How should a points pension system be managed?

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A points system, operating at defined yield, makes it possible to rethink how pension systems are managed. Instead of having to make repeated ad hoc changes to the parameters of the system, it is possible to define change rules that offer guarantees to future pensioners, as regards not only their entitlements but also the long-term sustainability of the system. In this brief, and based on simulations of a variety of shocks to the pension system, we study what management rules deserve to be chosen. Two rules absolutely must be selected: firstly the growth in the value of the pension point should match the growth in salaries; and secondly converting the points into pension should take into account the life expectancy of each generation (cohort). A third rule that is important for the long term, is the relationship between the rules for index-linking claimed pensions and the amounts of the pensions when they start being claimed. This rule should serve as a guide to managers so that they can steer the system towards an equilibrium that is not based on too low an index-linking of the pensions. Such management implies high institutional autonomy for the system, whereby the managers need to be accountable for the financial equilibrium and for the risks to pension revaluation.

- A defined-yield points system offers guarantees for pension entitlements through a strict rule for revaluating the value of the point based on growth in salaries.
- Converting the points into pension, at the time the pension starts being claimed, should explicitly take into account how life expectancy changes for each cohort.
- Systems that incorporate these rules are better able to absorb economic and demographic shocks, and thus to guarantee that they are financially sustainable.
- The index-linking of the pensions depends directly on the degree of advance on pension already granted on claiming, and on the rate of growth of the wage bill. It is up to the managers to choose the degree of advance on pension in order to guarantee a sufficient revaluation of claimed pensions.
- Pension management cannot be based entirely on index-linking rules. In addition to the need for having a reserve fund for smoothing out temporary shocks, the managers need to cope with the uncertainties regarding long-term growth and population growth rate.

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The reform currently being prepared by the French Government should result in a points system being put in place that operates at defined yield. In such a system, defining the rules for managing it is decisive in offering guarantees to future pensioners both on their entitlements and on the long-term sustainability of the system.

The public debate on this transformation of the way the pension system is managed is focused on the confrontation between: using rules; "automatic" management; and discretionary decisions by the system managers. This policy brief assesses the effects of the various possible rules for designing a defined-yield system on the basis of simulations. It then presents various possible management options, by discussing the respective parts that can be played by automatic rules and by trade-offs and choices to be made by the managers.

What is a defined-yield points system?

A defined-yield system

A defined-yield pension system is, like the current French system, a pay-as-you-go system in which the contributions from the working population directly fund the pensions of the retirees. It differs essentially through the way it is managed, in the sense that the guarantee offered to future pensioners does not relate to a fixed amount of pensions – as it does in defined-benefits systems – but rather to the yield or return on contributions, i.e. the relationship between the pension entitlements and the contributions paid in (COR, 2018). Since the equilibrium yield of a pay-as-you-go system is known (cf. encadré 1), a defined-yield system aims to offer as much pension as possible under the constraint of maintaining equilibrium. Offering a higher yield implies giving pensions that are not funded, and offering a lower yield procures a surplus of contributions for the manager of the system. In this regard, it is worth noting that in "defined-benefits" systems – such as the annuity systems of the current French system – the benefits are not really "defined": the formula for calculating entitlements is changed periodically by reforms, and, with the rules for index-linking them to inflation rather than to salary growth, entitlements are gradually devalued, with the aim of balancing the system (Blanchet, Bozio, and Rabaté, 2016).

A points system In a defined-yield points pension system, the link between the careers of the members (contributors) and the pensions is established on the basis of points: each year the worker builds up points proportionally to their contributions, and, at the time they retire, the accrued points total is multiplied by a conversion coefficient to calculate the retirement pension.

Three parameters govern how such a system operates: the **value of the point** gives the number of points corresponding to the contributions of the future pensioner. The **conversion coefficient** converts the sum total of the points accrued over the career into retirement pension. Once the pension starts being claimed, the pensions **revaluation rate** gives the annual change in pension amounts.

The term "points system" might suggest that it is an identical reproduction of the systems currently in place in France for the supplementary pension schemes (Agirc-Arrco or Ircantec). But actually, those points systems differ considerably in the way they are managed from a system having defined yield. In the French supplementary pension schemes, the key parameters are the purchase value and the payout value of the points, the payout value defining both the conversion of the points and the revaluation of the pensions(Vernieres, 2004). In a defined-yield system, there is a single value for the point, and it complies with a strict revaluation rule in order to guarantee the pension entitlements.

Designing a defined-yield system

What differentiates a defined-yield system from other points systems is thus indeed the rules that define the way the three preceding parameters change. Various important principles make it possible to understand how such a system operates.

The principle of equilibrium for the system is an essential principle for any management in that it guarantees long-term equilibrium between the pensions paid out and the contributions paid in. From the point of view of contributory fairness, it is also desirable for the value of the points to be stable over time, and for the contributions paid in at any two different times in the career to give the same pension entitlements. This is the idea behind the campaign slogan “each euro contributed gives the same entitlements for everyone”.

Complying with this contributory fairness requirement has a major implication as regards the value of the point: that value must be index-linked to mean salary. That index-linking guarantees that the mean salary gives an entitlement to the same number of points, regardless of the period. A simple way of guaranteeing this index-linking is to set the value of the point proportionally to mean salary: for example, it is possible to set the value of the point initially to 1 euro – 1 euro contributed gives 1 point – which always makes it possible to be able to give a counter-value in euros to the sum of the accrued points (e.g. 1000 points built up with a point value that has gone up to 1.5 euros gives an equivalent of 1500 euros in pension entitlements).

Box 1 : The yield of a pay-as-you-go system

In order to understand how a defined-yield system operates, it is worth remembering that any pay-as-you-go system can offer a positive yield or return on contributions, i.e. offer retirement pensions that are higher than the contributions initially paid in.

The yield of a pay-as-you-go system. It was the economist Paul Samuelson who, in a famous article (Samuelson, 1958), showed that pay-as-you-go systems could offer a positive rate of return to contributors by means of the intertemporal transfers that the system makes possible.
He demonstrated this effect with a simple case in which people live for two periods: they work and contribute during the first period, and receive a pension from the contributors during the second period. If the contribution rate is fixed, then the overall amount of the contributions increases during every period and its growth rate is equal to the growth rate of the wage bill. Thus, if g is the growth rate of mean salary, and n is the growth rate of the population, then the wage bill, and more importantly the amount of the contributions, is multiplied by $(1+g)(1+n)$ every period. The constraint of equilibrium for the pay-as-you-go system requires the contributions to be equal to the pensions paid out, and therefore, for each euro paid in during the first period, a worker receives at the most $(1+g)(1+n)$ euros in pension. In more recent work, researchers have also shown that this yield of the system can be increased by changes in life expectancy (Settergren and Mikula, 2006).

A defined-yield system. The idea of designing a pay-as-you-go system having a defined yield is to use the definition of the yield in a system that is consistent with long-term equilibrium, and to define the pension entitlements as being the contributions paid in to which the yield of the system is applied. With such a definition of the entitlements, the system offers the maximum possible pension that is consistent with long-term equilibrium.

While the principle of contributory fairness governs the relative value of the points between two periods, the principle of equilibrium determines the way in which the points are transformed into pensions and how those pensions ultimately change. In addition to the accrued entitlements, the total volume of the pensions depends on life expectancy at the time of retirement, and on the choice of the index-linking of the pensions. The equilibrium of the system thus requires the conversion coefficient to depend on these two factors. Box 2 describes these mechanisms in detail. Thus, the conversion coefficient decreases – at a given retirement age – as life expectancy increases.

We should emphasise that this equilibrium principle does not imply that the entire life expectancy rise adjustment relates to the level of the pensions or to the age of claiming. A defined-yield system is compatible with a rise in the contribution rate that comes to offset the reduction in the pension calculation rate (theoretical replacement rate) with a larger accrual of points. The goal of raising the contribution rate is not to balance the system, but rather to increase the total amount of pension spending.

Revaluation of the pensions and advances on pensions

The last element of the system to be determined is the index-linking of the pensions. The defined nature of the system requires a commitment from the manager about the revaluation of the pensions. Three types of commitment are proposed: the pensions after claiming (after calculation) may be index-linked to prices, as in the current system, to mean salary, or to wage bill. In the latter two cases, the faster salaries or the wage bill change, the more dynamic the change in the pensions.

However, as indicated in box 2, a more dynamic change takes place to the detriment of a lower pension at the time of claiming. In order to attenuate this effect, it is possible to grant an advance on pension at the time of claiming that is then deducted from the revaluation. This lever genuinely enables the manager to adjust the pension amounts at the time of claiming. However, such an adjustment is not without risk: an advance that is too high, or that is based on an over-optimistic anticipation of growth, can result in the need to make revaluations lower than inflation in order to balance the system.

Automatic adjustment mechanisms: an evaluation by stress test

In order to test the sensitivity of the defined-yield system and of the current system to macroeconomic and demographic conditions, we adopted a micro-simulation approach (cf. box 3). We simulated individual pathways (salary, employment, retirement) to which we applied different pension calculation formulae. The pensions were calculated under different economic and demographic scenarios: in addition to a reference scenario in which the economy changed in steady-state manner, other scenarios were simulated, in which demographic and economic shocks took place. For each of the shocks simulated, we studied adjustment of the current pension system, in the absence of a parametric reform of the system, and adjust-

Box 2 : Conversion coefficient and revaluation of pensions

In a defined-yield system, the conversion coefficient is mechanically linked to the choice of index-linking of the pensions, and to the life expectancy at the time the pension starts being claimed. This box gives a detailed description of the consequences for the conversion coefficient of various options for index-linking the pensions.[a]

Index-linking pensions to wage bill. Generally speaking, the conversion coefficient depends on the ratio between the anticipated yield of the system and the planned revaluation. Since the yield or return of any pay-as-you-go system is equal to the growth in the wage bill ($(1+g)(1+n)$), it therefore suffices to index-link the revaluations of the pensions to that growth in order to have a conversion coefficient that is not dependent on the economic situation or on demographic change. The conversion coefficient that results from this rule for index-linking the pensions therefore depends only on the retirement age: the higher the life expectancy, the lower the conversion coefficient. This component of the conversion coefficient thus guarantees actuarial neutrality for the system. Advance on pension. The manager of the system might also want to propose higher pensions at the time of claiming, in exchange for lower pension revaluation: this is the mechanism of paying out an advance on pension. The pension revaluation $(1+\tilde{r})$ is then defined proportionally to change in wage bill:

$$1+\tilde{r}=\frac{(1+g)(1+n)}{1+s} \tag{1}$$

where the parameter s gives the degree of advance on pension. The higher the value of s, the higher the advance and the higher the conversion coefficient, but the lower the revaluation of the pensions. In particular, if s is set such that the pensions revaluation is in line with inflation ($\tilde{r}=0$), then the conversion coefficient is at a maximum rate. In the precise case when revaluation of the pensions is proportional to the change in wage bill, the conversion coefficient depends mainly on the degree of advance on pension. If this proportionality is not complied with, then the conversion coefficient that balances the system will also depend on the forecast growth in wages or in the working population.

Anticipated growth and revaluation of pensions. The conversion coefficient is calculated at the time of claiming of the pensions, i.e. at the time they are calculated and start being drawn for the first time, while the pensions are revaluated subsequently. At the time of claiming, i.e. of calculation, of the pensions, the information that is available is therefore incomplete. Using revaluation that is proportional to the change in the wage bill is therefore advantageous: the conversion coefficient does not depend on future change, and the equilibrium of the system cannot be affected by poor anticipation of the future growth in the wage bill. However, good anticipation of the growth in the wage bill is necessary in order to set the degree of advance on pension appropriately. There is a risk of negative index-linking if the degree of advance on pension is too high. It is then up to the manager of the system to choose the advance on pension that makes possible both a pension level that is sufficient at the time of claiming, and also a positive revaluation of the pensions.

[a] Managing defined-yield pension systems is described in detail in Chapter 1 of IPP Report No. 23 "Quelles règles de pilotage pour un système de retraite à rendement défini?" (2019).

ment of a defined-yield system in which the value of the point was index-linked to mean salary. This comparison serves as a reference rather than as a judgment of the current system which would naturally undergo parametric reforms, in the longer or shorter run. Here, the idea was to subject each of the systems to stress tests, similar to bank stress tests that are simulated by central banks, or to the simulations conducted in the literature on pension systems Auerbach and Lee (2011).

Adjusting the points system in the face of economic and demographic shocks

The demographic shocks that we considered were: a baby boom of magnitude similar to the post-war one; and a rise in life expectancy by five years (spread over a period of 50 years). The economic shock considered consisted in a fall or in a rise in salary growth, which either fell from 1.5% to 1% or rose from 1.5% to 2%.

Figure 1 shows the adjustment of the current system (on the left) and the adjustment of the defined-yield points system (on the right) in response to the various shocks mentioned. The ratio of pensions to salaries was normalised at 100 when the shock occurred: a rise in that ratio reflected an increase in the share of pensions in GDP. In all of the shocks simulated, the current system, with the legislation remaining unchanged, generated high variations in the share of pensions in the economy – and therefore high surpluses or deficits with the contribution rate remaining unchanged. This confirms the high sensitivity of the equilibrium of the current system to economic and demographic conditions. Conversely, in the points system, the ratio remained around its reference level for most of the scenarios considered. The shocks were therefore to a large extent absorbed by the adjustment mechanisms incorporated into the system, thereby guaranteeing very high financial stability.

Adjustment mechanisms in the points system

The various shocks considered were absorbed by the points system to different extents and at different speeds. In the event of a negative or positive shock on long-term productivity, the adjustment was total and almost immediate because the purchase value of the point and the revaluation of the pensions internalised that change in the yield of the system. Figure 2 shows such an adjustment for a negative productivity shock: the fall of five percentage points in the growth rate translated into a reduction of the same magnitude in the purchase value of the point and in the revaluation of the pensions.

If the case of a rise in life expectancy, the adjustment took place only via the conversion coefficient: every year, when the pensions were calculated and started being claimed, the rise in life expectancy resulted in a fall in the pension amount obtained by converting the accrued points for a given age (or in a rise in the age at which the same amount was obtained). The adjustment was total in the long-term, but was not immediate, because the rise in life expectancy was measured only once it had been fully achieved, and the conversion coefficient therefore adjusted late, without taking into account that the people starting to claim their pensions during the transition were going to live longer on average.

Finally, the points system considered did not absorb the fertility shock at all when the revaluation of the pensions was index-linked to mean salary. The choice of a yield based on mean salary disconnected all of the parameters of the system from demographic variations (except for life expectancy). The sensitivity of the equilibrium of the system to shocks was thus maintained in that case (see box 2).

The limitations of the pension management rules

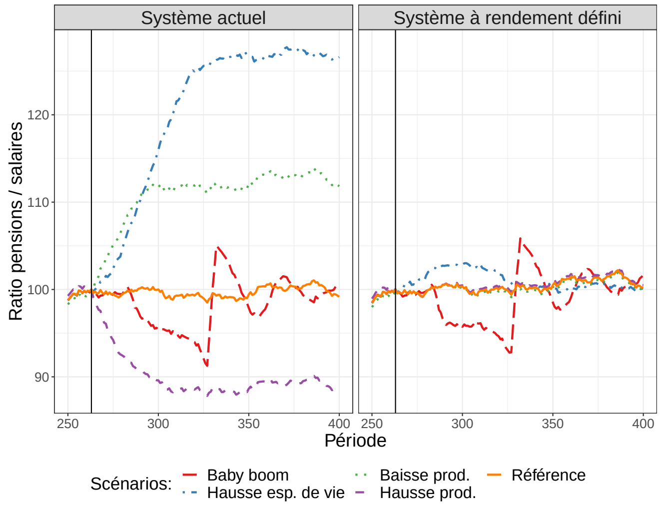
This sensitivity to variations in the wage bill constitutes a first limitation of the points system presented. Variations in fertility or in migration, in the short or long terms, would therefore require additional adjustments in order to maintain the financial equilibrium. One possible solution is to add a specific correction for demographic changes, by acting on the conversion coefficient and/or on the revaluation of the pensions. Another possibility is to put in place an overall adjustment mechanism similar to the one in the Swedish model that would adjust the entitlements upwards or downwards according to the financial prospects of the scheme (Settergren, 2003).

In spite of these possible avenues for improving the adjustment rules, the various simulations conducted and the international examples show that no system can guarantee the financial equilibrium under all circumstances and at every date. Indeed, such an equilibrium is doubtless not desirable: in the event of a short-term economic crisis or recession, adjusting the pensions downwards for safeguarding the financial balance could have harmful procyclical effects.

Finally, the adjustment mechanisms proposed can prove to be difficult to implement in practice. In particular, in the event of a negative shock on long-term productivity, the system makes provision for revaluation rates that are continuously lower than inflation. This is due to the advance-on-pension mechanism, which leads to index-linking below inflation if the growth rate is lower than the chosen reference.

The automatic management rules, however useful they are for incorporating the constraints of balancing the system into the way entitlements change, are therefore not self-sufficient and should be accompanied by trade-offs and choices made by the managers to avoid pension revaluations that are too low.

Figure 1 – Reactions to the shocks for the pensions-to-salaries ratio as a function of the system used



NB: The pensions bill to wage bill ratio is normalised at 100 at the time of the shock at t = 263.

Interpretation: In the current system, the ratio between the pensions bill and the wage bill had increased by 20% at the period t = 300 relative to its initial level measured at the time of the shock, in the case of a rise in life expectancy.

Source: PensIPP 0.1.

Box 3 : Methodology of the simulations

The simulation exercise from which the results presented in this policy brief come was based on a set of assumptions that are described in detail below. The methodology of the simulations is described in detail in Chapter 2 of IPP Report No. 23 "Quelles règles de pilotage pour un système de retraite à rendement défini?" (2019).

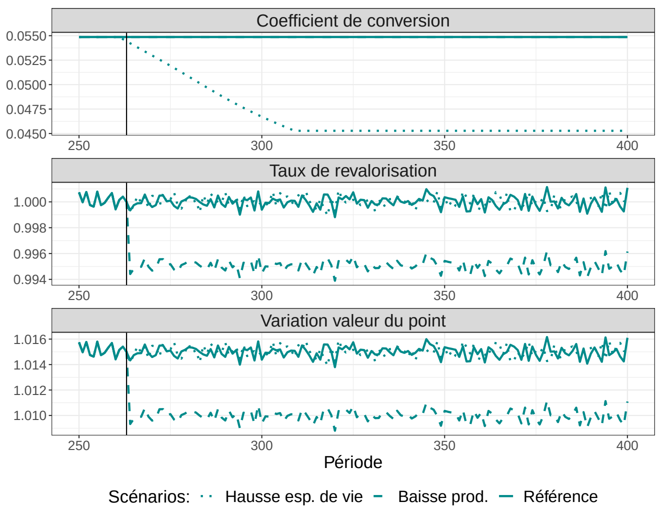
Simulating a stationary population: the micro-simulation conducted was based on a simplified population, in which each individual could be assigned any one of the following four states: private-sector employee, not in work, unemployed, or retired. The situation was drawn randomly according to the defined economic assumptions. If an individual was in work, their salary was a deterministic function of their sex and of their age. Each individual entered the labour market at 20 and remained in it to 65, which was the deterministic retirement age.

Simulation of the pension amounts: we made projections for the pension amounts in each pension system using the PENSIPP 1.0. micro-simulation model. That model uses the overall architecture of the Destinie model (Buffeteau et al. 2011): the first block simulates the family biographies (unions, separations, births and deaths) and the occupational biographies (periods of employment, of unemployment, and of not working, and salaries) in order to simulate the individual pathways to the horizon of 2060. A second module is devoted to modelling the retirement of the individuals in the biographic module. The model computes the amount of the pensions as a function of the retirement behaviour assumptions (retirement at a fixed age) and of the systems considered.

The systems simulated: We simulated a series of points systems that varied by the yields incorporated into them (wage bill or mean salary) and by the degree of advance on pension. They were compared to a current system, without any reform. We assumed a fixed contribution rate. That led to an adjustment to shocks that applied only to the pension entitlements for the points systems. In the simulated current system, any imbalance led to deficits or to surpluses.

Demographic and economic assumptions: the demographic and economic assumptions defined the scenario considered. For the reference scenario, the economic and demographic assumptions were as follows: the mortality and migration rates were set at their values measured in 2013 (Insee, France's official statistics authority) and were maintained unchanged over time. The fertility rate was set to maintain the growth rate of the population at 0.1%, given the mortality and migration rates. Economically, we applied the unemployment and in-work rates measured in 2013 (Insee) to all of the periods. They differed depending on gender and on age categories. The initial distribution of the mean salaries per age/sex applied at the beginning of the simulation was that observed by Insee in 2013, and the salaries then grew by 1.5% per year. Producing an economic or a demographic shock consisted in causing these initial assumptions to change.

Figure 2 – Adjustment mechanisms



Interpretation : In the event of a rise in life expectancy, the conversion coefficient of the points system goes from 0.0544 at the time of the shock to 0.0459 at t = 305.
Source: PensIPP 0.1.

How should a points pension system be managed?

Index-linking rules as guarantees

In spite of the reservations mentioned above on the possibility of putting automatic management in place, using index-linking rules in a points system is necessary, to guarantee both the entitlements of the future pensioners and also the equilibrium of the system. The essential rules in putting the new system in place would be:

1. Index-linking the value of the point to the growth in mean salaries. This rule should be written into the law, and should not be a parameter for adjusting to cope with changes in conditions. Otherwise, there is a risk of devaluating the pension entitlements, and of losing the guarantees for the contributory entitlements that the reform is trying to provide.

2. Taking life expectancy into account in changing the conversion coefficient is essential for maintaining the equilibrium of the system, and the first rule of index-linking the entitlements will not hold up without the

retirement life expectancy being taken into account automatically and progressively.

3. Taking the revaluation of the pensions into account in defining the conversion coefficient.

Choosing the degree of advance on pension

Among the management choices facing the managers is the degree of advance on pension to be granted at the time the pension starts being claimed. The higher the advance on pension, the higher the pension on claiming, but the lower the subsequent revaluations of the pensions. Choosing the degree of advance on pension is thus a trade-off between a risk of under-index-linking the pensions and maintaining a high level of pension at the time of claiming.

Our proposal here is to indicate to managers what revaluation of the pensions is implied by equilibrium. In the light of the preceding recommendations, default index-linking of pensions to the change in the wage bill minus the advance on pension already paid out on claiming would provide guidance for managing the system.

The current system implicitly has a high degree of advance on pension, resulting in replacement rates on claiming that are high and in subsequent revaluations of the pensions that are at best at inflation level – and regularly below inflation in recent years. The advance on pension implicitly granted in the current system would lead to a major risk of pensions being under-index-linked.

It would be desirable to be able to guarantee pensions revaluation that at least keeps up with inflation. One solution consists in progressively reducing the degree of advance on pension so as to reduce the risks of under-index-linking.

That would generate a reduction in the conversion coefficient at a given retirement age, in exchange for stronger guarantees on the revaluation of the pensions.

The need for a reserve fund

The stress tests conducted in this study show that the index-linking rules cannot, or indeed should not, have immediate effects. The effect of a negative shock will therefore be to put the system into deficit temporarily. To avoid adjustments that are too sudden, it is necessary to smooth the chocks out over several years. To this end, the use of a pensions reserve fund appears essential, such a fund aiming to guarantee long-term budget equilibrium and to facilitate absorption of the temporary demographic and economic shocks.

A criticism often levelled at using reserve funds for publicly funded pension systems is their possible effect on public finances. For example, it has been emphasised that building up the U.S. Social Security Trust Fund facilitated US federal deficits(Smetters, 2004). In the European context, it could also be argued that a pensions reserve fund would have a negative impact on the capacity of the State to cope with economic crises and recessions, since, under the Maastricht rules, its deficit capacity is defined as a balance for all of its government departments and agencies.

However, such criticisms do not seem to us to be sufficiently strong to reduce the advantage of long-term management with a reserve fund that would very specifically serve to guarantee the equilibrium of the public finances in a much more credible way than in the current situation.

Budgetary autonomy for long-term management

Using reserve funds only has any point if the managers are made accountable for the long-term equilibrium of the system. To do that, a form of budgetary autonomy needs to be guaranteed that defines the conditions for balancing the system: any temporary deficit should be funded entirely by the system itself, and thus by lower pensions. The managers will therefore have to genuinely manage the system by deciding, with caution, to build up sufficient reserves to cope with the various shocks. If the system is not managed cautiously, lower pension revaluations will then have to be applied until it returns to equilibrium.

Such budgetary autonomy should be accompanied by a series of indicators on the sustainability of the system, the risk of under-index-linking the pensions, and the degree of coverage of the commitments of the system. Rather than having automatic rules, better informing the managers about the sustainability risks, and about the implications on the revaluation of the pensions would be the best way to facilitate trade-offs and choices whose consequences will have to be borne by the future pensioners.

Conclusions

This policy brief is based on a major piece of work aiming to simulate shocks to the pension system in order to stress test various management rules. Rather than reducing the choices to an over-simplified contest between discretionary management and fully automatic management, we show the importance of having index-linking rules for the system, without which no long-term management is really possible, but we also show their limitations and the importance of trade-offs and choices made by the managers on managing the risks inherent to the pension system, in particular the unknown quantities about how productivity growth and demographics will change in the future.

Reference study

This policy brief is based on IPP Report No. 23: "Quelles règles de pilotage pour un système de retraite à rendement défini?", produced by Antoine Bozio, Simon Rabaté, Audrey Rain and Maxime Tô (2019).

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