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## NDC: The Generic Old-Age Pension Scheme

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DISCUSSION PAPER SERIES

IZA DP No. 12221

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# **NDC: The Generic Old-Age Pension Scheme**

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## ABSTRACT

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### **NDC: The Generic Old-Age Pension Scheme<sup>1</sup>**

This chapter defines a universal public pension scheme (UPPS) as a government-mandated lifecycle longevity insurance scheme that transfers individual consumption from the working years to the retirement phase of the lifecycle. It discusses the differences in four UPPS designs defined with regard to whether they are defined contribution (DC) or defined benefit (DB), and financial (F) or nonfinancial (N). Generally speaking, DC schemes are distinguished from DB schemes by their basic building block of individual accounts. This ensures the important design feature of transparency, the “enabler” of economic efficiency – through the effects on marginal decisions to choose formal work over informal work or leisure and to postpone retirement marginally toward the end of the working life. The chapter examines additional criteria (fairness, financial sustainability, affordability, and adequacy), plus some other design characteristics of interest in a comparative assessment. The conclusion is that the two UPPS-DC designs are superior to the two UPPS-DB designs. The difference in the relative rates of return of NDC versus FDC designs, together with uncertain demographic effects on future investment needs, speak in favor of a UPPS portfolio with both. UPPS-FDC involves additional risks and costs, but also provides positive effects through returns for individuals and the economy.

**JEL Classification:** D6, D62, D81, E62, G22, G28, H23, H55, J14, J18

**Keywords:** income allocation, retirement, externalities, transparency, fairness, universal public pension scheme (UPPS), non-financial defined contribution (NDC)

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## 1 Introduction

In all societies, people of working and childbearing age transfer economic resources to provide for the current consumption of their children and their parents, and for their own future consumption in old age. The resources they transfer consist of their unpaid nonmarket time and/or their labor market income. The latter occurs through abstaining from consumption (i.e., saving) during the working phase of life to provide for consumption in old age. In a mature economy, the young save (pay contributions) and the old dissave (receive benefits), which is an exchange of financial and nonfinancial assets. As a consequence, paying for one's parents' consumption and paying for one's own consumption are almost the same.

This conceptual chapter begins with the universal need to allocate consumption over the lifecycle from the working phase to the retirement phase. It is set in the paradigm that maximization of utility over a lifetime requires managing longevity risk, which – if done optimally – follows the principles of longevity insurance. The chapter presents the case for a universal public pension scheme, called a UPPS, as the universal lifecycle longevity insurance scheme for a nation. It assesses the relative strengths and weaknesses of four designs in achieving the UPPS lifecycle longevity insurance scheme –the end goal is provision of a fair, economically efficient, and financially sustainable UPPS.

The universe of possible pension schemes is assessed for four general UPPS designs, based on two sets of design properties: (i) defined benefit (DB) or defined contribution (DC), and (ii) financial (F) or nonfinancial (N).<sup>2</sup> In all cases, payments of the current working generation are transferred over the lifecycle into retirement income – and thus consumption possibilities – in old age. The chapter assesses to what extent these four alternative designs satisfy the three criteria above.

The chapter begins by presenting the general economic rationale for a UPPS as a social contract mandated in a nation's laws. It then presents the four design choices: NDB, FDB, NDC, and FDC, a typology introduced in Góra and Palmer (2004). Here, the arguments supporting the superiority of NDC and FDC over DB in the context of creating a UPPS are presented in depth. The end result is to establish whether NDC may merit the distinction of being the generic UPPS, which entails weighing each scheme's different strengths – and eventual weaknesses – in dealing with the economic, demographic, and financial risks confronting all UPPSs.

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<sup>2</sup> Nonfinancial DC is presented in Palmer (2006, 2013), where the latter presents an alternative view regarding how the definition of the NDC "contribution asset" should be treated in the context of the conceptual rate of return. The term "nonfinancial defined contribution" as well as the NDC, FDC, NDB, FDB typology were introduced in Góra and Palmer (2004). The "nuts and bolts" of NDCs are presented in Holzmann (Chapter 9). For a broad perspective of issues and implementation strategies, readers are referred to the approximately more than 80 individual studies on pensions contained in three anthologies: Holzmann and Palmer (2006); Holzmann, Palmer, and Robalino (2013), and this volume (Holzmann, Palmer, Palacios, and Sacchi 2019), which cover the development of NDCs and issues in creating and implementing NDCs.

In the long term, the UPPS is thus an institutional structure whereby a claim on current gross domestic product (GDP) “pays” or is “traded” for a claim on future GDP (Góra 2013). This chapter deals with the design effects on the efficiency, fairness, and financial sustainability of this intertemporal transfer. The issues are analyzed outside the dichotomy of “pay-as-you-go versus funding” that – in this chapter’s view – is misleading within the structure of the UPPS.

The chapter is divided into seven sections. Section 2 establishes the difference between the meaning of “private” and “public” in the pension design dialogue. Section 3 presents the double dichotomy – DB versus DC and nonfinancial versus financial – of UPPSs. Section 4 presents the rationale for establishment of a UPPS as the universal lifecycle longevity insurance scheme. Section 5 presents a general framework for understanding the technical differences between the four UPPS designs and discusses and compares these differences. Section 6 summarizes the assessment in terms of the criteria presented and discussed. Section 7 concludes.

## **2 Distinguishing features of private and public pension schemes**

UPPSs are macro pension schemes with micro properties, while private pension schemes are solely micro – by definition. This distinguishing property of UPPSs underlies the framing of the discussion of this chapter. Whereas individual private “micro” pension schemes by themselves are unlikely to interact significantly with the macro economy, a UPPS interacts with the macro economy by definition.

In a UPPS the public provider is responsible for the scheme, although some or all of the specific functions – i.e., collection of revenues, account keeping, information to participants, financial portfolio management, etc. – can be performed by either public institutions or private firms. A major difference between private and public schemes involves where the legal (financial) responsibility lies. Traditionally, many DB UPPSs were intertwined financially with government budget transactions and the national debt. The emergence of DC UPPSs was driven by the need to create financial autonomy for the universal public pension commitment.

## **3 The double dichotomy of UPPSs**

A UPPS design can be described by two characteristics – whether the scheme is nonfinancial (N) or financial (F) and whether it is DB or DC. This constitutes the double dichotomy presented in Table 1. In a nonfinancial UPPS, the rate of return is determined by the return on nonfinancial human capital investments (the productivity of the labor force) and the labor supply that embodies these investments. In a financial UPPS, the rate of return is the return on financial investments, which in an open market economy includes investments in domestic and foreign capital.

**Table 1: The double dichotomy characteristics of UPPSs**

<b>Direct determinants of the rate of return</b>	<b>UPPS-Defined Benefit (UPPS-DB)</b>	<b>UPPS-Defined Contribution (UPPS-DC)</b>
Financial investments	FDB	FDC
Non-financial human capital investments and labor supply	NDB	NDC

Source: Based on Góra and Palmer 2004.

**Box 1: Definition of DC and DB schemes and their distinguishing features**

The DC design builds on a foundation of individual accounts, the accumulation of savings (through contributions) on these accounts, and the creation of a life annuity at retirement based on the individual’s account balance and life expectancy at retirement.

No unique definition exists of what a DB scheme is, other than its design does not fulfill the generic definition of a DC scheme. Examples of DB schemes are: (i) the number of years of service and, for example final salary, (ii) the individual’s salary during the best X of Y years, (iii) a formula containing an “accrual” rate, or (iv) a so-called “point system” based on the ratio of the individual wage to the countrywide average and a model for valuation of the points determined this way.

Irrespective of the design fairness of DB schemes that underlies the benefit rules employed, all UPPS-DB designs have in common the absence of built-in mechanisms that steer them toward financial affordability and sustainability. The provider maintains financial sustainability through ad hoc adjustments. The latter is necessitated by the fact that the DB design per se does not deal directly with the demographic, economic, and, in the case of UPPS-FDB, financial risks. This is the important distinction between UPPS-DB and UPPS-DC designs. In short, the dichotomy is discretion versus rules. Section 5 returns to a much more comprehensive discussion of the differences between UPPS-DB and UPPS-DC. However, section 4 first develops the rationale of the role of the UPPS as a lifecycle longevity insurance scheme.

**4 The UPPS viewed as a lifecycle longevity insurance scheme**

The presentation starts with the idea of the UPPS as a pure lifecycle longevity insurance scheme by considering the ramifications of the definition of saving, the definition of a generic longevity insurance, and the rationale for universal longevity insurance.

**4.1 The economic definition of saving**

Saving is a result of forgoing current consumption out of current income. The general motive for individuals to save is to provide resources for consumption in the future. Although it is not the only reason to save for the future, the most important reason in the lifecycle context to save is to provide for consumption when one is old and retired from the labor force. The act of paying contributions into a

pension scheme performs the function of transferring individual consumption possibilities from the present into the future. The difference is the strength of the link on an individual basis. If the link is 1:1 then even though participation is mandatory and thus unavoidable (why it is mandatory is argued later), it is not a tax by definition if one defines a tax as relinquishing income to the tax authority to provide general revenues that in the end may or may not return to the taxpayer. The intention of UPPS-DC is that the unit of money paid is a liability to be repaid with interest to the payee – which can be called forced saving.

In NDC and FDC frameworks, the transfer from the current period to the future is accomplished by using personal accounts that perform the function of a bank “savings account.” What characterizes a UPPS is that the transfer of income is mandatory for everyone, and under the same rules for everyone, although it is the way of managing contribution flows that differs between nonfinancial and financial UPPSs – which follows from the discussion up to this point – and which will be alluded to several times hereafter.

#### *4.2 Lifecycle saving through the vehicle of insurance in the generic UPPS scheme*

The well-known reason for individuals to save through by contracting into longevity insurance is the uncertainty about how long they will live – explicitly, the risk of outliving one’s resources in old age. In line with the lifecycle theory of consumption and saving, all rational individuals will also strive to achieve a steady level of consumption throughout their entire lifecycle, referred to in the literature as consumption smoothing.

The rational choice for individuals is to contract longevity insurance to manage the risk of ending up with insufficient resources for consumption in old age. The underlying principle of insurance is, then, that those who end up living a shorter life than the average expected life contract by virtue of their participation in the insurance scheme to transfer the remaining money on their accounts to those who live longer lives. In the face of uncertainty about their individual longevity, this is an efficient individual strategy that also enhances the welfare of the entire group.

#### *4.3 UPPS longevity insurance is welfare-enhancing*

Would everyone voluntarily join an insurance scheme, contribute regularly from the time they are young entrants into the workforce, and continue to save on a regular basis throughout their working lives, thereby accumulating the funds necessary to earn a benefit sufficient to finance adequate consumption in retirement? Most would probably not do this.

Generally speaking, people are “short-sighted.” They live for today and tend to forget their obligation to themselves to save for their own consumption tomorrow. The greatest risk for society is that the myopic segment of the population will discount future needs too heavily and start saving too late in life to create sufficient savings to cover at least basic consumption needs in old age.

A second reason is that some healthy people with sufficient work skills would nevertheless consciously choose to be free riders, which means that they expect the altruistic others to pay for them in old age. The logic of the UPPS is thus to save people from the unfortunate consequences of their own poor



judgment, which also protects those who would make the right decisions from the negative economic consequences of those who would not. In addition, the UPPS can for some provide a positive incentive to work and contribute more than they otherwise would have. The conclusion is that overall economic efficiency and the welfare of (practically) all is increased by the creation of a UPPS.

#### **4.4 *The Universal Public Pension Scheme as “the” lifecycle insurance***

Under the Rawlsian veil of ignorance, due to the absence of knowledge about one’s personal outcomes in life, and where individual fates in life are distributed randomly, the claim can be made that economists’ rational individual would do what is best and choose to join an insurance pool where everyone is treated equally. Individuals’ shared uncertainty about their own life expectancy when young provides the justification for all individuals in a nation to join together to form a national insurance pool. The universal scheme compels people to enter into the insurance scheme from the very outset of their working careers, reducing the long-term negative outcomes of myopia and freeriding.

A straightforward criterion for participation is that everyone pays a certain percentage of income from employment or self-employment into the universal insurance scheme. The payments represent current savings that are set aside during working years to pay for future consumption during years of retirement. In this way, the lifecycle universal longevity insurance brings in the idea of individual consumption smoothing, creating a fair “Rawlsian” lottery of outcomes distributed around the average life expectancy of each participant’s (e.g., birth) cohort.

### **5 The design of the UPPS and how UPPS-DB and UPPS-DC fulfill the criteria of a good pension scheme**

This section examines the four basic forms of UPPS design with reference to the following criteria for judging the micro and macro outcomes of a specific pension scheme, and within the context of three general categories of risk: economic, demographic, and financial. The criteria employed in the comparison of schemes are: transparency, micro and macroeconomic efficiency, intra- and intergenerational fairness, financial sustainability and stability, affordability, and adequacy. These are also assessed in terms of the basic function of the UPPS: to provide a lifecycle mechanism for converting individual savings, through contributions, to a universal (national) longevity insurance scheme with the same rules for all.

#### **5.1 *A generic technical framework for the UPPS based on the lifecycle model with longevity insurance***

To illustrate the design consequences of the four lifecycle UPPS insurance schemes, this section begins with a generalized expression of the lifecycle model with longevity insurance as viewed at the individual level; i.e., as the typical lifecycle saver might formulate his or her individual savings to provide for consumption in retirement.<sup>3</sup> It starts with the phase of the lifecycle when individuals work and pay

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<sup>3</sup>This is the formulation of the individual lifecycle model underlying the discussion of the dynamic intergenerational model in Palmer (2013).

contributions to a UPPS. Individual,  $i$ , pays a certain percentage,  $c$ , of yearly earnings,  $W$ , during the working phase of the life of  $T$  years, and each year the accounts earn a rate of return  $\alpha$ . The sum, or balance, of the individual's payments accredited with interest – valorization of some other origin – over  $T$  periods of contributing into the savings scheme at  $T$  is:

$$(1) \quad K_{i,T} = \sum_{t=1}^T c_{i,t} W_{i,t} \prod_{t+1}^{T-1} (1 + \alpha_{i,t}).$$

where year  $T$  can be seen as the last year of contributions into the saving scheme before the individual retires with a benefit based on the real situation that the money has been paid into the savings scheme. The whole purpose of the UPPS is to create a lifecycle savings vehicle for transferring individual resources from years of work to consumption during the remaining years of life. The important message of expression (1) is that individuals' decisions to work and contribute to their own savings in the UPPS insurance scheme also determine their consumption possibilities in old age. This is the principal message of the UPPS-DC design. The message is easy to communicate (i.e., transparent) and easy to understand and accept as a fair outcome.

With the goal of achieving adequate and affordable pensions, the message of a good UPPS is that healthy individuals are ultimately responsible for contributing to their own lifecycle saving scheme. To the extent that they are not capable of doing this – for whatever reason – the UPPS is supplemented with a tax-financed minimum pension “floor.” The one-to-one message of UPPS-DC stands out in stark contrast with the dominant messages of pension politics underlying the Post-WWII era and the generous UPPS-DB schemes that emerged – that could only become temporary pension schemes in a transition to a form of a financially intergenerationally sustainable UPPS.<sup>4</sup>

Moreover, in retrospect, there is little doubt that post-war generosity was made possible in the immediate two post-war decades by strong economic growth spearheaded by a post-war reconstruction boom together with a baby-boom labor force becoming working age in the mid-1960s. Sweden's UPPS-NDC scheme created in the 1990s was a response to Sweden's awakening to the long-term financial unsustainability of too generous rules regarding early exit (Palmer 1999) and more general system benefit design deficiencies of UPPS-NDB schemes, which generally do not maintain the 1:1 link between contributions and benefits, thereby leading to long-term financial difficulties. These are themes running through Palmer (2002a, 2002b, 2005).

Expression (1) is only half of the story, however. The second half is how the distribution of individual savings over the remaining life from the time of exit from the labor force with a retirement benefit is determined. This entails converting the accumulated capital balance (with the internal rate of return),  $K$ , into a stream on income (consumption) over the remainder of the individual's life. In the UPPS-DC framework this is done by constructing the yearly pension payment  $P$  as a life annuity (see Palmer and

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<sup>4</sup> This said, the immediate generosity of post-war DB schemes was clearly well-motivated by the necessity to provide adequate benefits to persons whose own prospects were severely restricted by two World Wars separated by an extensive period of worldwide economic depression.

Zhao de Gosson de Varennes (Chapter 13) for a discussion of whether the rate of return should be included exogenously to the annuity, in the latter case in the form of periodic indexation):

$$(2) \quad P_{k,i,\tau} = \frac{K_{i,\tau-1}}{G[LE_k, \beta(LE_k)]}$$

where  $k$  is individual  $i$ 's birth cohort pool and  $LE_k$  is the cohort's average life expectancy from the year  $\tau$  when the annuity is granted. Expression (2) converts the individual's savings  $K$  at retirement into a yearly payment based on a rate of return  $\beta$  and the individual's birth cohort's average life expectancy,  $LE_k$ . The role of the birth cohort pension pool is to create a sum of money – i.e., the entire birth cohort's pension savings – that is distributed among individual participants in accordance with their actual number of years of life. This technical mechanism distributes the capital of those who die younger than average to those who live longer than average.

An important message of expression (2) is that the higher the individual's life expectancy at retirement, the lower the yearly benefit payment, and vice versa; i.e., the distributional mechanism is "actuarially fair." Postponing retirement adds an additional year of contributions to  $K$  and also reduces the value of  $LE$  employed in computing the yearly payment (i.e., it results in a higher yearly payment).

Since the UPPS is a mandatory, universal insurance, the idea of discriminating on the basis of indicators of specific individual risk was eliminated from the outset on the basis of the social-value argument of the Rawlsian veil of ignorance. This by no means precludes the possibility of changing the final distribution of income through the general tax-transfer system, but it is a socially acceptable point of departure for the generic UPPS.

Summing up, this technical presentation of the lifecycle model of saving for old age to contract a longevity insurance at retirement satisfies the basic criterion of accomplishing consumption smoothing over the lifecycle. The longevity insurance is actuarially determined and as such is self-financing for the national pool of pensioners, and what individuals pay determines what they have available for consumption in retirement – i.e., pensions are a direct reflection of individuals' allocation of their time during the working phase of their lives between market work and other activities.

The conclusion is that UPPS-DC fulfills the criteria set out in expressions (1) and (2) regarding the "saving" and insurance payout phases of the individual's lifecycle. UPPS-DB schemes are not explicitly designed as in expressions (1) and (2). By virtue of its design UPPS-DC dominates UPPS-DB given the one-to-one relationship between individual lifetime contributions and benefits. And, if the design criteria of a UPPS-DB fully fulfill the criteria of expressions (1) and (2), then, in fact, it is instead a UPPS-DC design by definition. This conclusion is also important in the following discussions of the role of transparency in the determination of fairness and economic efficiency, and in the end the degree of affordability and long-term sustainability of a UPPS.

## 5.2 *“The” generic UPPS in the context of the technical model*

From here on, this chapter presents the case that UPPS-DC is the optimum design of a UPPS and that UPPS-NDC is the generic version of these two DC schemes, in the sense that UPPS-NDC brings the current elderly into the intergenerational transfer chain at the time the UPPS is started up. A UPPS-DC takes about 45 years from the start-up for participants to achieve a benefit at retirement based on a full working career. Two factors favor the UPPS-NDC.

First, a UPPS-NDC design is an efficient intergenerational transfer mechanism that can harness the economic and demographic dynamics of emerging economies – and demographic dividends (positive or negative) in general. The simple design vehicle of individual accounts accommodates all degrees of partial prefunding of a UPPS of intergenerational transfers. In other words, individual accounts consisting of explicit liabilities to today’s workers make possible a transfer of consumption in real-time today from the working-age population to the elderly. This can be done through a financial or a nonfinancial UPPS design – or something between these two alternatives.

An interesting design to think about in this context is a demography in which the working-age population is in an NDC equilibrium, but adopts a policy where the population is increasing steadily due to generous immigration rules or/and high birth rates – over decades – creating reserves that accumulate until they are needed about 40 to 60 years later. This results in a substantial build-up of liquidity (i.e., funds).<sup>5</sup> The extreme example is introduction of an NDC in today’s typical African nation. Larsson, Leyaro, and Palmer (Chapter 23) investigate how the UPPS-NDC design works in the context of a young population on its way toward demographic equilibrium and beginning with a largely informal labor market that begins to evolve into a formal market economy. Here the demographic dividend can be separated and invested through the vehicle of an NDC fund. The fund is invested in physical and human capital augmenting economic growth and development. What makes the emerging economy an interesting real-world case is that a real option exists between consumption and investment of the funds. In the emerging economy, the dynamically young population transitions from an informal to a formal market economy.<sup>6</sup>

In theory, the same principle can be harnessed in an economically developed society, which also has a spate of options for distributing the dividend between consumption now or in the future. Even a mature economic society has the option of financing investment or consumption today generated by demographic dividends. An example is baby-boom generations whereby the second, third, and successive generations of offspring produce cyclical “booms” at intervals of, for example, 20 years or so.

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<sup>5</sup> It is worth noting that in the mature UPPS, NDC with a buffer fund and FDC converge to a similar economic structure.

<sup>6</sup> Prolonging large-scale informality is a challenge not only for pension systems. This important issue goes beyond the scope of this chapter.

Second, financial designs – i.e., FDC (and FDB) schemes (private and public) – require government supervision due to the risk of mismanagement and fraud. Mismanagement entails systematic imprudent investment strategies and unmotivated costs for administration. Fraud entails unwarranted use of savers' funds for one's own gain. Supervision brings with it additional costs paid by the country's taxpayers, which in the case of a UPPS are the same persons as the savers and pensioners, even if these costs are seldom transparent for the participant. Since corruption is a real risk in financial dealings, this factor works against UPPS-FDC and FDB schemes.

### *5.3 Universal fairness and distributive social policy*

The one-to-one link between what individuals pay into the system during their working career and what they get out of it in retirement is arguably an acceptable principle defining fairness of a universal public pension scheme. This statement, however, must be accompanied by the important qualification that social fairness also requires that society augment the universal lifecycle insurance scheme with a social income safety net that is deemed sufficient for those who due to various circumstances cannot provide for themselves.

#### *5.3.1 Intragenerational fairness*

With the building blocks of expressions (1) and (2), it is easy to understand that two persons coming from the same birth cohort who are employed at the same workplace doing work that yields the same hourly wage will be entitled to exactly the same expected pension benefit at retirement. If one works 10 percent more hours at this wage for the same number of years, then the result is a lifetime retirement benefit that is 10 percent higher.

#### *5.3.2 Intergenerational fairness*

In the same spirit, *ceteris paribus*, if the wage rate increases by  $x$  percent over generations, the same formula (with a constant contribution rate) will yield an equivalent increase in pensions where the relationship of years of work and retirement maintains the same ratio over time (which is determined by the life expectancy factor). In other words, the UPPS-DC rule – expressions (1) and (2) – defines a universal pension scheme that is fair within cohorts and over generations. This definition embodies the simplest combination of distributional rules – rules that aspire to do no more than fulfill every individual's need to save for an old age inevitably characterized by every individual's uncertain longevity.

#### *5.3.3 Introducing distributional policy*

The distinction between UPPS-DC and UPPS-DB schemes is fundamental. First, it has to do with creating rules regarding fairness that are transparent and can be accepted by a general society as such. Second, it deals with the question of whether distributional rules should be internal or external to the universal public pension scheme. Proponents of UPPS-DB schemes point to the possibility of building distributional rules into the UPPS-DB design as its strength, whereas proponents of UPPS-DC believe that

social policy should be exogenous, formulated as specific goals of policy and financed with general tax revenues.

Examples of the latter are (i) externally tax-financed rights for care of children in conjunction with childbirth, and for higher education and skills training, and (ii) contributions for periods covered by insurance for lost earnings due to sickness, disability, and unemployment. All of the latter are universal rules in that they apply to all parents of newly born children, all persons in various types of higher education, or all persons who have lost days of earnings due to sickness, disability, or unemployment.

Making this transfer pro tempore into the individual account serves two purposes. The first is that by financing the transfer with “today’s” tax revenues, the transfer is not pushed over to the coming generation to finance (i.e., this leads to intergenerational fairness). The second is that there is a greater chance that the individual will actually receive this benefit in a pension scheme where there is an actual and transparent individual account, because this makes it more difficult for the pension provider to shift the money in time, for example, from present workers to pensioners. In other words, by keeping the equivalence of rights through the vehicle of accounts, it is straightforward that the individual has a right to a future claim on consumption (GDP).

Finally, it is reemphasized that regarding the safety net for the poor elderly, whatever the cause, that the strongest argument for holding the distributional rules outside the UPPS is the existence of a general-tax-financed minimum pension benefit available to all, with sufficient means-testing, and also taking into consideration spouses’ (co-habiting partners’) economic resources.

In conclusion, the UPPS-DB design fails to fulfill the one-to-one criterion of the universal lifecycle insurance scheme, regardless of its construction, and is therefore inferior for two reasons. First, it is likely to be an inefficient model for income redistribution, compared with making redistribution an exogenous separate component of policy, steered by its own policy goals. Especially at the lower end of the earnings scale, the UPPS-DB redistributes money in the pension pool to spouses who are well-off themselves through their relationship with high income earners; i.e., cases where a judgment based on combined economic resources would not approve such transfers. Second, all redistribution presumes a tax and a transfer.

The tax transfer mechanism can be implicit because of a nontransparent mechanism in the UPPS-DB context; or it can be an explicit, specific exogenous social policy as in the case of a UPPS-DC. In the DC case, this is accomplished by putting policy-determined and explicit tax-financed “add-ins” (i.e., transfers) into individual accounts. The DC approach is preferable on both an individual and a societal level, because it can be more successfully targeted on prioritized needs that enhance the fairness of the overall UPPS.

To fulfill its basic purpose, a good UPPS needs to work efficiently and reliably over periods of time spanning generations of successive cohorts, with firm rules. On the other hand, social needs requiring redistribution change over time. A tax-financed policy can be easily adapted to these changes. The UPPS

cannot simultaneously be an efficient lifecycle insurance and deal with the distributional issues associated with the many social policy needs that arise over time.

#### *5.4 Efficiency through transparency*

The transparent account construction of UPPS-DC design opens the door for fulfilling another criterion – economic efficiency. The individual account design of DC schemes makes clear to everyone that they are pension savers. On the margin, this can be of importance for individual decisions regarding the tradeoff between formal work and the many alternatives. In principle the contribution should not be or be perceived as a tax. Instead, it should be perceived as an act of abstaining from consumption today (saving) in the working phase of the lifecycle in exchange for a claim on future consumption (GDP) when retired.

In the UPPS-DC design this feature constitutes a positive incentive to choose work over time spent in other activities. This feature of UPPS-DC is efficient because it has either no effect or one that incentivizes individuals to work more than they otherwise would have. In both less developed and developed market economies this may occur through choosing formal, market-based work rather than informal work. It may also entail choosing formal, market-remunerated work as opposed to work in the home. In both cases, the message focuses on the advantages in terms of the yearly pension payment of postponed retirement rather than an earlier age of retirement.

Given timely and transparent information provided by the administration of the UPPS, individuals can easily see the advantage of remaining economically active longer. In a UPPS-DC design, increasing life expectancy means a smaller yearly pension (replacement rate) for the same number of years worked by previous birth cohorts – which provides an incentive to work marginally longer. This supports efficiency and by doing so works dynamically toward financial sustainability and affordability. All other things equal, the UPPS-DB design implies some combination of “borrowing” from younger cohorts, increasing the DB pension age (ad hoc), increasing contribution rates or transfers from the government budget, or some combination of all of these.

Together with the one-to-one provision, the marginal effect of the narrative that life expectancy is an important determinant of the individual outcome is necessary to create both micro- and macroeconomic efficiency. Two elements are necessary: (i) the message transmitted through accounts; and (ii) access to information about the individual outcomes of choosing work over informal activities and postponing exit from the labor force. In the latter (i.e., postponing exit), the design and the message it conveys can impact “everyday” economic decisions to allocate time between work and leisure. This property is supported by the knowledge that the contribution is personal savings for future consumption in old age, a belief that is easily conveyed by the annual development of the individual account. Because the aggregate effect is expected to be an overall positive incentive on labor supply at the margin, the result is an aggregate increase in the labor force and consequently GDP (i.e., macroeconomic efficiency).

## 5.5 *Intra- and intergenerational fairness*

With the UPPS-NDC design all individuals in all living cohorts have universal lifecycle longevity insurance based on the same rules. The design itself embodies fairness both within a birth cohort and between cohorts over time, as the same rules apply to all at any given time. More formally, expressions (1) and (2) apply to all cohorts over time in the context of NDC.

This is not the case for all UPPS-NDB designs. This is clear already from the information and examples in Box 1. As opposed to this, the built-in redistribution of contributions between participants within the DB framework breaks with both the principle of fairness and with the framework of the UPPS as a universal lifecycle longevity insurance. Moreover, the UPPS-NDB internal tax-transfer mechanism is likely to be economically inefficient compared with a pure longevity insurance scheme (i.e., NDC) augmented with an explicit tax-transfer minimum benefit and other explicit policy.

UPPS-NDB schemes are sometimes used to provide transfers – special rights – to specified occupational groups –financed by the revenues of the general collective of contributors – which runs counter to the universal insurance principle. The special privileges often have to do with early retirement with “a full benefit” or (and) a higher benefit for the specified group – but unaccompanied by additional contributions from or on behalf of recipients. To the extent that the special rule regimes promote early retirement from the labor force, they are neither efficient nor fair.

Both nonfinancial and financial UPPS-DBs may seriously break the links between what people pay and what they can expect to receive. This is because the links derived from expressions (1) and (2) – i.e., the formal account link, or the liability of the provider – are soft links in the DB framework. In UPPS-FDB schemes this means money can be moved between cohorts when the provider misjudges the economic, demographic, and financial risks. Specifically, contributions of younger participants may be “borrowed” to cover benefit payments to contemporary pensioners, which, first, breaks the link between individuals’ own contributions (savings) and future benefits. In addition, however, it is not always the case that development of the exogenous financial and economic environment enables repayment – which leads to a need to adjust liabilities downward by revising the conditions of the “defined” benefit actually paid.

A second deficiency of UPPS-DB designs (although there may be a life expectancy factor in the DB formula) is that its function is usually not transparent. When this is the case, it is inefficient. In contrast, in the UPPS-DC design the life expectancy projection is revised yearly and the consequences for retiring at alternative pension ages are made readily available by the provider. The high degree of transparency means that this information is more likely to be in the thoughts of the participant both as “the” retirement age approaches and thereafter promoting the rewards of postponed retirement compared with the “norm” at a lower age.

In closing, it is important to note that the UPPS-FDC design differs from the UPPS-NDC design with respect to the rate of return. In NDC schemes, one homogeneous rate of return is shared by all, but in the context of a UPPS-FDC institutional design, this is not necessarily the case. However, if there is more than one fund and well-advertised information on the fund outcomes, competing investors are likely to



achieve results that regress toward the mean – and this result may closely follow a world market portfolio rate of return. This suggests an underlying market-shared evaluation of the risks and yields of large financial portfolios. This picture means a world market rate for FDC funds, with small, random deviations around an age-adjusted mean, assuming all funds are characterized by lifecycle portfolio glide paths.

This final discussion suggests that although both UPPS-NDC and FDC schemes rest upon the same base (individual outcomes depend on labor force participation during the savings phase and life expectancy at retirement), NDC does not share the institutional risk associated with how policy makers determine (i) how individual participants are to be allocated to different participating funds in the UPPS-FDC participant fund managers, and (ii) how annuity provision is accomplished in the UPPS-FDC context.

The bottom line is that UPPS-NDC schemes are generically fair, both in an intra- and intergenerational perspective as they offer the same investment portfolio to all –the return is a single homogeneous valorization factor. In contrast, the risk of unequal portfolio investment outcomes for individuals in the same cohort and country may lead to a broad distribution around the average outcome with respect to FDC investment results, reducing intragenerational fairness. This risk is of course manageable by focusing on the institutional design of the UPPS-FDC scheme.

In summary, UPPS-NDC is intra- and intergenerationally fair – and the three other alternatives may come close one way or another (supplementary design or continuous ad hoc adjustments). Even a UPPS-FDC design does not necessarily deliver a fair outcome between individuals in the same generation (cohort), because the institutional setup may be flawed. This can occur when the institutional design focus is on enabling free choice, which has generally proven not to be a good design property, given that most participants are not financially literate and are not interested in this. Research has shown that this group should be steered into a well-managed default portfolio/fund characterized by a mix of worldwide assets consciously chosen and combined through high-quality assessment of yields and risks. Many examples from around 2000 arise whereby faulty implementation of UPPS-FDC designs led to poor yields for suboptimally defaulted nonchoosers, inadvertently segmenting the UPPS pool of savers. The result of suboptimal institutional design has also been characterized by results well below the world-market index and with management costs that are much higher than in countries with efficient institutional designs.<sup>7</sup>

## 5.6 *Financial sustainability, affordability, and adequacy*

### 5.6.1 *Financial sustainability*

In macroeconomic terms the UPPS's total pension expenditures can be expressed as the product of the average pension  $\bar{P}_t$  times the number of retirees  $R_t$  at time  $t$ . Likewise, the contribution wage base – the

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<sup>7</sup> Note that good examples of world-market index funds can cost 10–20 basis points, whereas many existing national UPPS-FDC funds cost 50–150 basis points, according to OECD pension statistics.

earnings that underlie the payment of individual contributions – is the product of the average wage  $\bar{W}_t$  of all contributors  $L_t$  in the same period  $t$  multiplied by the number of contributors. The ratio of these two is the contribution rate needed to finance pensions at time  $t$  with the wage base generated in that period. In discrete time the ratio of pension expenditures to the wage base is:

$$(3) \quad C_t = \frac{\bar{P}_{t-1}(1+g)_t(1+\lambda)_t(1+p)_t \cdot R(LE)_t}{\bar{w}_{t-1}(1+g)_t(1+\lambda)_t(1+p)_t \cdot L_t}$$

This ratio communicates several messages. First, the ratio  $\bar{P}_t / \bar{w}_t$  is the aggregate replacement rate. Second,  $R_t / L_t$  is the old-age dependency ratio. Third, under the assumption that the policy maker has chosen a contribution rate  $C$  based at the outset on a desired ratio of expenditures to revenues,  $C^*$ ,  $C_t$  will oscillate around  $C^*$ . Moreover,  $C_t$  has a relation to GDP that is fixed if the wage sum on which contributions are paid is a (relatively) fixed percent of GDP (i.e.,  $C_{GDP}^*$ ). The economic dependency ratio is the critical component of expression (3). With increasing longevity at older ages, with a “fixed” pension age – including the DB concept<sup>8</sup> of a full-benefit or pension age – the message of “aging population” means two things. First, life expectancy is increasing at all ages in the age group 60+ (including into the 90s). Second, countries need to adopt an effective policy to maintain a constant or growing labor force. The choice of UPPS design can contribute positively in this context, but only marginally. It is important to note that life expectancy is also increasing at ages below 60+, and in most countries this is still an important positive factor determining the supply of labor.

Generally speaking, three strategies can accommodate aging populations while at the same time maintaining a targeted macro replacement rate: (i) increase the working-age population through family policy that supports a total fertility rate of around two children per women in the population; (ii) augment the working-age population through active (net) immigration policy; and (iii) make life expectancy an explicit component of the UPPS pension formula, with the aim of providing a transparent incentive for healthy older workers to remain in the workforce to increasingly higher ages – together with indexing the minimum age at which a benefit can be claimed. A fourth mechanism to keep in mind that has implications for adequacy, affordability, and financial sustainability is the important role of transparent and efficient design, enabled by transparent individual accounts.

An important point regarding financial sustainability is that the indexation of benefits in the numerator of expression (3) is a process that begins with the accumulation of individual rights and continues through the life course of an individual. The overall index is the rate of return  $\alpha$  in expression (1) and expression (4) below; and the rate of return  $\beta$  in expression (2). The component  $\lambda$  (see the discussion in conjunction with the presentation of expressions (1) and (2)) adjusts current and future benefits to both an increasing and a decreasing labor force – originating in an increasing/decreasing population and/or participation rate of a given population. As discussed above, a positive increase (positive value of  $\lambda$  - e.g., in the form of a demographic dividend) can and in most cases should be funded, while it is

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<sup>8</sup> Or more correctly rhetoric, since in reality it is systematically adjusted on an ad hoc basis.

important for a negative value to be included as a component of the indexation – working through  $\alpha$  in expression (1) and  $\beta$  in expression (2). The latter stabilizes the UPPS in the face of demographically generated instability in the financial outcome of the UPPS.

In countries where the total fertility rate is chronically below two children per woman and net immigration is not sufficient to counter this, the contribution base in expression (3) will experience a chronic decline in the labor force. The country may experience decades with a negative value of  $\lambda$ . In this case, it is necessary to valorize acquired rights/pension accounts and pensions in payment with an indexation formula including  $\lambda$  or to implement a solvency-ratio approach with continuous deflation of acquired rights and pensions in payment. Note that Sweden uses the latter approach to fund the demographic dividend arising from the combination of a fertility rate of close to 2.0 and policy leading to net immigration. If and when the labor force begins to recover, the outcome will yield a demographic dividend that can either be put into a reserve fund or distributed. The third option available – ad hoc adjustments – is easily understood to be the worst approach, since the absence of transparency and built-in incentives is an inefficient way to deal with the situation, as already argued. Nevertheless, this is the approach most often availed in the context of UPPS-DC designs. The dimensions of this discussion are summarized in Table 2.

It is important to note the advantage of the UPPS-FDC design in this context, compared with the other three UPPS designs –it is constructed as an individual lifecycle insurance scheme that depends solely on the economic choices of individuals, other than mandated participation in the UPPS. As discussed under the topic of rates of return, this advantage of the UPPS-FDC design should nevertheless be weighed against the specific caveats regarding institutional design and the need for supervision.

**Table 2: Distinguishing characteristics of UPPSs**

	<b>Maintenance of affordability, financial stability, and sustainability in response to demographic and economic dynamics</b>	
<b>Determinants of the rate of return</b>	Requires ad hoc interventions to modify the benefit promises, including implicitly reducing the commitment to younger generations to avoid breaking commitments to current pensioners	Automatic adjustment through the rate of return on accounts and benefits and life expectancy in the annuity calculation
<b>Financial investments</b>	FDB	FDC
<b>Nonfinancial human capital investments and labor supply</b>	NDB	NDC

Source: Based on Góra and Palmer 2004.

### 5.6.2 Adequacy and affordability

In a UPPS-DC, at the micro level the replacement rate for the average contributor is determined by the average number of years worked up to retirement– in expression (1) this is years of work underlying the

account balance at retirement, and the average life expectancy at retirement; i.e., expression (2) (Palmer 2013). On an individual basis it is individual  $i$ 's earnings history:

$$(4) \quad K_{i,\tau} = \sum_{t=1}^{\tau} \bar{w}_t L_{i,t} \prod_{t+1}^{\tau} (1 + \alpha_t)$$

that matters in the context of expressions (1) and (2). To simplify the presentation, assume that the individual is an average wage earner. Yearly earnings are then determined by time worked,  $\sum L_{i,t}$ , which is simplified to the number of years worked, realizing that years may be part- or full-time in practice.

Regarding adequacy, it is obviously the individual's choice between work in the formal labor force versus informal, nonmarket-remunerated work and leisure time that determines the magnitude of the savings in (1) at retirement. Together with the average life expectancy of the individual's birth cohort at the chosen age of retirement, these determine the magnitude of the generic UPPS lifecycle insurance (i.e., expressions (1) and (2)).

In summary, adequacy is intertwined with affordability – and both are dependent on financial sustainability as implicit in expression (3) and the discussion around it. The purpose of connecting the individual's results to an individual wage-based contribution is to support economic efficiency, the central line of argument up to this point. This is done most efficiently through use of a defined contribution rate and individual accounts– i.e., UPPS-FDC and UPPS-NDC designs. The important challenge is to set the appropriate contribution rate from the outset – and in the DB context, defining an affordable benefit rule that yields an adequate benefit.

## **6 NDC as the generic UPPS**

This section summarizes the discussion in the preceding sections regarding four UPPS designs. It concludes with a discussion supporting the claim that UPPS-NDC is the generic UPPS.

### **6.1 *Accounts, transparency, and efficiency***

All other things equal, individual labor supply decisions ultimately determine the scale and distribution of outcomes of all UPPS designs of national, universal lifecycle longevity insurance schemes. This is what tips the scales in favor of UPPS-DC. UPPS-DC individual accounts provide a transparent framework for incentivizing individual labor supply decisions at the margin between formal labor supply as opposed to informal work and leisure. The argument is as follows: accounts engender transparency, which together with the defined contribution – which is and is perceived as a contribution and unit saving but not a tax – transforms a unit of consumption today when young into a unit of consumption tomorrow when old.

### **6.2 *Summary of the arguments favoring UPPS-DC over UPPS-DB***

The transparent accounts of UPPS-DC support communication of the message that a full working life with contributions provides a fair universal insurance against the risk of living much longer than the average person. Policy makers set the UPPS-DC parameters to provide an affordable and financially sustainable framework for a full working-life career. The message of an efficient UPPS is to communicate

that it is individuals' years of work and contributions that determine the scale of the payout at the end of their working career. A UPPS-DC is economically efficient because it incentivizes this desired behavior, at the margin tipping the scale in favor of a longer working life and an "increasingly more adequate" pension, which also provides a benefit by incentivizing marginal decisions that increase the nation's overall supply of labor.

In the UPPS-NDC design, with the DC foundation of transparent accounts and the accompanying contribution to efficiency, NDC works dynamically to "manage" demographic and economic risks through automatic stabilizers. NDC is thus financially stable and as a result an adequate pension – a function of one's own efforts – is by definition affordable under the same framework within and across cohorts. A UPPS-NDC is thus the benchmark for UPPS-NDB designs. Likewise, a UPPS-FDC, with its straightforward coupling between individuals' account values and the retirement annuity, is the benchmark for UPPS-FDB designs. It is worth emphasizing that no other way exists to increase the UPPS average replacement rate than through a reduction in the remuneration of economic activity of the working generation (today or tomorrow).

UPPS-FDC schemes enjoy the advantage of being financially sustainable by definition. Nevertheless, they are subject to considerable volatility and uncertainty regarding the future of the economy and financial markets. In a UPPS-NDC, financial sustainability is achieved through automatic stabilizers – i.e., wage-sum indexation that adjusts for a declining working-age population and use of life expectancy, the latter being an advantage shared with a UPPS-FDC. A UPPS-NDC maintains a stable ratio of pension expenditures to GDP by automatically dealing with the macroeconomic demographic risks arising due to low fertility rates and the subsequent decline in working-age population. The construction of the benefit – as an annuity based on the individual's balance in the NDC account and life expectancy at retirement – not only incentivizes postponed retirement, it also "balances" the effect on pensions of increasing life expectancy.

What characterizes UPPS-DB designs is that they encompass many sources of nontransparent redistribution between participants – whereas UPPS-DC designs provide a one-to-one link between forgone consumption (savings) today when working and consumption tomorrow in retirement. UPPS-DB designs either intentionally break with or have a higher risk of breaking with the criterion of intragenerational fairness; i.e., some get less than and others more than what they pay for. It is particularly unfair and inefficient when a built-in redistribution works in favor of those working fewer years at the expense of those with longer working careers.<sup>9</sup> To the extent that such arrangements put financial stress on the pension scheme, this increases the risk of needing to use resources of the younger generation at the expense of intergenerational fairness. The automatic stabilizers of UPPS-NDC and the design of UPPS-FDC minimize the risk of intergenerational fairness by definition.

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<sup>9</sup> For special cases, if a society decides that it is just, additional regulations outside the UPPS are more efficient than intra-UPPS solutions. A good example is the case of "bridging pensions" implemented in Poland in 2009.

This chapter's assessment of the four UPPS designs – and how they fulfill the criteria of transparency, efficiency (incentivizing desired behavior), intra- and intergenerational fairness, affordability, financial sustainability, and adequacy – is that a UPPS-DC performs better than a UPPS-DB on all counts. Proponents of the UPPS-DB design often argue that its virtue is that policy makers can craft different distributional rules, sometimes well-motivated but often not. In both cases they aim at goals here and today adversely affecting UPPSs' long-term generic goals. The UPPS framework and criteria presented here explicitly support the principle that all social distributional policy should be institutionalized separately from the UPPS in the context of the goals of a nation's tax-transfer policy –including the minimum income/pension guarantee for the elderly.

Summing up the general economic picture, a UPPS's overriding characteristic is that it covers, regardless of design, everyone in a country with the same set of rules.

The UPPS has two fundamental economic goals: (i) microeconomic – it provides an institutional mechanism meeting the need for individuals to transfer income over the lifecycle from years of work to years of retirement, referred to as consumption smoothing; and (ii) macroeconomic – in the perspective of a closed economy, it provides an institutional mechanism that in every period allocates current GDP between remuneration of production factors (labor and capital) and financing pensions. In the context of an open economy, the latter statement is modified to the extent that international assets share in pension portfolios.

To a significant extent the macroeconomic process surrounding pensions reflects the dynamics of the demographics of a country. Not yet addressed is how long-term demographics can be more precisely managed through funding in the context of the UPPS, the topic of the next section, which motivates the claim that a UPPS-NDC is the generic form of a UPPS.

### *6.3 UPPS-NDC as the generic form of an UPPS*

This section asks the question: What is the best strategy for introducing a UPPS in a young, emerging economy with a large informal labor force? The answer is NDC because as an account-based UPPS it can combine NDC with FDC, which is especially useful in the context of an emerging economy, but also for using financial markets in conjunction with cyclically repeating booms of birth cohorts.

Begin with the case of an emerging economy – which covers a majority of the world's population. Implementation of UPPS-FDC (or UPPS-FDB) takes 40+ years. The full process of covering the entire working-age population as it becomes formal takes even more time. On the other hand, the contributions of the first generation of savers do not need to be converted into pensions fully until up to 15+ years after retirement on average.

In the initial decades, a dual process will operate: in about 20 years the fertility rate will decline to around 2.1, while the economy will continue to formalize. Together, these two dynamics constitute the so-called "double demographic dividend." The superiority of NDC in this context is that individual accounts allow the system to (i) keep track of the liabilities to contributors, and (ii) provide a rate of

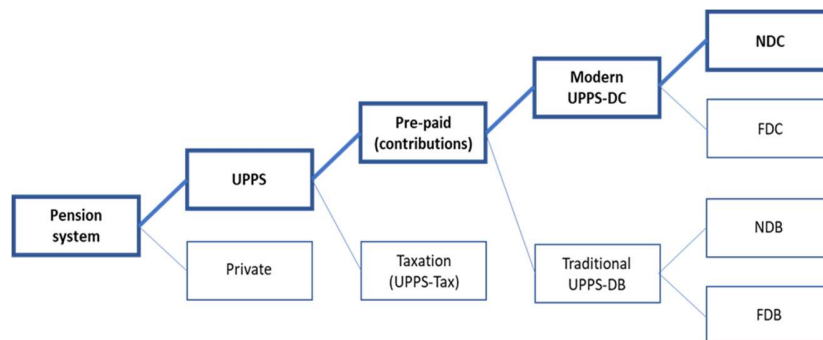
return (Góra 2013). The liabilities can be used in part to finance minimum pensions to the current elderly. These can be transferred to an NDC fund that purchases NDC bonds. The NDC bonds are issued by the government for infrastructure, but also to finance private entrepreneurial capital investments. The bonds can, for example, be perpetuities, amortized in the future when needed to cover an increasing number of pensioners (Larsson, Layero, and Palmer Chapter 23).

Another example is a reserve fund in a country that has a large baby-boom “generation,” where their offspring and their offspring’s generation of children create repeated booms at intervals going forward in time (with an otherwise fairly constant fertility rate of about 2.1 children per woman). In this case the cyclical dividends are funded in the NDC reserve fund and drawn upon to finance the large “generation” when they become pensioners. Sweden is an example of a country that has done this (Palmer and Könberg Chapter 2).

#### 6.4 Looking back at the historical development of UPPSs since WW II

Note in closing that the pay-as-you-go (“public”) versus funding (“private”) nomenclature used in the pension world since World War II is based on a two-way distinction that fails to recognize that a public scheme can be either a nonfinancial or a financial DC. More generally, that nomenclature completely misses: (i) the fundamental role of a UPPS in providing lifecycle longevity insurance, characterized by the criteria discussed herein; and (ii) the distinction between UPPSs and the private schemes that emerge to provide insurance for subgroups of the working population. Figure 1 illustrates the evolution of thinking on pension schemes as presented in this chapter.

**Figure 1: The evolution of thinking on public pension schemes**



This evolutionary path enabled fulfillment of the individual lifecycle model of consumption and saving in the context of providing universal longevity insurance to the population of a country. Progress has meant bringing the properties of financial sustainability and affordability, economic efficiency, and intra- and intergenerational fairness – all properties believed by many, and hopefully most, to constitute a package of desirable properties of a UPPS – that together make and protect adequate universal public pensions over a continuum of cohorts and for the whole of a society.

## 7 Conclusions

A UPPS is a government-mandated lifecycle savings scheme that provides insurance covering the longevity risk in old age. It covers the entire population of a country with the same rules for all. In the long term, the UPPS is an institutional structure whereby a claim on current GDP “pays” or is “traded” for a claim on future GDP. From the individual point of view, this trade of individual claims on GDP in time is the microeconomic essence of the act of saving. In the macro perspective, these savings can be invested through the financial market or transferred to other individuals for the purpose of consumption.

One of the stimuli for writing this chapter was to replace the post-war dichotomy of pay-as-you-go (which implies “public”) versus funding (which implies “private”) with the double dichotomy of financial versus nonfinancial and defined benefit versus defined contribution. Why this goal? The answer is that the “old-school” nomenclature misses two fundamental points. First, a UPPS is a publicly mandated universal lifecycle longevity insurance. Second, in today’s world the double dichotomy can be easily defined with the four designs discussed in this chapter. The word “private” does not play any role in this context. The four schemes of relevance are all publicly mandated and differ from each other through their designs. However, they may have functions that can be contracted out to privately managed companies, such as portfolio management.

In the context of the economic framework of this chapter, a UPPS design is “fully funded” if the design is inherently financially sustainable over generations. It is robust to changes in the exogenous demographic and economic parameters, and by virtue of its design “manages” these risks. This explains why UPPS-DC designs are superior to their DB counterparts. This is a key conclusion of this chapter, for even if UPPS-DB designs can provide the same level of benefits under a single set of exogenous risks, in a UPPS-DC (geared to a reasonable ratio of average years in work to years in retirement), the time-independent design “manages” the demographic and economic risks by balancing long-term assets and liabilities, thereby giving intertemporal financial equilibrium and autonomy from the government budget. And UPPS-DCs’ long-term financial sustainability and economic efficiency are preconditions for affordability – and reduce the uncertainty of outcomes – not the least in comparison with a UPPS-DB.

Although the *raison d’être* of the UPPS is to provide longevity insurance for all through individual contributions, the belief promoted here is that targeted prevention of poverty in old age is most efficiently dealt with through tax-transfer policy, rather than as a component clouding the basic function of the UPPS. Keeping policy outside frees policy makers to cope with the challenges of anti-poverty instruments where the needs can change with the times. In this spirit, countries that adopt UPPS-DC designs need to think through the construction of exogenous, tax-financed social safety nets or lowest means-tested, pension-level guarantees, and introduce policy-motivated, tax-financed account add-ins.

Both FDC and NDC schemes perform the basic function of a lifecycle longevity insurance scheme, transferring consumption from the working phase of the lifecycle to the retirement phase, with a rate of return based on the growth of the economy. Both are transparent, economically efficient, fair, and



financially sustainable by virtue of their design. The UPPS-NDC is nevertheless arguably the generic UPPS, since it focuses solely on the intertemporal transfer of consumption.

That said, compared with a UPPS-NDC, a UPPS-FDC provides the opportunity to harness positive effects through high yields for individuals (if assets are successfully invested abroad), but an FDC also involves higher costs of administration, supervision, and a design that minimizes the risk of fraud.

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