o}} = \rho \tag{4}$$

Equation (3) illustrates the source of the welfare cost of wage-based contributions: a wedge introduced on the relative prices of consumption and leisure. Equation (4) is the standard Euler equation for consumption. The final demand functions would be given by:

$$c^y = c^y(w(1-\tau), \bar{L}, P) \quad (5)$$

$$c^o = c^o(w(1-\tau), \bar{L}, P) \quad (6)$$

$$L = L(w(1-\tau), \bar{L}, P) \quad (7)$$

Thus, at the margin, a higher wage tax leads to substitution away from consumption toward leisure. Even if the higher tax leads eventually to a higher pension--but the individual fails to see the connection-- the individual would be worse-off.

• *Linking benefits to contributions*

Italy's new pensions formula establishes a close link between contributions and benefits. However, since in a pay-as-you-go system there is no assurance that every year the flow of contributions would suffice to pay actuarially fair benefits to all retirees, there is always the possibility that changes in other fiscal variables may be necessary. Thus a realistic way of characterizing the perceived link between contributions and benefits established by the new regime could be:

$$P = \frac{A + \theta\tau w(\bar{L}-L)\rho}{\rho} = \bar{A} + \theta\tau w(\bar{L}-L) \quad (8)$$

where, as before, P represents the present value of pension benefits received in the second period. Equation (8) shows that the pension can be thought of as the sum of two components: (i) a lump-sum payment, and (ii) an amount proportional to contributions, with θ representing the marginal link. The first order conditions for an individual maximizing his utility function (1) subject to the budget constraint given by (2) but perceiving a link between contributions and benefits as given by (8) are:

$$\frac{U_L}{U_{c^y}} = w [1 + \tau (1-\theta)] \quad (9)$$

$$\frac{U_{c^y}}{U_{c^o}} = \rho \quad (10)$$

A stronger marginal contribution-benefits link (a higher θ) dampens the negative effect of the wage tax on the individual's optimal decisions. In the case where $\theta=1$, the individual would

face the same first order conditions that would prevail under a funded social security system. This, however, is an efficiency issue, as the general equilibrium properties of a system characterized by $\theta=1$ would likely be different from those prevailing under a funded system. In particular, capital formation would be higher in the funded system, where the pensions system entails actual saving by workers, whereas in the pay-as-you-go system with $\theta=1$ pensions would entail intergenerational transfers.

ROBUSTNESS OF THE LONG-RUN EQUILIBRIUM

This Appendix illustrates the effects of a demographic transition on the cash flow of an actuarially-fair pay-as-you-go system. The discussion is based on a simple overlapping generations model with 2-period-lived individuals.

• *Demographic dynamics*

The total population (N) is comprised of two groups: the young generation currently employed (L) and the elderly, all of whom are retired (R). Denoting the (gross) rate of growth of the labor force by λ , this 2-period model implies the following identities:

$$L_t = \lambda_t L_{t-1} \quad (1)$$

$$R_t \equiv L_{t-1} = \lambda_{t-1} R_{t-1} \quad (2)$$

$$N_t \equiv L_t + R_t = \lambda_t N_{t-1} + \frac{R_{t-1}}{N_{t-1}} [\lambda_{t-1} - \lambda_t] \quad (3)$$

The first identity simply relates current and last-period labor forces through the rate of growth λ ; the second identity shows that the dynamics of the elderly population react to changes in λ with a lag; and the third identity shows that total population growth would equal λ only if the latter were constant. An acceleration in λ leads initially to a less-than-proportional increase in the rate of population growth.

• *Taxpayers, retirees and the public finances*

In any given period, each young individual pays social security contributions at a rate τ of his wage (w), and each retired person obtains a pension equivalent to the product of a transformation coefficient (β) and a pensionable capital (M). This capital is the value of the pensioner's earlier contributions capitalized at the (gross) rate γ . Thus, in period t , the cash flow of the social security institute is:

$$SSB = L_t [\tau w_t] + R_t [\beta M_t] \quad (4)$$

where M_t equals $\gamma \tau w_{t-1}$. Assuming that real wages grow at the (gross) rate ϕ , the cash flow of the social security authority (SS) can be written as:

$$\mathbf{SSB} = \tau L_{t-1} w_{t-1} [\lambda_t \phi_t - \beta \gamma] \quad (5)$$

Therefore, with β and γ given by law, the existence of a deficit or surplus in the finances of the SS depends on the rate of growth of the labor force and the rate of growth of earnings: starting from a balanced position, a reduction in either of those two variables would generate a deficit.

• *Actuarially fair pensions*

In order to provide an actuarially fair pension, β must be chosen in a way that ensures that the present value of the pension received during retirement equals the contribution made by the individual during his working time (first period in this model):

$$\begin{aligned} \beta^* M_t &= \tau w_{t-1} \rho \\ \beta^* &= \frac{\rho}{\gamma} \end{aligned} \quad (6)$$

Clearly, if the rate at which contributions capitalize according to the law (γ) equals the real interest rate (ρ), then $\beta^*=1$. The cash flow implications of selecting an actuarially fair β can be obtained by combining equations (5) and (6):

$$\mathbf{SSB}_t = \tau L_{t-1} w_{t-1} [\lambda_t \phi_t - \rho_t] \quad (7)$$

This is simply the condition for the yield of a pay-as-you-go system to dominate that of a funded system as demonstrated by Samuelson (1958) and Aaron (1966). As described above, it implies that if the government were to pay actuarially fair pensions to all individuals, it would run a permanent surplus whenever the product of the rate of growth of the labor force times the rate of growth of earnings exceeds the real interest rate.

In the Italian case, the steady-state rate of capitalization of contributions is equal to the rate of growth of GDP (ψ). Equation (7) suggests that in the simple case in which ψ equals ρ , a balanced cash flow would require:

$$\lambda \phi = \psi \quad (8)$$

that is, a constant share of labor income in value added. If either earnings growth or labor force growth were to decelerate (i.e., if the share of labor income in value added were to fall) the social security system would run a deficit, even though each individual is set to receive an actuarially fair pension.

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