

## CAN NOTIONAL ACCOUNTS SAVE THE FRENCH PAYG SYSTEM?

*The French Pay-As-You-Go (PAYG) pensions system is faced with a major challenge: how can it absorb the demographic shock resulting from the retirement of the baby-boom generations and the increase in life expectancy? After several reforms reconfiguring the system, restructuring the current systems in favour of one based on notional accounts is now in debate. Using the CEPII's OLGAMAP model, we evaluate the effects in terms of pension financing, redistribution between generations and institutional transition. We show that, even if it makes the system easier to understand and to adapt to future demographic and economic fluctuations, the notional accounts system does not provide new solutions for the financing of pensions, being still based on the question of the choice between increasing contributions, reducing pensions and inciting the increase of the average retirement age.*

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2010 promises to be the year of a major reform of the French pensions system. This system is based on a PAYG financing: today's contributors finance the pensions of today's pensioners and at the same time acquire rights to a pension that will be financed by tomorrow's contributors. It was not designed to deal with a demographic shock such as the one expected for the French population in the next fifty years. If there are no new reforms, the continual extension of life expectancy will lead to an increase in the retirement length that will affect the system's balance. In addition, the mass retirement of the baby-boom generations between 2005 and 2030 will significantly reduce the ratio of the number of contributors for each pensioner, even if, unlike its neighbours, France can rely on a fertility rate close to the generation renewal rate. After several *parametrical* reforms, a transition to a notional accounts system is now in debate. In this system, which has

already been introduced in Sweden and Italy, each individual's pension is calculated so that the value of the pension that he or she will receive during retirement is equal to the contributions that he or she has paid. Therefore, the basic principle is modelled on capitalisation, since contributions paid each year are virtually credited to an individual account. However, the system is still a PAYG one, which protects it from the uncertainties related to the evolution of financial markets rate of return. Such a reform could also be the opportunity to transform a system, in which a multitude of funds with different operating rules coexist, in a more uniform one, both simpler and more transparent. It would also be able to automatically take into account any increase in life expectancy or change in the rate of economic growth in the calculation of pensions.

Antoine Bozio and Thomas Piketty<sup>1</sup> have recently defended the transition to a notional accounts system. The Conseil

1. A. Bozio & T. Piketty (2008), "Pour un nouveau système de retraite – Des comptes individuels de cotisation financés par répartition", Cepremap.

d'Orientation des Retraites (COR) (Pensions Advisory Council) has also studied this question, on a request from parliament. In its seventh report, the COR presents the technical and legal clauses for the transition to this kind of system as well as several assessments carried out by its general Secretariat (on the basis of a stylised model), by INSEE (assuming an immediate application of the new system) and by the Caisse Nationale d'Assurance Vieillesse (National Old-age Insurance Fund) (only for the general scheme). However, none of these studies can be used to analyse the effects in terms of the the pension funds financing, inter-generational redistribution and institutional transition in a general equilibrium context, integrating economic interactions. In this goal, we have used an updated version of the OLGAMAP model developed at the CEPII<sup>2</sup>. The main advantage is to take into account macroeconomic feedback effects. Thus the reforms' feedback effects on the capital and labour markets as well as on growth are computed into the model and not defined exogenously, which will finally affect the reforms' impact on the financial situation of the pension system.

## ■ Recent reforms are important but insufficient

The French pension system had been created 45 years ago and undergone several reforms aimed at increasing its generosity (creation of a minimum retirement income in 1956, increase in the general scheme's replacement rate in 1971 and reduction of the legal retirement age to 60 years in 1982). The 1991 white report on pensions highlights growing awareness of the financing problem in the future. There have been several successive reforms since then. Amongst them, the 1993 Balladur reform reduced the general scheme's overall generosity by progressively increasing the contribution time necessary in order to get the full replacement rate, by increasing the number of years taken into account when calculating the reference wage and by indexing the pensions and wages taken into account when calculating the reference wage on prices rather than on wages. This reform was extended to other schemes (particularly those for public employees) by the 2003 Fillon reform. Furthermore, this reform provided a mechanism for almost automatically increasing the legal contribution length according to increases in life expectancy.

Nevertheless, various assessments of the financial needs after the reform (COR<sup>3</sup>, DREES<sup>4</sup>) still suggest that, even if the 2003 reform is totally applied, it will not be sufficient to guarantee the sustainability of the pension schemes.

According to our simulations (see table 1, reference scenario based on the assumptions described in detail in box 1), the financial needs of the current system (difference between pension expenditures and contributions with respect to GDP) progressively increase with the mass retirements of the last baby-boom generation reaching more than 2% of GDP in 2050. The accumulated deficits then result in a pension schemes' debt of more than 25% of GDP (table 1, reference scenario). Pension expenditures should increase from about 12% of GDP in 2005 to nearly 15% in 2050. These changes can be explained by the large increase in the number of pensioners whilst, at the same time, the number of working people remains constant. Between 2005 and 2050, the number of pensioners will increase from 5 to about 8 for every ten working age people. Over the same period, pension expenditures as a share of the GDP will "only" increase by 24% due to the huge decrease (-22%) in the ratio of the average pension to the average wage of working age people at that time, resulting from the application of recent reforms, especially the indexation of pensions on prices.

## ■ Notional accounts: towards a complete remodelling of the system

A notional accounts system calculates the pension so that the discounted value of the pensions received is equal to the value acquired by the contributions paid. The simplicity of this rule is attractive. However, it highlights the fact that the transition to such a system will not, in itself, resolve the problem of pensions financing: it will depend on the choice of parameters in the new system, in particular because (1) the change of system involves a transition period which could be long and (2) the dynamic equilibrium can only be achieved in a stationary demographic context.

We have simulated here a first scenario (A) with a gradual setting up of a global notional accounts system between 2015 and 2030, completely replacing all of the current schemes (basic and complementary)<sup>5</sup> in the long term. In this scenario, the rate of return on contributions is fixed at the payroll

1. A. Bozio & T. Piketty (2008), "Pour un nouveau système de retraite - Des comptes individuels de cotisation financés par répartition", Cepremap.

2. The reader will find a complete description of this model in J. Chateau, X. Chojnicki & R. Magnani (2009), "Disparities in Pension Systems and Financial Flows among European Countries", *Journal of Pension Economics and Finance*, 8(1). The model's main assumptions are presented in boxed text 1.

3. COR (2007), "Retraites : 20 fiches d'actualisation pour le rendez-vous de 2008".

4. C. Bac, C. Bonnet, O. Bontout & G. Cornilleau (2003), "Exercice de simulation de l'évolution à long terme du système de retraite", DREES, *Document de travail*, Série Étude.

5. This is an extreme assumption. In practice, the specific features of different schemes could be partly preserved using, for example, a second pillar specific to each scheme.

growth rate, the pensions discount rate is set at 1.8%, the pensions are indexed on prices (and therefore remain constant in real terms) and there is no ceiling on the contributions paid (see box 2). From 2016 onwards, each new pensioner receives a pension from the old system (and therefore depending on his or her socio-professional status) and a pension from the new notional accounts system (independent of socio-professional status). At the end of the transition period (in 2030) the notional accounts system enters fully into force and covers all pensioners drawing their pension.

Here, the simulations have been carried out in a closed economy framework, implying that the interest rate adjusts to balance the capital market at national level. This assumption allows us to take into account a release of the interest rate when the pension scheme's financial needs reduce as a result of the reforms. However, it ignores the worldwide nature of demographic ageing, although this will occur according to different timescales in the different world regions. In reality, in the coming decades, the interest rate will be influenced by world demographics, because saving depends on the proportion of the population of "mature" age according to the lifecycle hypothesis. Furthermore, national savings generated by a pension reform do not result in a reduction of the interest rate in an open economy framework but in capital outflows that reduce the expected benefits in terms of capital accumulation and growth. In order to assess the importance of the financial environment choice, scenario A has also been simulated in an open economy context, using the inter-temporal profile derived from the results of the INGENUE<sup>6</sup> model as the world interest rate.

With the closed economy environment, the simulation results show that gradually introducing a notional accounts system, as described above, would reduce the financial needs by around 0.7 points of GDP in 2050, which represents almost a quarter of the financial needs increase of the old system between 2005 et 2050 (Table 1, scenario A). This positive effect is determined by a reduction of the pension share in GDP (-0.7 points of GDP compared to the reference model) which results in a progressive reduction of the ratio between the average pension and the average wage (-25% between 2005 and 2050 against -22% in the reference model), while contributions with respect to GDP remain constant over the study period. In an open economy framework, the transition to notional accounts significantly reduces the effects due to lower GDP growth coming from capital outflows in order to obtain higher returns (Table 1, scenario A in an open economy). However, this open economy environment is questionable because it assumes perfect financial integration at world level.

In addition, France is assumed to be the only country to have carried out a pension reform. If we now assume that financial integration is limited, *de facto*, to the advanced economies and that they are all forced to implement reforms, then the closed economy framework seems the most reasonable. We will use this assumption from now on.

The extent of the effects resulting from setting up a notional accounts system depends mainly on the choice of parameters. Firstly, the contribution rate determines the system's overall level of generosity. Our simulations are based on the effective contribution rate applied in the current system (which corresponds to a contribution rate of about 22% in our simulation exercise), but the reform could permit to modify it if salaries wish, collectively or individually, to increase their contribution level to the pension system.

The system's two key parameters are then the rate of return on contributions and the pensions' discount rate applied at the time of drawing the pension. To ensure the system's viability, these two parameters must be less than or equal to the payroll growth rate. But uncertainties about productivity and therefore real wages are great. If we use a contribution rate of return and a pensions discount rate equal to 1.8% (while the forecast average annual payroll growth rate between 2005 and 2050 is around 1.9% in scenario A), then we get a reduction in financial needs of around half a point of GDP by 2050 compared to scenario A, resulting from a reduction in the replacement ratio (scenario B).

If we now consider an extreme scenario where the pensions' discount rate is null (scenario C), which simply amounts to determining the pension's value by dividing the capitalised value of individual contributions by the anticipated length of the retirement time, pensions are then severely reduced and their weight decreases by around 3.2 points of GDP by 2050 compared to scenario A. The pension scheme then produces surpluses over the whole period. Conversely, the notional accounts system could be configured to maintain the generosity of the current system and, consequently, its financial needs. Consequently, it is not the notional account system that reduces the financial needs, but the choice of the system's parameters.

## ■ Generosity and redistributive effects of notional accounts

One possible objective of the notional accounts systems could be to unify the existing schemes, in conformity with the simulations described above. Naturally, any such unification

6. INGENUE (2006), "The larger Europe: technological convergence and the labour migration", *Revue Économique*, 57(4), 823-850.

would have a different impact according to the categories of population (graph 1). In particular, the transition to a single system, as the one described above, gradually reduces the replacement rate for public employees; this reduction being all the more marked that the pension is drawn early. In fact, integrating the public employees' scheme into a common system under private law implies a system in which the calculation of a reference salary is based on all of the years of contributions rather than on the final salary. Furthermore, applying a unique contribution rate of around 22% in the new system would induce a strong reduction of the scheme's generosity for public employees given that the implicit overall pensions contribution rate currently exceeds 60% of gross pay in the public sector (employee contribution rate of 7.85% and implicit employer contribution rate of 55.7% in 2008 assuming that the scheme is in equilibrium)<sup>7</sup>. Even if such adjustments obviously cannot be considered, they point out the singularity of the current public employees' scheme, which is financed by the public budget and therefore by the general taxation, and the consequent difficulty of harmonising the public and private sectors.

For executives, the transition to the new system results in an increase in the replacement rates, which can be partly explained by the abolition of the social security ceiling in our simulations. The choice of a correct ceiling should then be the result of a choice between redistributive effects (limiting the highest pensions) and disincentive effects (a ceiling too low would lead to the development of additional pensions for the highest incomes). Finally, for non executives, the transition to the new system penalises those who draw their pension before 65 years but benefits those who draw it later. Due to their contributory aspect, notional accounts actually take long careers into account better and introduce a much more easily understood incentive mechanism for remaining on the

labour market than the current penalty system applied to replacement rate, even if that incentive obviously depends on an improvement in the labour market for older people.

## ■ Conclusion

The proposed transition to a notional accounts system seems attractive. Great clarity, self-adjusting mechanisms and an explicit link between contributions and pensions are just some of the advantages of notional accounts. Nevertheless, financial gains made by notional accounts over the next decades depend entirely on the system's configuration. This means that remodelling the system will not produce a miracle solution: once the possibility of increasing the contribution time has been exhausted, a choice will have to be made between the options of increasing contributions and limiting the system's generosity.

Of course, the assessments we have proposed are based on uncertain assumptions (demographics, technical progress, *etc.*). The nature of the financial environment plays a role that determines how financial needs are met. When confronted with these uncertainties, a notional accounts system has the advantage of better adaptability to the changes observed. It is this dynamic property that we should be looking for in the structural reform of pension schemes, rather than a miracle formula.

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7. However, part of this contribution also finances invalidity.

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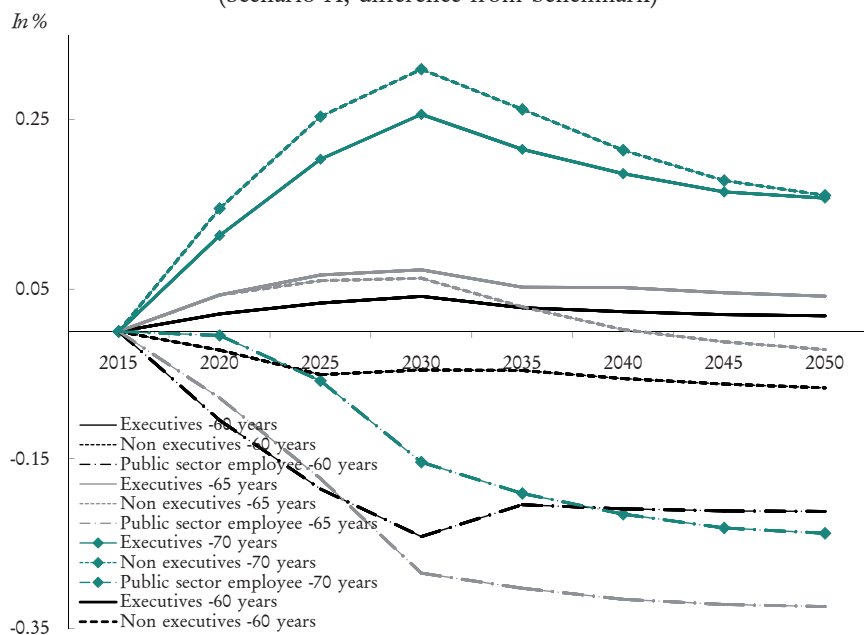
Table 1 – Comparison between the current system and the notional accounts system (in %)

	2005	2020	2030	2040	2050
<b>Benchmark scenario</b>					
Financial needs (in % of GDP)	-0.4	18.3	1.0	1.6	2.1
Debt of the public pensions schemes (in % of GDP)	-2.8	-7.0	-1.2	11.4	27.8
Public pension payments (in % of GDP)	12.1	13	13.8	14.5	14.9
GDP growth rate	1.9	2.1	1.9	1.9	1.8
Average pension/average wage (= 1 in 2005)	1.00	0.86	0.81	0.79	0.78
<b>Notional accounts (scenario A)</b>					
Financial needs (in % of GDP)	-0.4	0.2	0.8	1.3	1.4
Debt of the public pensions schemes (in % of GDP)	-2.8	-7.0	-1.9	8.5	20.5
Public pension payments (in % of GDP)	12.1	12.9	13.6	14.1	14.2
GDP growth rate	1.9	2.1	2.0	1.9	1.8
Average pension/average wage (= 1 in 2005)	1.00	0.86	0.79	0.77	0.75
<b>Notional accounts (scenario A open economy)</b>					
Financial needs (in % of GDP)	-0.4	0.1	0.9	1.6	2.0
Debt of the public pensions schemes (in % of GDP)	-2.8	-8.9	-4.1	8.4	26.2
Public pension payments (in % of GDP)	12.1	12.8	13.7	14.5	14.8
GDP growth rate	1.9	2.1	1.8	1.7	1.7
Average pension/average wage (= 1 in 2005)	1.00	0.85	0.80	0.78	0.77
<b>Notional accounts (scenario B: rate of return on contributions and discount rate at 1.8%)</b>					
Financial needs (in % of GDP)	-0.4	0.1	0.6	0.9	0.9
Debt of the public pensions schemes (in % of GDP)	-2.8	-7.0	-3.1	4.2	12.2
Public pension payments (in % of GDP)	12.1	12.9	13.4	13.7	13.7
GDP growth rate	1.9	2.1	2.0	2.0	1.9
Average pension/average wage (= 1 in 2005)	1.0	0.86	0.78	0.74	0.72
<b>Notional accounts (scenario C: zero discount rate)</b>					
Financial needs (in % of GDP)	-0.4	0.0	-0.3	-1.1	-1.9
Debt of the public pensions schemes (in % of GDP)	-2.8	-7.2	-7.3	-12.5	-23.4
Public pension payments (in % of GDP)	12.1	12.8	12.5	11.8	11.0
GDP growth rate	1.9	2.2	2.1	2.2	2.2
Average pension/average wage (= 1 in 2005)	1.00	0.85	0.73	0.64	0.58

Note: The reference model assumes no additional reforms to absorb the imbalances. The notional accounts model assumes a gradual introduction of the new system between 2015 and 2030. In scenario A, the contribution rate is about 22%, the rate of return on contributions is based on payroll growth rate and the pension discount rate is fixed at 1.8%.

Source: Authors' calculations.

Graph 1 – Change in the "average pension/average wage" ratio (Scenario A, difference from benchmark)



Source: Authors' calculations.

### Box 1 – The OLGAMAP model assumptions

The main assumptions are quite similar to those used in the 2007 COR forecasting exercise:

- central scenario of the demographic and activity rates forecast from the 2006 INSEE projections,
- convergence of the target unemployment rate at 7% in 2015 (COR low hypothesis),
- labour productivity growth rate of 1.8% over the whole forecasting period,
- complete application of the 2003 Fillon reform (the legal contribution period gradually increases to 41.5 years in 2020),
- scope: all of the basic and complementary schemes.

Conversely, the model differs by:

- a macroeconomic linkage between demographic changes, the working of the pension system and the macroeconomic environment,
- actual retirement ages depending on changes in activity rates: after 60 years, any reduction in activity rate is interpreted as retirement; after 75 years everyone has retired,
- the lack of explicit modelling of any solidarity mechanisms (non-contributory rights, derived rights and minimum pensions),
- a closed economic environment: no possibility to use capital inflows to improve the financial situation of the pension system; so the interest rate is endogenous.

### Box 2 – Choice of notional account parameters

Political decision makers have to make several choices if they introduce a notional accounts system:

- The contribution rate (constant over the period): it is set so that the mass of contributions coming from the old system at the start date of transition is constant..
- The rate of return on contributions: here, for the contributions paid at date  $t$ , we have chosen the average annual payroll growth rate between date  $t$  and 2050. In Sweden, the rate used is the average annual growth rate of wages; in Italy, it is the average growth rate of GDP (over 5 years).
- The pensions discount rate at the time of retiring: for the new system to be sustainable, this rate should correspond to the average growth rate of contributions over the period during which the pension is paid. As the latter is not known in advance, we have chosen a value of 1.8% in the basic scenario. In Sweden and Italy, the rates used are 1.6% and 1.5% respectively.
- The pensions indexation rule: indexation on prices means that we assume a relative high initial pension then a gradual falling behind of the level of pension related to the wage growth; indexation on wages means paying a lower initial pension. Here, we have chosen to index pensions on prices, as in the current system.
- The date of introduction of the new system and the transition period: we have assumed that the new system is introduced in 2015 with a linear transition period of 15 years. In Sweden and Italy, the transition period was 15 and 35 years respectively. During the transition period (and beyond for people who continue to draw pensions from the old system), the financial needs are generated by the previous system. We do not assume any temporary measures that can be used to balance the previous schemes.
- The social security ceilings above which no contribution is withheld, implying no right to a pension: we have used the simplifying assumption of an absence of ceilings. The introduction of a ceiling would modify the system's impact in terms of redistribution.
- The schemes concerned by the transition to a notional accounts system: we assume the gradual integration of all of the current schemes (basic and complementary schemes for private and public sector employees and self-employed) in a single notional accounts scheme.