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ALTERNATIVE THEORIES OF PENSIONS – 20 YEARS AFTER *PENSION REFORMS AND ECONOMIC THEORY*

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Abstract

These notes compare the interpretations of pay-as-you-go (PAYG) and fully funded (FF) pension systems and proposals of reform provided by alternative economic theories. After outlining the debate on the intra-temporal or intertemporal nature of PAYG, we will focus on the issues of pension reforms aimed at expanding the funded pillar. We will particularly discuss the issue of the transition from PAYG to funded systems. Mainstream support for reforms has often been based on comparing the rates of return on contributions from the two systems. Criticism of the funded pillar has often been heard from heterodox economists being based on the relative higher risk of capitalization. However, both points of view neglect the issue of transition, as if the choice were in the abstract between PAYG and the FF pillar. In this sense, twenty years ago Cesaratto (2005) contributed to fill a severe gap both in conventional and in post-Keynesian analyses. Other innovative contributions will be noted in passing, such as the outline of a classical surplus-theory of the social state and of the role of public pension-spending in demand-led output theories.

Keywords: Pension reforms, Pay-as-you-go, Fully Funded schemes, Neoclassical theory, Classical-Keynesian approach

JEL: E11, E12, E22, H55, E24

Introduction*

The debate on pension systems has often been a battlefield between economists more oriented towards laissez faire – supporters of capitalisation or fully funded (FF) systems – and those of a Keynesian persuasion – supporters of pay-as-you-go (PAYG) systems. These opposing orientations certainly reflect preferences of a political-cultural nature: the capitalisation system satisfies more a logic of individual choices favoured by the liberal view (Kotlikoff 1979), while PAYG is closer to the vision of a paternalistic and redistributive state proper to many Keynesians (Blinder 1988) and, of course, to the conflict view of income distribution proper to the classical economists' tradition (Garegnani 2024). Unsurprisingly, in the midst of the Keynesian 'golden age', Paul Samuelson (1958) proposed a reinterpretation of the PAYG system, likening it to a fictional capitalisation scheme whereby older people receive back the support they contributed to the system when they were young, thereby making it more palatable from a liberal perspective. This greatly concerned the then ultra-Keynesian Abba Lerner (1959), who feared that this ambiguous support would instead play into the hands of PAYG's detractors accusing PAYG of being a 'chain letter'. His concern proved well-founded (e.g. Kotlikoff 1995, p. 4). To complicate matters, however, the idea of PAYG pensions as an 'acquired right' also served as a line of defence for PAYG by trade unions in some countries during the years of the Washington Consensus, to the extent that they became supporters of the strictly 'contributory' version of PAYG. The core issue here is that a PAYG is essentially an intra-temporal (tax-transfer) mechanism; however, the links between contributions

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(from workers' payrolls) and pension benefits give rise to the 'illusion' that it is an insurance (intertemporal) mechanism – an institutional construct in which pension benefits are deferred wages, or pensioners obtain what they invested first. The contributory principle may thus reveal useful to defend this pension scheme against attacks from FF supporters, as well as being a way of determining pensioners' benefits. All in all, it seems to us that neither financial engineering nor the rhetoric that may accompany it can resolve the issues facing the PAYG system, whose social and financial sustainability requires an external context of solidarity and growth.

While the main argument backing the FF scheme regards its presumed ability to face population ageing, support for pension reforms has also been based on comparing the respective rates of return of the two systems, with FF supporters championing the relative benefits of capitalisation. Criticism of the funded pillar, on the other hand, has often been voiced by heterodox economists being owing to the relative higher risk of capitalization. Yet, both points of view neglect the issue of transition, as if the choice were in the abstract between PAYG and the funded pillar. In this and in other respects, a couple of decades ago Cesaratto (2005) contributed to fill a severe gap both in conventional and in post-Keynesian analyses. Other contributions from that book will be noted in passing, such the outline of a classical surplus-theory of the social state and of the role of public pension-spending in demand-led output theory.

Conventional and in post-Keynesian analyses are distinguished by a different view of the functioning of the macroeconomy from which derives a different assessment of the macroeconomic nature and sustainability of the two pension systems. We are aware that economists are not so clearly distributed between the two factions. On the contrary, most would be in the middle, likely sharing the traditional compromise about the validity of Keynesian theses in the short run and neoclassical hypotheses in the long run. Unfortunately, neoclassical theory has serious analytical troubles both in the short and in the long run (the long run being particularly

relevant for the validity of the FF reforms), and it is therefore an unlikely support for both mild-oriented or hard-liner mainstream students.¹

We shall proceed as follows. In section 1 we set out the debate on the economic nature of the PAYG system, particularly underlining that its intertemporal framing does not constitute a binding macroeconomic constraint, but rather a normative and institutional construct. In section 2 we deal with capitalisation particularly discussing its supposed better capacity to deal with demographic shocks. In section 3 we illustrate the issue of the ‘transition’ between the two systems: is it possible to design a painless transition from PAYG systems, prevalent in many industrialised countries, towards a greater reliance on capitalisation systems? Cesaratto (2005) captures the mood of the Washington Consensus era, which, with regard to pension privatisation, crystallised in an influential World Bank report (1994). But the wolf is always lurking, and there is still talk of pension reform towards a funded system, partly as a consequence of demographic changes which, in certain regions, cannot be underestimated. We shall touch briefly on these issues in the conclusions.

¹ Representative of “pure” Keynesian positions are: Eisner (1998); Baker and Weisbrot (1999); Wray (2000). “Pure” neoclassical contributions are: Feldstein (1998); Kotlikoff (1979); Valdés-Prieto (1997). The economists of the “neoclassical synthesis” and the “New Keynesian” relegate Keynes' validity to the short term, so on the merits of pension reforms, which are exquisitely long term, they tend to place themselves in the neoclassical camp, for example: Modigliani, Ceprini and Muralidhar (1999); Lindbeck and Persson (2003). In the neoclassical framework, welfare state institutions, including pensions, are located in the so-called Welfare Economy in which they are justified because of the failures of insurance markets. For a critique of this view see Cesaratto (2005, ch. 7) and Cesaratto (2007a) where, starting from the classical theory of surplus, the welfare state is seen as a component of distributive conflict.

1. The economic nature of PAYG ²

It is an accepted fact that in any pension system it is the 'productive-age' generations that support the 'unproductive' older ones. What changes between PAYG and FF schemes is the mechanism through which the productive generations support the unproductive ones: PAYG is based on a fundamentally political mechanism, capitalisation on a market mechanism.³ One can immediately see here why the advocates of capitalisation claim its less arbitrary nature – market mechanisms would be objective while political ones are more subjective, hence more arbitrary. A final judgement on the relative feasibility of the two systems is, however, more complex. In this section, we will elaborate on the mechanisms of PAYG.

There are indeed two ways of conceptualising PAYG: *intra-temporal*, i.e. considering it as a way of ensuring a transfer of income between coexisting generations mediated by a political decision; or *intertemporal*, i.e. a way through which each 'younger' generation transfers income to itself once it gets old. The first conceptualisation seems to reflect what PAYG is in factual terms, and as such considered in national accounts: a transfer of resources from active labour to the inactive elderly based on income sharing within each period. The second conceptualisation belongs to a more virtual dimension, but no less important in its politico-economic implications. The father of the

² For a more extensive illustration see Cesaratto (2005, chapters 1 and 2) and Cesaratto (2007c).

³ For a genuinely Keynesian economist, being in working age (itself a convention) does not mean being employed. Thus, demographic comparisons of the number or growth rates of young and elder populations, respectively, have a limited meaning given that being young does not imply having a job (or a good job). On the opposite, for neoclassical economists the tendency, under conditions of sufficient labour market flexibility, towards full employment leads to the identification of 'young' with 'employed', ending up seeing the pension problem in almost exclusively demographic terms.

latter interpretation is Paul Samuelson (1958) in a celebrated article, whereas the former view was first advocated by Abba Lerner (1959), precisely in a critique of Samuelson's contribution from which we make our starting point.

1.1. Samuelson's intertemporal interpretation of PAYG

Samuelson's approach to the pension issue is based on methodological individualism and we take him as representative of the liberal-neoclassical view. The problem he poses is how a representative individual (member of a fully employed working population) can transfer resources from youth-age, when he is active, to old age, when he is inactive. Samuelson identifies three solutions.

A first way would be to store consumer goods in the early phase of life to be able to consume them later when older. However, it can be assumed that it is physically impossible to stock consumer goods in sufficiently good conditions over a long period of time and, in any case, at a non-prohibitive cost (such as cold storage). A second way would be to use the resources saved in the active life phase ("foregone consumption") for investments in capital goods as these offer an income and can be resold once retired in exchange for consumer goods – it can be assumed that subsequent generations of young people will have the same interest in accumulating capital goods for retirement purposes. This view of the intertemporal transfer of resources is not exclusively characteristic of the marginalist or neoclassical view of capital as a fund of consumption goods whose consumption one wishes to defer into the future. Savings and capital accumulation are a fact, so they do not only exist in the marginalist world but evidently also in the Keynesian one. The contentious issue is in the causal relationship between savings and investment (whether decisions to save translate in capital accumulation at will). We shall return to this issue which is part of the transition question (section 3). A third mode of intertemporal transfer is PAYG, which Samuelson mainly deals with in his 1958 essay.

To explain Samuelson's model in elementary terms, let us assume a simple economy with a stationary population in which individuals live two periods: in the first they work and in the second they rest. Let us also assume that the population is stationary and consists half of young (fully employed) workers and half of old retirees. Let us then imagine that there is a bank into which, through a social pact, each young individual pays half his or her salary, and from which one can withdraw the same amount as a pension as an old person, with the guarantee that this system is perpetual. The system is at the same time a transfer of resources between coexisting generations: the current payments of the young are withdrawn as current pensions by the old; but it can also be interpreted as a virtual intertemporal transfer, by which each younger generation figuratively transfers income to itself when old and retired: 'In a stationary system,' argues Samuelson (1958: 471), 'everyone goes through the same life-cycle, albeit at different times. Giving over goods now to an older man is figuratively giving goods to yourself when old'. Everyone may also recognize in such a system an extension of a family-based pension system, in which it is the duty of the young to support the old while waiting to be supported in turn by the old: family altruism is extended to a wider social pact between generations, the PAYG scheme.

Let us assume next that the (fully employed) working population grows at the rate of, say, 1%, so that in period $t + 1$ the employed young are 1% more numerous than in the previous period t (who are old at $t + 1$). In this economy both contributions and pensions at $t+1$ will be 1% higher than at t . Samuelson refers to this rate as a 'biological' rate of interest as it is related to the rate of growth of the (fully employed) population.

This economy might also benefit from labour productivity growth determining the growth at the same rate, for a given wage share, of real wages and contributions to the pension system. This is a second reason, in addition to the growth in the number of workers, why the virtual bank – a pension authority, which could be public or private – will see an increase in the flow of contributions

over time, and will therefore be able to pay out to the elderly more than they had contributed in the previous period. The rate of return of the PAYG, λ , will thus be constituted not only by the ‘biological rate’, but also by the rate of growth of productivity which we call ω . In formulae

$$\lambda = n + \omega.$$

To summarise, the pension institution pays out all the contributions it receives, only retaining the administration costs.⁴ If this inflow grows over time, the participants will be in the fortunate position of paying x in and receiving $x(1 + \lambda)$ once they retire. There is a risk, however: if the number of (fully employed) young people declines and productivity growth fades, λ may take a negative value and, when old, they will withdraw less than they have paid in. Still the system would remain in financial balance, hence solvent. In other words, the fall in the wage bill is reflected in a negative return (i.e. a negative interest rate) on the contributions paid in. Since with a falling wage bill the capacity of the system to provide pensions decreases (at the given contribution rates and given the share of wages in income), indexation to wages automatically reduces benefits. Of course, a rise of the wage share can mitigate one-off the situation.

Many readers will have easily recognised in Samuelson's theorisation the principles of what in modern times is termed as the ‘notional defined contribution scheme’ (NDC), adopted, for example, in Italy (in 1995) and Sweden (in 1996).⁵ Supporters of contribution reform have particularly emphasised the two interconnected features of a NDC scheme: actuarial fairness – the actuarial correspondence for each individual between contributions paid and benefits obtained – and financial sustainability. These are two sides of the same coin in that the sustainable rate of

⁴ A privately managed PAYG will generally be much more costly than a public one, as shown by the fake-reforms described in section 3.

⁵ For a complete analytical discussion of the contributory system see Nisticò (2019).

return on contributions λ ensures both intra-temporal (period-to-period) financial equilibrium and actuarial fairness.

NDC reforms have usually substituted the so-called Defined Benefit (DB) schemes. In the earnings-related DB-scheme, the amount of the pension allowance is commensurate with the last or with an average of the last salaries received. In a classic and commendable paper, Richard Musgrave (1981) pointed out that a DB scheme puts the burden of negative growth rates on the workers' shoulders: if the current contribution flow becomes insufficient to pay the present pensions cheques calculated on past wages, this implies that the contribution rate, the share of contribution over current wages, must rise. On the opposite, a NDC scheme would put the risk over the retirees: a fall in the contribution flow entails a negative rate of returns on past contributions and a lower replacement rate.⁶ Whatever the system, its social sustainability implies a stable and growing economy at least as an average over the medium term. While a further comparison between the two schemes is presented in section 1.3, let us conclude here that the economic and social sustainability of the pension system relates to the context in which it operates, making mere actuarial engineering a misleading way to discuss of pensions if isolated from wider growth and distribution considerations.

⁶ In simple formal terms, Musgrave's argument can thus be summed up. Define first the financial balance of a PAYG scheme at time t as $b_t R_t = \alpha w_t N_t$, where b_t is the average pension cheque, R_t the number of retirees, α is the contribution rate, w_t current wages and N_t the number of workers. If the wage bill grows at a rate λ , that is $w_t N_t = w_{t-1} N_{t-1} (1 + \lambda)$, and defining the replacement rate as $\sigma = b_t / w_{t-1}$, a simple manipulation leads to the expression $\sigma_t / \alpha_t = (1 + \lambda)$. The implication is that a fall in λ , due to a decline in the number of workers or of productivity growth is consistent with the preservation of financial equilibrium either by a fall of σ or a rise of α , or both (Musgrave's favourite solution).

1.2. Lerner's intra-temporal objections

In his critique of Samuelson, Lerner defends the intra-temporal interpretation of pension transfers against the intertemporal one by arguing that: 'It is only a somewhat more sophisticated fable that today's transfer from workers to pensioners is a "repayment" of yesterday's transfer from workers to pensioners' (1959, p.517). According to Lerner, the distribution 'is nothing but a device by which today's pensioners are maintained out of today's social product, which is, of course, produced by today's workers' (ibid, p.524). On the one hand, Lerner argues, Samuelson's contrived construction, which transforms an actual intra-temporal transfer of income into a virtual intertemporal process which mimics a traditional savings plan, has no economic solidity. On another front, however, it does have a political justification: to show that PAYG is not a 'socialist tax', but that the state collects workers' 'savings' to return them later as pensions, something that is consistent with liberal moral and economic wisdom (ibid, p.514).⁷

Lerner grasps an important truth: since strictly speaking PAYG is an intra-temporal transfer of income, decisions concerning it are made period by period, i.e. the amount of income transferred to the elderly may change depending on the political-moral orientation that in each period regulates the distribution of income, firstly between wages and other incomes and secondly between active workers and the elderly. At the same time, however, PAYG has also an intertemporal component that regulates, within the distributional preferences of the community, the actual modalities of income distribution between generations. In other words, in order to

⁷ 'Samuelson's mathematics ... indicates a "solution" in which the rate of interest is equal to the biological rate of growth of population. What this "solution" indicates is that the authorities can pretend that "social security" is not a "socialist" tax and give-away program by the government but a "saving" by each worker out of his current income to provide for his old age' (Lerner, 1959, p.514).

function, the PAYG needs to make explicit the *qui pro quo* rules that relate contribution to benefits, although this relationship is subject to the variability of forthcoming social-political contingencies.

Such rules have, on the one hand, an eminently practical function, allowing social security institutions to operate within well-defined rules, and, on the other hand, an ideological-moral function that gives political-moral pregnancy to these rules. What Lerner rejects is the characterisation as 'natural' of the intertemporal interpretation of PAYG advanced by Samuelson. PAYG is, instead, an intra-temporal, period-by-period political choice that may include an intertemporal political pact (susceptible to violation as happens with any political pact).

Samuelson's contribution model presents PAYG as figuratively operating on principles akin to an individual savings plan, which makes the system politically more acceptable to conservatives.⁸ The cohabitation of an economically founded intra-temporal conceptualization of PAYG and a virtual, more politically motivated intertemporal one is also proved by a more progressive viewpoint. From the workers' point of view, in fact, the fiction has a reassuring function in supporting one's rights to see what one has contributed during one's active life returned as a pension. We find here the idea of the pension as 'deferred wage', an expression found in various national labour-law cultures. We are of course still in the realm of fictions, as strictly speaking in economics wages are a current income flow while 'deferred wages' do not exist. Lerner was, in this regard, concerned that opponents of PAYG might call the bluff and use Samuelson's construction to present PAYG as a

⁸ The contributory principle permeated Beveridge's proposals (1942) while it was rejected by Bismarck, the initiator of the German welfare state, precisely because it would have given workers the impression of receiving pension benefits as an acquired right and not as a benevolence of the state (Myles, 1984, p.35). In the 1990s, Italian trade unions accepted the contributory system as the last resistance line of workers 'acquired rights' through paid contributions.

giant chain letter.⁹ In this sense, Lerner argued, the fiction would weaken PAYG.¹⁰ For example, Milton Friedman accused the exponents of Samuelson's 'insurance fiction' of selling what is a 'tax-transfer' system as insurance, and thus in fact of selling a 'chain letter'" inviting workers to sign a contract for which they pay now in the expectation that in the future someone, who has not (yet) signed the contract (or is not even born), will honour it.

This unilateral contract between generations, Friedman writes: 'foisted on generations that literally cannot give their consent, may be sufficient assurance, but ... chain letter would be a more accurate designation' (1972., p.24). Friedman was of course too shrewd not to recognize the political function of insurance fiction and speaks of a 'smoke screen' (ibid., p.26), 'a triumph of imaginative packaging' (ibid., p.58). In his discussion with Friedman, Wilbur Cohen – an active witness to the creation of American Social Security in 1935 – replied that, in fact, 'people live on rhetoric'. (1972, pp.54-55). In an evocative essay, Robinson Hollister (1974) compares the view of PAYG held by the advocates of the insurance function, the 'priests of Social Security' as he calls them, with that of the advocates of the 'tax-transfer' view. For the latter 'there are dangers in

⁹ Bruno de Finetti (1956) advanced similar fears to Lerner's.

¹⁰ Thus, for example, Meeropol (2000, p.122): 'the fiction that social security is not a programme to redistribute income has helped keep its broad political support, but it has also opened up a possible avenue for attack from those who never liked the idea' [Meeropol is the son of Mr and Mrs Rosenberg, victims of McCarthyism]. In support of this fear, a well-known conventional pension expert can be quoted: 'Samuelson's paper bears careful re-reading, not least where he discusses the issue of how such a "social contract" can be maintained. It is extremely hard to think of practical mechanisms by which such contracts can be replicated and implemented by successive generations... The key point of unfounded social security is that the financing of accruing liabilities is left to future generations. In that case, it bears much the same character as the schemes of Charles Ponzi' (Disney, 2000, p. F12).

building a social institution around a consciously conceived myth', but then again 'one must seriously consider whether ... social myth is not the necessary cement with which to hold together social institutions' (ibid., p.21). Edward Thompson's concept of 'moral economy' has also been evoked in this regard (e.g. Thompson 1971).

It can therefore be concluded that the 'insurance fiction' version of PAYG introduced by Samuelson – like that of the deferred wage – has the value of anchoring this system to a set of moral and institutional rules that make the system politically acceptable and technically functional. This is what the supporters of such a system always intended to ensure by upholding, to a greater or lesser extent, the contributory principle. In Sweden, but also in Italy, for example, while the adoption of a strict interpretation of the contributory principle has been aimed at reducing pension expenditure in the long run, it has also served the function of responding politically to the conservative offensive aimed at downsizing PAYG. The more Keynesian-oriented economists remind us, on the other hand, of the ultimate 'tax-transfer' nature of PAYG, and that there is therefore no 'natural' intertemporal arrangement of its modes of operation, but that it is subject, from period to period, to the changing circumstances governing income distribution.¹¹

1.3. On the distributive implications of the NDC and DB pension schemes (some reflections on Pivetti)

¹¹ By way of example, one can cite what happened in Sweden following the global economic crisis of 2008. As is well known, the Swedish public system, prized for its rigour, has both a majority pay-as-you-go and a minority funded component, both of which are strictly contributory (NDC). Faced with a fall in expected benefits in 2010 and 2011, the political authority intervened in the rules, particularly regarding the capitalisation component, to spread this fall over a longer number of years in violation of actuarial principles (Sundén 2009). This shows that any intertemporal arrangement will be subject to political intervention if circumstances make it appropriate.

Cesaratto (2005, pp. 59-60) pointed out that an advantage of a contribution-based scheme could consist of the overcoming of certain distributional inequities of the 'defined benefit' version of the PAYG. In the earnings-related DB-scheme, the amount of the pension allowance is in fact commensurate with the last or with an average of the last salaries received. This system benefits the (fewer) workers who have steeper careers, i.e. for whom the last salaries are much higher than the initial salaries. This also implies that, with the pension system in financial balance, part of the contributions of workers with flatter careers (the vast majority) does not return to them when old (nor does it currently go to their retired colleagues) but finances the pensions of the more fortunate. The concept can also be expressed by saying that the rate of return on pension contributions is much higher for workers with steep careers than for the others, violating a principle of fairness that does not seem just actuarial but substantial. Let us make a small example. Table 1 shows a simple, stationary economy in which at a given time there are four workers who are respectively active for two *life-periods* (so that two belong to the younger generation and two to the older generation) and receive a PAYG pension in the third life-period (hence there are two pensioners per time-period). For simplicity wages are stationary (no technical progress). Two workers have flat careers and two have steep careers. Given wages, with a *contribution rate* of 0.5 (50%), the contribution flow in the given time-period is 250 account units (ac), 100ac from the first generation, 150ac from the second). With an *NDC scheme*, the pension cheque is equal to the past contributions each worker paid in. The replacement rate σ – defined as the pension over the last salary – is $\sigma = 1$ (or 100%) for the 'flat' workers and $\sigma = 0.75$ (or 75%) for the 'steep' workers. From an intra-temporal perspective, all current contributions paid by 'flat' workers (50ac+50ac) go to the pensioner coming from this group, and so for those of 'steep' workers (50ac+100ac), which finance the pensions to their retired colleagues.

Table 1 - A simple, stationary economy*				
Life-periods	1	2	3 (retirement)	
	Wages		Defined contribution	Defined benefit
Workers	(net of contributions)		pension	pension
Flat career	100	100	100	83.3
Steep career	100	200	150	166.6
	Contributions		Replacement rates	
			(pension/last net wage)	
Flat career	50	50	100%	0.83%
Steep career	50	100	0.75%	0.83%
Total	100	150		
* At each time there are four workers (two with flat careers and two with steep careers). Each works two life-periods and retires in the third. Without growth in either the population or productivity, the rate of return on contributions is zero.				

To calculate the replacement rate σ of the alternative *DB system* consistent with the financial equilibrium of the system, we solve the equation $100 \sigma + 200 \sigma = 250$ which gives $\sigma = 0,83$ (or 83%). With this replacement rate, the sum of pensions paid out by the system (83.3ac to the flat pensioner and 166.6ac to the steep pensioner, respectively) is equal to the total contributions paid in each period (250ac). The ‘steep’ workers’ replacement rate is now higher than with the NDC scheme, while that of the ‘flat’ workers is lower. From an intra-temporal perspective, moreover, only part of the contributions of the flat workers (100ac) pay the allowance to their retired colleague (83.33ac), the rest going to the ‘steep retiree’, since the contributions of the steep workers (150ac) are not sufficient to pay the cheque to their retired colleague (166.66ac). A ‘class inequity’ seems to emerge, both intertemporal and intra-temporal.

Massimo Pivetti (2006, p. 382) defends the DB scheme because it better ensures the continuity of living standards for ‘steep’ workers as measured by the higher replacement rate, thus strengthening their political support to the public PAYG scheme. What the example shows is that,

however, the DB sounds both inter and intra-temporally unfair. Pivetti disregards the ‘class transfers’ that the DB system may entail.¹² On the other hand, however, Pivetti, underlines that the sustainability of any pension system, either DC or DB, depends on the economic context, particularly on productivity and wage growth. The latter would make greater contribution burdens due to ageing – or due to the class inequities highlighted above – more socially acceptable, burdens whose weight would be alleviated by growth in per capita incomes: the working part of the population would still be better off with a levy of 30 on an income of 150 than with a levy of 10 on an income of 100, Pivetti writes (*ibid.*, p. 385). Although Pivetti’s example confirms our concerns about the regressive implications of the DB system, it underlines again that the political sustainability of any pension system, however organised, also depends on the macroeconomic and distributional context. (Even in the direct distribution of income between wages and profits, increasing the size of the pie to be shared can facilitate social compromise on a particular division). Moreover, while the DB scheme inequities may raise some perplexities, they must be also considered in the light of the perversities which affect the NDC regime. Decent NDC pensions imply continuous careers with nonstop payment of social contributions, as well as positive rates of economic growth to ensure their remuneration. The prevalence in many countries of discontinuous careers, undeclared work, and poor growth rates lead to pensions below social decency which undermine pension expectations, eroding confidence in the system. Once again,

¹² I may be accused of defending too strongly the intertemporal actuarial principles that I criticised above in relation to Samuelson. The continuity of living standards could in fact be preserved by resorting to general taxation in line with Lerner’s intra-temporal (tax-transfer) view. In an NDC system, for example, the continuity of living standards for ‘steep’ workers could be financed by raising taxes. But with a progressive tax system, this is not dissimilar to increasing contributions from ‘steep’ workers and lowering pensions of ‘steep’ pensioners, a disguised way to reiterate the NDC principles. Symmetrically, the disadvantages for ‘flat’ workers in a DB system could also be alleviated by resorting to general taxation. But with progressive taxation on ‘steep’ individuals, this can also be seen as a return to some form of contribution-based system.

the social sustainability of PAYG systems depends on the macroeconomic context and on the relative bargaining power of social classes and not on actuarial engineering (albeit this aspect should not be ignored).

2. The fully-funded system¹³

A funded social security system is nothing more than a form of saving management, typically operated by pension funds (PF), to which an insurance component is added aimed at transforming the accumulated amount into a periodic annuity based on expected survival at retirement. Unlike in pay-as-you-go systems with virtual accumulation – the NDC scheme modelled by Samuelson – in this case the accumulation is real, in the sense that the financial assets purchased by the PF are securities representing real capital. For this reason, the system is referred to as fully-funded (FF). We will see how a scheme based on investments in government bonds does not represent a genuine FF scheme, which is why it is often called narrowly funded (NF). A genuine capitalization system is synonymous of FF scheme.

In intuitive terms, an FF scheme ideally works like a relay race: a first generation of workers builds up a fund of real securities (assets) with their savings. According to neoclassical theory the assets workers have collected are a fund of foregone consumption (savings) embodied in a real capital stock (the assets). These securities (bonds, shares) are real assets in that they represent real capital assets (productive equipment). This fund of real assets represents the baton. Once this first generation has grown old, it passes this fund on to the next generation of workers, who are also eager to build up their own pool of securities, and so on from generation to generation. In this way, with their savings, each active generation equips itself with a commodity (the fund of assets) to

¹³ For a more extensive illustration see Cesaratto (2005, Ch. 3) and Cesaratto (2007b)

obtain income when it is idle, income being also supplemented by the return obtained during the period of ownership of the capital assets. With PAYG in the NDC version (the closest to capitalisation) there was a political promise that the virtual accumulation of contributions when young would be matched by their restitutions when old (having also received a rate of return on contributions equal to employment and productivity growth). With a FF scheme workers buy real assets when active (the 'baton' of a generational relay) which are sold when retired (having also received a rate of return on these assets equal to the profit rate). The presence of a real baton is why the advocates of capitalisation consider it more secure than the political promise characteristic of PAYG.

As an example, Table 2 describes the steady-state operation of an FF scheme based on a simple two-generation overlapping model taken from two purists of neoclassical analysis (Auerbach and Kotlikoff 1995, pp.90-92; see also Kotlikoff 1995). The simulation employs a Cobb-Douglas production function written in per capita terms: $y_t = A_t k_t^\beta$, where $A_t = 10$ and $\beta = 0.3$. The economy has a stationary population of two generations of individuals each. Pensioners own the capital stock to the extent of 5.987ua each, so that the aggregate stock is 598.7ua. This stock is leased through pension funds to the firms. The latter also rent workers to whom they pay, at the end of each period, a wage equal, in equilibrium, to the marginal product of labour (given a labour supply of 100ua). The workers consume half of their income and save the rest, and then retire. Retirees at the end of each period earn interest on the capital assets they hold, equal to its marginal product, and sell it to the next generation of workers. Finally, they consume both the interest received and the proceeds from the sale of the capital stock and pass away. In the table, the per capita consumption of pensioners is 11.119ua resulting from the sum of the value of the per capita capital stock sold to the young (5.987ua) plus the interest received on this stock calculated at the

net interest rate of 0.857 (equal to the marginal productivity of capital at the given factor relative scarcity).

Table 2 - Simulation of the long run equilibrium of a neoclassical overlapping generations economy with a FF scheme										
Period	Workers (*)	Retirees	Capital stock	Per capita income	Per worker capital	Wage rate	Interest rate	Per capita consumption		Net Saving
								Workers	Retirees	
1	100	100	598.7	17.106	5.987	11.975	0.857	5.987	11.119	0
2	100	100	598.7	17.106	5.987	11.975	0.857	5.987	11.119	0
....										
Secular equilibrium	100	100	598.7	17.106	5.987	11.975	0.857	5.987	11.119	0
(*) A stationary population is assumed.										
Source: Auerbach and Kotlikoff (1995)										

The system illustrated above is a fully operational FF scheme. For expository convenience we have described it using a neoclassical model. But even those who would refer to a different theory of income distribution, e.g. of a “classical” nature with the real wage given by historical-economic circumstances and profits as residual, would not describe it differently, at least from a pension point of view – as in the case of Hegel’s cows which are all grey at night, models are all grey in equilibrium.

In Cesaratto (2005, Ch. 3) and Cesaratto (2007) we proposed further simulations based on table 2 illustrating the neoclassical thesis about the robustness of an FF scheme in the face of demographic shocks. The thesis is that if the younger generations – always fully employed according to the neoclassical theory – become less numerous in number and demand less capital (at the given average capital endowment), there would still be no difficulty for the elderly to recover the investment made when young and maintain the expected standard of living, as we are going to explain.

As already seen, while PAYG is a political pact, an FF scheme relies on a market mechanism whereby workers buy capital assets when active, selling them to the next generation when retired. The 'young' will of course offer consumption goods in exchange (as seen, the holders of the assets will also enjoy a rate of return on them given, in the neoclassical narrative, by the marginal productivity of capital). For neoclassical economists the assets consist of a fund of foregone consumption embodied in a real capital stock. Yet, if there is a demographic (fertility) shock (identified by marginalists as a fall in full employed-labour) there are fewer young wishing to buy the assets from the 'old' at the given capital/labour ratio: capital is, so to speak, too abundant. Two compensation mechanisms are however at work. Think of the capital stock as entirely owned by the elders that bought it by saving when young. The first mechanism relies on the neoclassical factor substitution mechanisms

(a) Since, by hypothesis, the labour stock is falling, *given the initial capital stock*, wages rise, the interest rate falls, and the desired capital-intensity of techniques rises (at least temporary), contributing to absorbing the initial relative capital abundance. The neoclassical factor substitution mechanisms thus help the capital assets offered by the elders to be absorbed by the economy.

(b) The young are yet less numerous and, in spite of the higher wages, they might not want to buy all the existing capital stock (at the given marginal propensity to save).¹⁴ However, using the depreciation funds (coinciding with that part of the capital stock that has resumed its liquid form) the elders may in principle reconvert, so to speak the capital stock

¹⁴ Note that the elders' saving decisions, embodied in the capital assets they want to get rid of, depends on the data of the initial equilibrium, while the youngers' saving decisions hinge on the data of the new equilibrium (after the demographic shock), therefore they will not in general coincide with the former.

(a fund of foregone consumption) into consumption goods. A revealing quotation from Garegnani (2024, p. 399) shows the deep marginalist roots of this view: “‘Capital’ [our FF baton] thus appears as past savings which are, so to speak, “‘incorporated” in the capital goods existing at a given instant of time. As a result of the productive consumption of those goods, these past savings will periodically re-emerge in a “free” form and can be re-incorporated in capital goods of the same or of different kinds; *alternatively, they can be turned back into consumption*’ (my italics). (Garegnani's seminal passage and my exposition of the issue were taken up by Kuné (2011) to which I replied in Cesaratto [2012]).

Through selling part of the capital assets to the young and by depleting the depreciation funds, the elders can therefore recover in liquid form the capital assets bought when young and buy consumption goods (and pass later away). It can be shown that, in the long run, the economy adjusts to the new population level (or new rate of growth) at the same initial levels of the distributional values (including the capital/labour ratio).¹⁵ The neoclassical theory of capital behind this vision, however, opens well-known controversies that we recall later.

¹⁵ Further simulations conducted with a standard Cobb-Douglas production function and a given propensity to save (e.g. corresponding a given mandatory contribution rate to the FF scheme) show in fact that a Solowian stationary economy hit by a fertility shock (a fall in the labour supply) returns to an identical stationary state (Cesaratto 2005, pp. 102-106). In other words, the reconversion of part of the capital stock into consumption goods is such to produce a fall in the capital stock eventually restoring the initial capital/labour ratio. Cesaratto (2005, appendix 3.1) also examines the case of a shock on population *growth* which become negative, with a similar adjustment process. Taking the validity of neoclassical *theory* for granted, the practical plausibility of these mechanisms – that is, the extent to which such adjustments can take place smoothly in the real economy – is also discussed in Cesaratto (2005, p. 460).

What it is very important to appreciate here of the neoclassical view is that the ex-novo constitution of an FF program entails an act of net savings (investment), additional to the existing stock of savings (capital stock). In general, it can be argued that a pension reform towards capitalisation is successful if it is able to increase the supply of net savings beyond what would have been offered in the absence of reform; or in other words, the reform must result in the formation of *additional* real capital beyond what would have been created without reform: ‘The key requirement is an increase in national saving’ as stated by Feldstein and Liebman (2001, p.70). We call this the ‘savings test’. In the neoclassical model an increase in net saving – or in the marginal propensity to save – would ceteris paribus lead to an increase in capital and income per employee. It is by no means certain that this happens when considered from other theoretical perspectives. But before discussing the objections to the neoclassical relationship between savings and investment, the creation of an FF scheme encounters other, so to speak, preliminary difficulties.

3. The transition between the two systems¹⁶

3.1. Design and reform contexts

In discussing of tax reforms, Martin Feldstein (1976) distinguishes between ‘tax design’ and ‘tax reform’ contexts. The design context refers, in the field of pensions, to the introduction of a social security system where there was none; the reform context applies where a reformer intends to introduce a new system alongside or instead of another: ‘design is a guide for ... policy ... in the “original position”... [while] reform must take as its starting point the existing ... system’ (1976, p.77, original italics). A pure design context is hardly to be found even at the time of the creation ex novo of large PAYG systems when, in fact, circumscribed forms of support for the elderly were

¹⁶ For a more extensive illustration see Cesaratto (2005, cap. 4) e Cesaratto (2006a)

present within the family, while funded forms of provision were already common in certain social classes. The context of reform is certainly more appropriate for projects of flanking and/or partial replacement of PAYG schemes with FF regimes as proposed some decades ago in the influential report by the World Bank (1994).

Feldstein's distinction is important because the heated discussion about the respective advantages of the two systems – in terms of the respective returns on contributions or respective risk – has often taken place as if we were reasoning in an abstract 'design' context in which by decree, with a political stroke of the pen as it were, we could introduce the more advantageous of the two system deleting, without costs, the existing one. This procedure is methodologically flawed because the context is, generally and particularly nowadays, the more complex one of 'reform'.

Unfortunately, the most common criterion for judging between the two systems, pay-as-you-go and capitalisation, has frequently been to compare the respective rates of return on contributions – or, among the less orthodox, the relative riskiness of the two systems.¹⁷ As repeatedly pointed out by Barr and Diamond (2006, p.22), however: 'It is mistaken to focus on a pension system in steady state, while ignoring or underplaying the necessary transition steps to get from one steady state to another. ... An error ... is to argue that funding is necessarily superior because stock-market returns are higher than the rate of growth of the wage base, which determines the return to PAYG schemes' (v. also pp. 31, 34-35, 36, 38 e Barr e Diamond, 2008, pp.106-109). This sounds to closely follow what I previously expounded, with strikingly similar words, in Cesaratto (2005, p.91): many economists 'simply compare the rate of return on contributions in the two systems – the

¹⁷ A Minskian influence on heterodox economics is perceptible here which emphasises financial instability as the main evil of capitalism. Without denying the important role of this approach, the latter tends to pass over the battle of theories about the structural operation of capitalism (for similar discontent with the Minskians, see Palley 2009).

“biological rate” of PAYG, and the rate of return on investment of [a capitalisation system] – without discussing the transition difficulties and macroeconomic implications of adopting either of the two competing schemes’ (see also Cesaratto 2006a, p.34). It is therefore the transition between the two systems that needs to be addressed, in particular how a reform towards capitalisation succeeds in passing the ‘savings test’.

3.2. The savings test: controversies over the transition from pay-as-you-go to capitalisation

The literature has extensively discussed the issue of transition focusing on the following four points.

(a) Let us assume that there is no formal pension system in force. It is generally recognised that it is not easy to induce workers to save more. The most favourable situation to obtain such result would entail a generation of sufficiently well-off workers who, however, are improvidently short-sighted and therefore do not save enough. It is more likely, however, that the better-off workers already save voluntarily, so that the introduction of compulsory saving could simply displace voluntary saving with zero net saving results – a typical situation in more advanced countries.

On the other hand, it might be politically difficult to force workers whose wages are close to subsistence to save part of them, even more so if they informally support older relatives – a situation closer to that of developing countries (this is one of the probable reasons for the failure of the Chilean reform of 1981). This difficulty has been pointed out by Cesaratto (2005, pp.117-122 and 2006d, pp.37-39), Barr (2006, p.13), Barr and Diamond (2006, p.30; 2008, ch.6), and by others cited therein.

(b) Things get even more intricate if a PAYG program already exists whereby workers pay part of their wages as mandatory contributions, as is common in most developed countries. On the one hand, it is now recognised that it is not possible to simply divert the flow of contributions from

PAYG in favour of capitalisation as this would wipe out the financing of existing PAYG pensions. On the other hand, it would not be politically feasible to force workers to make a second contribution in favour of capitalisation. The political difficulties of double contributions would be exacerbated by the fact that, to terminate the present PAYG scheme, current double-charged workers in the transitional periods would receive nothing in return for their PAYG contributions. Capitalisation also requires that additional mandatory savings (a) do not displace those already voluntary made, and that (b) additional saving determines additional investment. Conceding all this, the problem of double contribution would disappear in subsequent generations (as the transitional generations subject to the double contribution will be able to sustain themselves once retired relying on capitalisation, with the new generations contributing to the FF scheme only). In Orszag and Stiglitz's (2001, p.22) parlance the system would be 'broadly prefunded'.

(c) Several unlikely transition plans from PAYG to capitalisation have consequently been proposed – e.g. Castellino and Fornero 1997; Holzmann 1998 – which are evidently not very credible (Orszag and Stiglitz 2001; Geanakoplos, Mitchell and Zeldes 1998; Cesaratto 2005, chap. 4). In short, assuming the diversion of workers' contributions to pension funds, the funds accumulated by the latter would be matched by the creation of an equivalent public debt issued to finance the outstanding PAYG's pensions, so that there would be no net saving. In practice, the pension funds would use the contributions to purchase the public debt issued to finance the outstanding pensions. This difficulty is also pointed out by Barr (2006, p.8) and Barr and Diamond (2006, p.35; 2008, ch.6; Cesaratto 2005, ch.4 and 2006d). Barr and Diamond (2006, p.31) note how, without double-taxation (and conceding that private savings do not fall, informal labour does not increase etc.), such a kind of pension reform would consist of the government continuing to use workers' contributions to finance current pensions by handing specially issued government bonds to workers. There would then be no effect on national savings (the sum of public and private savings)

and the pension system would continue to operate on PAYG principles. In Orszag and Stiglitz's (2001, p.22) terminology the system would be 'narrowly prefunded', i.e. without net accumulation of savings. Cesaratto (2005, pp.151-153) defines the system 'false capitalisation', as Bruno de Finetti (1956, p.279) anticipated many decades ago. Another author, who we already met above for his effective neoclassical representation of a FF scheme, salaciously concluded, having the reform proposals made in a famous World Bank report (1994) in mind: 'In this putative shell game, workers, in the new regime, make contributions to their pension funds, rather than to the government, and the pension fund turns around and gives the contributions right back to the government as loans' (Kotlikoff,1999, pp. 16-17).¹⁸ This is not to say that, in the economies inspired by the World Bank that adopted these reforms, pension funds invested exclusively in government bonds. One should not be deceived, yet. In fact, it can be assumed that while the Treasuries of those countries were issuing securities to finance the payment of current PAYG pensions, other investors were also interested in buying those securities, consequently selling private securities to the PFs. Clearly, this would be a mere reshuffling of the composition of portfolios without any real additional capital accumulation taking place in the economy. It took some time after the mentioned report by the World Bank (1994) for so-called pension experts to become fully aware of the deceptions one can incur in speaking superficially about the transition to capitalisation.

¹⁸ Kotlikoff also adds: 'So the cash flow from the workers to the government remains the same. In the old system, workers receive implicit I.O.U.s to future government pension benefits in exchange for their contributions, whereas under the new system they receive, via their pension funds, explicit I.O.U.s (government bonds) that promise to pay interest and principal. If the implicit and explicit I.O.U.s have the same present value, then the "reform" has not reduced the present value of the government's future expenditure – it has simply relabelled them'.

It would be interesting for some young scholar to fully reconstruct the history of many World Bank-inspired pension reforms that de facto generated privatised PAYG systems. Their high operating costs (including profits), to the detriment of payouts, led many governments to later retrace their steps by nationalising PFs. Among these reforms and counter-reforms I can mention those in Argentina, Hungary, and Poland, and who knows how many others (see e.g. Elveren 2008; Kun 2010; Wall Street Journal 2010). The economists of the World Bank, the main champion of reforms, were of course not all so foolish as not to see that their proposals were a Kotlikoff's 'shell game'. But they had a spare argument. With the reform, the public debt would increase because, as it turns out, the state goes into debt to pay for current pensions. In the logic of the much worse, the better to which the World Bank winked, this would have opened the way for reforms to reduce other items of social spending.¹⁹

(d) Finally, one must ask what would happen if a pension reform succeeded, in the abstract, in inducing workers to increase their marginal propensity to save – say, through misinformation and scaremongering campaigns about the sustainability of PAYG that would encourage them to save more than they usually do, whilst continuing to pay into the PAYG scheme. Whether a higher

¹⁹ In the Chilean reform of 1981 obtaining public budget surpluses was preliminary by cutting other items of social expenditure. These cuts allowed current pension payments to continue while social security contributions were diverted to PFs. It is also a neoclassical legend that the good development of the Chilean economy since the beginning of the 1980s was due to the savings made available by the pension reform. In truth Chile adopted much less liberalist policies than other Latin American countries – after the initial failed liberalist binge that followed the coup – with industrial policies that favoured exports and controls on capital movements aimed at preventing speculative capital inflows (Cesaratto 2005: 161-62).

propensity to save leads to a higher amount of productive investment is, however, a highly controversial point in the literature.

The controversy relates to the relationship between savings and investment: even assuming that a pension reform does raise the workers' propensity to save – as in Feldstein and Liebman's (2001) and Ceprini and Modigliani's (2000) models – there would be neither analytical nor empirical reasons to argue that the level of investment would increase accordingly, neither at the national level nor in other countries to which savings could be 'lent' (Cesaratto, 2005, chapters 4 and 6; 2006a). Keynes (1936) had already argued how, within the limits of the full utilisation of existing productive capacity, it is investment that determines savings, and not vice versa as asserted by traditional theory. Moreover, the 'savings paradox' shows how an increase in the propensity to save, given the level of investment, leads to a decrease in national income. The criticism of capital theory raised in the well-known 'Cambridge controversy' reinforces this conclusion (Garegnani 1983 [2024]). Interestingly, economists not under suspicion of heresy such as Barr and Diamond (2006, p.33) accept, albeit without elaborating, that the relationship between savings and investment can be more complex than neoclassical theory would like. This is how Barr (2006, p.13) puts it: "it may not be right to argue that additional savings are always translated into productive investment via adjustments in the interest rate – the Keynesian argument that higher saving together with sluggish investment may lead to stagnation rather than growth may not be wholly dead."

The point is also mentioned in Barr and Diamond (2008, p.105) where, however, the role of Keynesian analysis is restricted to the short run. More radical Keynesians extend this proposition to the long run (which is more relevant for pensions) by arguing that, also in the long run, it is investment that determines savings, not through changes in the *degree* of capacity utilisation as in

Keynes' short-run analysis, but through changes in the *level* of this capacity.²⁰ The latter would adjust in the long run to the trend in aggregate demand and not vice versa (Garegnani (1992 [2024])). This suggests that Keynesian-inspired policies could support safer workers' access to forms of managed savings, albeit through policies that are the opposite of traditional ones – i.e. by supporting wages and spending, not savings! It would however be advisable to reckon that support to forms of highly regulated, managed savings intended for workers should not provide a temptation for pseudo-reformers to dismantle the PAYG pillar.²¹

Conclusions

After an illustration of the characteristics of pay-as-you-go and funded social security systems, this contribution has examined some issues related to the macroeconomic difficulties involved in setting up funded pillars as a substitute for or alongside PAYG. Criticism of the funded pillar, based on financial instability and risks to savers, has often been heard from heterodox economists which parallel the opposite neoclassical arguments prizing the advantages of FF regimes. The Minsky-inspired criticism is in many respects valuable and inspires caution in suggesting the involvement

²⁰ Disappointingly, limiting the Keynesian case to the short run, Michl and Foley (2004) presented a social security model in which saving determine investment. A discussion between Michl (2006) and Cesaratto (2006) followed.

²¹ In a genuinely Keynesian analysis, PAYG is not a mere transfer of income between workers and pensioners since it is pension expenditure that generates social security contributions (as in general it is public expenditure that generates tax revenues). Cesaratto (2005, pp. 202-204) also suggested that pension expenditure could be considered as 'autonomous non-capacity-creating expenditure' in a 'supermultiplier' model. In this model investment is induced by autonomous spending, both financed by endogenous money creation – a still little explored field (see Cesaratto and Di Bucchianico 2020; Cesaratto and Pariboni 2022). Febrero and Bermejo (2024) and Perez-Montiel (2026) extend the insights advanced in Cesaratto (2005). See also Barba (2006).

of workers in forms of capitalisation that, at the very least, should presuppose a tightly regulated financial sector while macroeconomic risks ought to be minimised through Keynesian output stabilization policies. This approach, however, as well as the parallel mainstream thesis, neglects the issue of transition in a reform context, as if the choice would take place between PAYG and FF schemes in a design context. In this sense, Cesaratto (2005) contributed to the growing criticism to the then influential World Bank (1994) report, also filling a gap in post-Keynesian analysis.

Reality has proved the critics right in the sense that a large number of countries in Latin America and elsewhere that had implemented pension reforms have gradually come to recognise that the result were privatised PAYG schemes managed, expensively and inefficiently by PFs, to the extent that the same countries have reversed course by renationalising those schemes. For many years, there was no further talk of such reforms, with the focus instead shifting to a revamp of the PAYG systems through NDC reforms, as in Italy or Sweden. However, using a demographic decline that in many regions has exceeded expectations – as in Europe – as a pretext, new privatisation projects are beginning to emerge, for example in Germany (Deutsche Bank 2026). In Cesaratto (2005), increased productivity and wages were viewed as the remedy through which to offset the so-called ‘demographic winter’. Though, these same ageing processes can have a negative impact on productivity trends, not relieved by the influx of a highly unskilled foreign workforce. We do not, however, believe that the productivity growth depends on population size and growth (Serrano and Cesaratto 2025), not even that the growth of skilled jobs mechanically depends on the supply of educated labour. We believe, in fact, that the economic policy choices in the eurozone, based on fiscal austerity policies rather than on measures to support domestic demand, wages and investment in new technologies, have mostly contributed to its technological and demographic decline. Maintaining decent levels of pension benefits cannot be preserved in the future through financial engineering, but only through progressive growth policies aimed at international

coexistence and cooperation, fair income distribution, and environmental protection, not least to restore confidence in the future among the younger generations.

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