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Replacing the Spanish PAYG Pension System for a Worker's Backpack

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EXECUTIVE SUMMARY

OECD economies are going through an ageing transition in the incoming decades. Between 2020 and 2060, the ratio between persons aged 15-64 years old to persons older than 64 years will increase from three to almost 2 by 2060. Among them, the Spanish economy 'is different' only in that its ageing transition is one of the most severe, the employment rate is relatively low, and its Pay-As-You-Go (PAYG) pension system is one of the most generous for such an ageing population.

The existing PAYG 'intergenerational contract' between the working and retired populations can only be made sustainable either by defaulting on the promises to retirees, severely curtailing their pension benefits (delaying retirement age and/or reducing pension payments), or the promises to those employed, with a severe increase of their contributions, a tax hike that will seriously damage the competitiveness of the economy, or a combination of both; i.e. reneging to all existing promises.

To avoid this scenario, the authors of this *Policy Brief* propose a profound revision of the system that implies a transition to a 'funded' *defined contribution* (DC) system that also protects those who lose their jobs: the so-called 'Worker's Backpack' system[1].

Pension reforms introduced in 2011 and 2013 pointing in this DC direction were abandoned and the current resource to transfers from the central government budget is a distraction that does not solve the underlying problem, while the recently introduced indexation of pension benefits in an inflationary environment is a dangerous step back. As the Spanish Independent Fiscal Institution recognizes "the expected increase in healthcare and pension spending as a result of the ageing population is one of the major risks for the sustainability of (Spanish) public finances in the medium and long term" (AIReF, 2022).

Our enquire provides a novel quantification to these statements, showing the welfare costs for the current and future generations of maintaining the current system, as well as the welfare benefits of a system overhaul with the introduction of a 'Worker's Backpack' (akin, but more substantial, to the one introduced in Austria in 2003). We show that, if properly designed, it can outperform standard DC pension systems in terms of social welfare and economic efficiency.

1   Note that it cannot rely on immigration, since it can temper the ageing transition but it is unlikely to increase average productivity to cover the excess burden that a PAYG system faces.

The basic features of a Backpack (BP) employment fund are: *i)* it is a fund contract with the employee, which accumulates the individual savings of a basic payroll tax (the BP contribution rate), while working; *ii)* it is transferable across jobs and can be used during periods of unemployment and finally as a pension fund; *iii)* it earns a market interest rate (it can be public or privately managed), but there are restrictions in its use (e.g. additional individual contributions may be restricted), and *iv)* it can be withdrawn or converted into a pension payment (annuitization) upon retirement.

Nevertheless, the major challenge that an overhaul of the pension system faces is the transition from the current to the new system. In fact, at the root of the opposition to pension reforms is the – selfish, but comprehensible – resistance to pay the costs, and the ageing transition increases reform costs.

In this *Policy Brief* we demonstrate that it is possible to implement a 'worker's backpack' system in Spain, so that there are no losers: the large economic and welfare gains of having a BP system in the long run outweigh the short-term costs of compensating the current generations (retirees with pensions and employed with PAYG claims).

The debt legacy cost is not trivial (we estimate circa 3.4xGDP), yet future generations would gain if the existing PAYG liability were replaced by the 'BP reform legacy debt' (we estimate the equivalent gain of a 36% increase in lifetime consumption).

We arrive to these conclusions after developing a highly sophisticated simulator of the Spanish economy, which uses the demographic projections made by the INE (Brogueira de Sousa, Díaz-Saavedra and Marimon, 2022).

The 'worker's backpack' system also has other advantages, as it will help to integrate the labor market by making all employees (with temporary or permanent contracts, as well as self-employed) part of the BP system, thus improving labor mobility and allocation.

1. Introduction

During the second half of the 20th Century, many countries implemented or extended PAYG pensions, which made this type of retirement pension scheme a pillar of Social Security systems in most advanced economies. During the same period, OECD economies grew on average by 3.1% yearly. In the first 20 years of the new Millennium, the same economies grew by 2.0% per year. These countries' population grew by 0.9% yearly from 1970 until the end of the century, and population growth has been slowing down ever since, to an average of only 0.65% since the year 2000. The latter trend, caused by demographic changes (increases in longevity and the decline in fertility rates), is slow moving and forecasted to continue in the coming decades, declining to less than 0.1% by 2050.[2] Another way of looking at this ageing process, particularly useful when thinking about retirement financing, is depicted in Figure 1. The figure shows the forecast for the 'old age dependency ratio' in the next four decades. Between 2020 and 2060, the ratio between persons aged 15-64 years old to persons older than 64 years will increase from more than three workers for each person older than 64, to almost 2 'working age' person to each 'retiree' by 2060.

Figure 1. **Ratio between number of persons 65 years old and over and persons aged 15-64 in OECD economies**
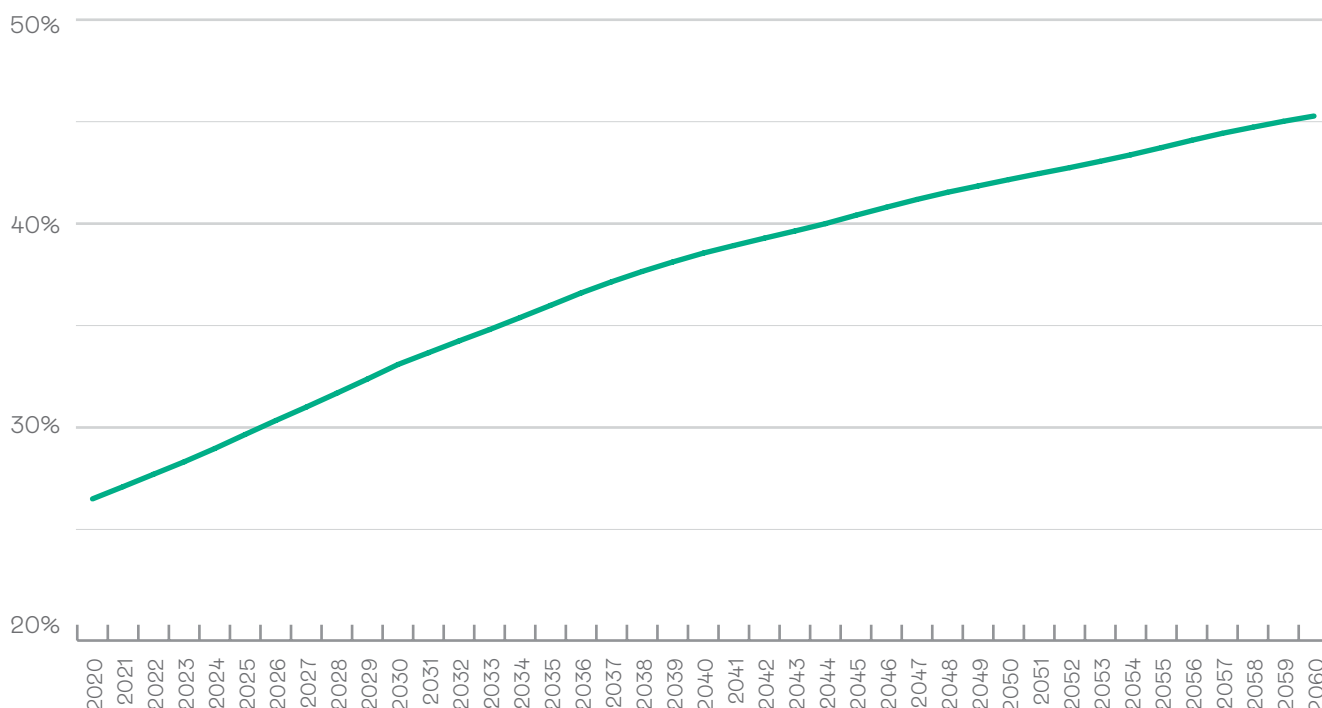
Source: OECD Population projections, 20 September 2021.

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[2]   OECD population projections as of May 2022. See also the European Commission *2021 Ageing Report*.

The stagnation in economic growth and the slow-moving ageing process, with relatively high PAYG implicit rates of return, renders them unsuitable for 21st Century developed economies. In other words, the ageing transition puts immense pressure on the sustainability of unfunded systems: increasing the number of retirees per worker in the system requires more funding per worker, or lower benefits per retiree, and these requirements are higher with lower employment rates. Improving the sustainability of these systems is hard: it involves delaying the minimum retirement age, increasing contributions, lowering pension benefits (or a combination of these). The fact that implementing these reforms does not have political support became evident during the recovery from the last global financial crisis and the euro debt crisis, when many countries backtracked previously legislated changes to their PAYG pension systems. These previous measures would have automatically adjusted pension payments or the early/first retirement age to the evolution of life expectancy.[3] In sum, PAYG systems perform poorly in low growth economies with aged populations and reforming these systems can be socially costly.

In the last decades, as an alternative to reforming or scaling back PAYG pensions, there has been a move towards introducing defined-contribution (DC) private funded systems, to complement or partially substitute unfunded PAYG (defined-benefit) systems. DC plans convert (pre-defined) contributions of workers to annuity payments at retirement, with the pricing of such annuities accounting for the accumulated returns on individual contributions and life expectancy at retirement. The evolution of life expectancy is embedded in the link between contributions and pension payments.[4] Chile (1981) and Mexico (1997) early on replaced the public PAYG systems by privately funded (mandatory) DC systems. More recently, Estonia, Hungary, Poland, and Sweden introduced or raised contribution rates of mandatory DC pension systems. In the United States, DC plans have been increasingly more popular among occupational pension plans OECD (2016). Currently, nine OECD countries have mandatory funded DC schemes, four of them in the EU. In general, moving away from PAYG pension systems to funded systems may involve high transitions costs. The main difficulty is that during the transition, pension funding will need to be higher to cover current PAYG pensions in addition to new savings to the funded system. Alternatively, debt issuance could cover current unfunded pension payments while workers would save only to the new funded system. This transitional debt issuance would be high (of similar magnitude to the debt levels observed during the last financial crisis or during the response to the COVID pandemic) and would account for the implicit liabilities of unfunded PAYG schemes. In other words, PAYG liabilities are replaced by debt liabilities, which as we show can be an efficient trade.

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3   Instead, among other examples: Italy introduced the "quota 100" measure and facilitated early retirement; Spain suspended the automatic adjustment of initial pensions at retirement and introduced the indexation of pensions, and Canada and Czech Republic decided not to implement the planned increase in retirement age.

4   Restrictions on the retirement age may also be a feature of DC systems.

5   The countries are Chile, Denmark, Estonia, Israel, Latvia, Mexico, Norway, and Sweden. Additionally, Italy and Poland have a notional DC scheme: there is a pension fund and pensions are based on the contributions, life expectancy at retirement and the 'notional rate of return', which may not be the market rate since the fund may be used to pay current pensions as in the PAYG system.

Although the trend in the population ageing process is common to many economies[6], among European countries Lithuania, Latvia, Poland, Greece, and Spain will have aged the most between 2020 and 2060. Spain is a particularly interesting economy to study. Unemployment is high, and highly volatile, population is ageing fast and its PAYG system, which had a separate budget and fund, has seen its social security fund being depleted in the aftermath of the euro-debt crisis. As in other OCED countries, Spain introduced reforms to its PAYG pensions in 2011 and 2013 that would effectively have transformed it in a defined-contribution pension system. These reforms would delay the legal retirement ages, increase the DC component of the system, and adopt a sustainability factor that would link pension payments to life expectancy at retirement. Spain had planned the introduction of the sustainability factor in 2019, however this has been first suspended and finally abandoned.

Figure 2. **Ratio between number of persons 65 years old and over and persons aged 15-64 in Spain, EU27 and OECD economies**
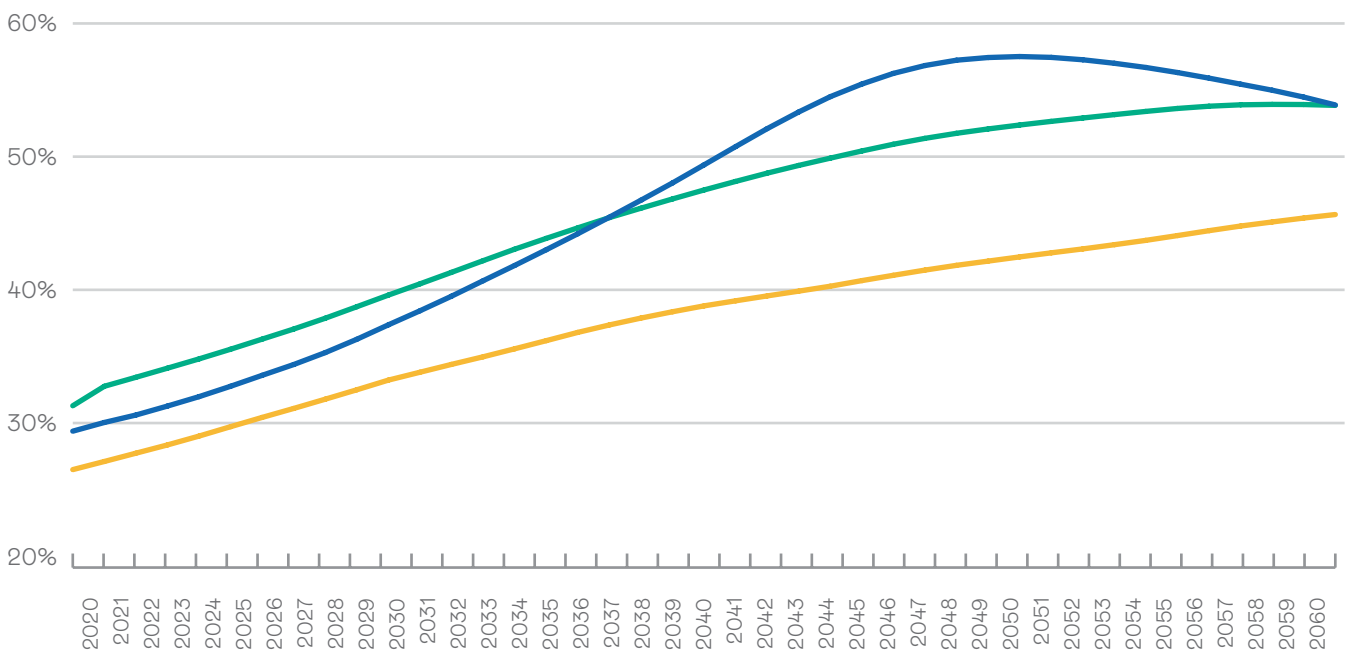
Source: OECD Population projections, 20 September 2021.

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6   Total working age population is expected to decline by 10% between 2020 and 2060, on average in the OECD economies.

While the originally planned parametric changes of the PAYG system were going in the direction of improving its sustainability, at the cost of a 30% reduction of the real value of average pensions by 2050 (Díaz-Giménez and Díaz-Saavedra 2017), even a *fully sustainable* unfunded system would be highly distortive (Brogueira de Sousa, Díaz-Saavedra and Marimon, 2022), with large welfare costs pilling up in the coming decades as the fast ageing process evolves in Spain (see Figure 2).

Among funded systems, the 'backpack' (BP) has not been studied as an alternative to PAYG or standard defined-contribution system.[7] Like a standard defined-contribution system, it features a fixed contribution rate on gross salaries of workers which accumulates, even across different jobs (i.e., the worker moves with the 'backpack'). These contributions earn a market return and can be withdrawn or converted into a pension payment (annuitization) upon retirement. The BP system offers additional flexibility since it allows unemployed workers to mobilize some of their BP savings during involuntary unemployment spells.[8] Unlike PAYG systems, the BP is an individual, fully funded system; hence the rapid increase in the number of retirees per worker that is underway is not compounded with an increase in payroll taxes.

2. Replacing the Spanish PAYG for a BP system'

In Brogueira de Sousa, Díaz-Saavedra and Marimon (2022) we study the replacement of the Spanish PAYG pension system with a BP system, with the following specifications. The worker enters the labour market with zero BP savings, and his 'backpack' grows during periods of employment, with a fixed contribution rate on gross salaries (the BP tax rate).[9]

Backpack savings earn a market rate of return (in our model, an economy-wide risk-free rate), and its interest payments are subject to capital taxes but not to income taxes. The worker can use BP savings to finance consumption in periods of involuntary unemployment if he is actively searching for a job. At retirement, BP savings are, in principle, converted into an actuarily fair annuity payment (a retirement pension).[10] We first develop a detailed dynamic overlapping generations equilibrium model with incomplete insurance markets and search-matching labour market frictions calibrated to the Spanish economy in 2018. Second, we simulate its evolution,

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7   See (Kettemann, Kramarz and Zweimüller 2017) for an evaluation of the 2003 Austrian reform that replaced a system with tenure-based severance payments after a layoff by payments into pension accounts similar to the BP system considered here, without the retirement annuity.

8   As an example, recently Australia and some U.S. pension systems allowed unemployed to extraordinarily use retirement savings during the large COVID shock.

9   In the baseline version we consider, additional discretionary contributions by the employer or the employee are not allowed.

10   In our economies, the annuity is optional — e.g. upon retirement BP assets can be liquidated — but all workers, who are risk-averse, choose this option. Alternatively, it can be made mandatory to avoid having retirees without savings; for the same reason, restrictions can be placed to avoid BP asset depletions during unemployment spells.

as an open economy[11], in the coming decades, taking as given the evolution of its population age distribution which is expected during this period. The model includes a detailed description of the Spanish tax and transfer system, Social Security policies (minimum income transfers, unemployment benefits) and crucially the PAYG pension system with its current rules.

We first run our benchmark Spanish economy assuming the PAYG system stays in place (i.e., there is no reform). Figure 3 displays the evolution of the payroll tax rate, that we assume to be adjusted over time to cover all the financing needs for PAYG pensions, (together with UI expenditures) until 2100.[12]

Figure 3. **The expected evolution of the dependency ratio in Spain, and the payroll tax rate required to finance pay-as-you-go pensions in Spain.**
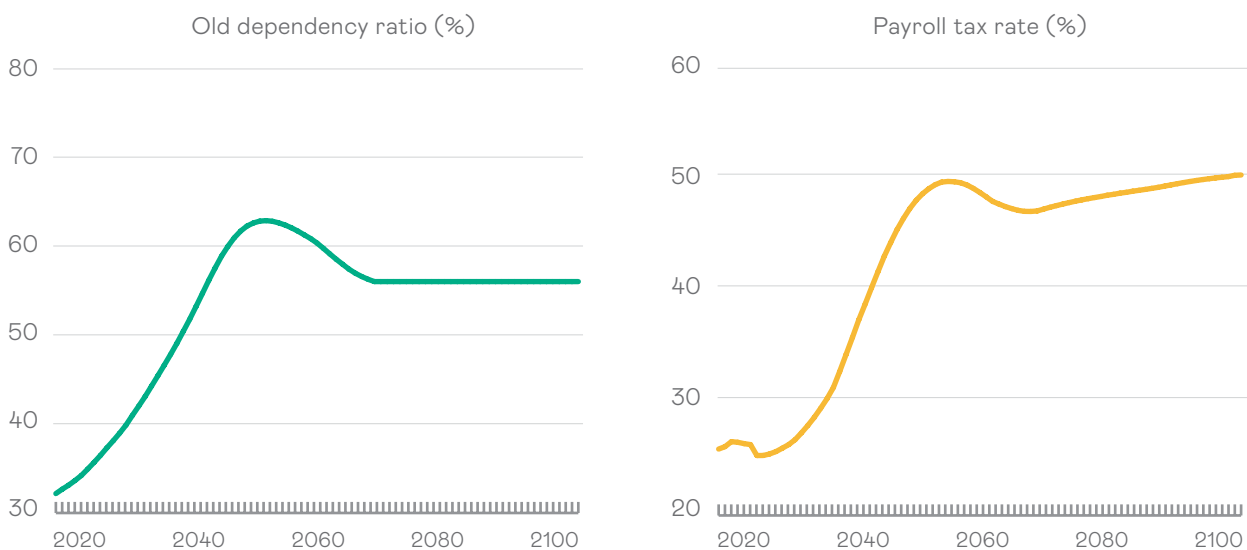
Source: (Brogueira de Sousa, Díaz-Saavedra and Marimon, A Worker's Backpack as an alternative to PAYG pension systems 2022)

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11   In Brogueira de Sousa, Díaz-Saavedra and Marimon (2022) we also analyse Spain as a closed economy, which exacerbates the reform results presented here due to general equilibrium effects: higher savings, either private or through the funded systems, lower interest rates and increase wages and, as a result, the welfare gains in terms of average life time consumption is 58%, instead of 36% if Spain is considered an open economy.

12   Note that the forecast for the changes in age-dependent survival probabilities, i.e. the 'ageing transition', stabilizes in 2070, and these are assumed constant after that year. However, changes in cohort-education structure last an additional 30 years, hence the population age and education distribution are stable over time only after 2100.

The increase in the share of retirees that results from the ageing process (left panel of Figure 3) increases the aggregate amount of pension payments. According to our simulation, PAYG pension payments as a share of output doubles: from 10.5% in 2018 to 21% in 2100 (Table 1). The payroll tax rate (right in Figure 3) reaches 51% in 2100, and total payroll tax collection increases from 12% to 22% of output in 2100[13].

Table 1. **Pension payments, payroll tax rate and payroll tax collection**

Year	Pension payments (a)	Payroll tax rate	Payroll tax collection	Effective labour tax (b)
2018	10.5	26.0	11.7	49.7
2100	21.0	51.1	22.2	65.6

Source: Model simulation, (Brogueira de Sousa, Díaz-Saavedra and Marimon, A Worker's Backpack as an alternative to PAYG pension systems 2022). (a) As a share of GDP; (b) the effective labour tax is given by $(1-t_e)= (1-t_y)(1-t_p)/(1+t_c)$, where t_y is the income tax, t_p the payroll tax, and t_c the consumption tax rate.

The increase in payroll taxes represents a large economic distortion, as captured by the effective labour tax wedge (which considers consumption taxes and income taxes, in addition to the payroll tax rate). This wedge increases by almost 16 percentage points. It has important economic and welfare consequences. Alternatively, pension payments would have to be reduced drastically to keep the system balanced. In sum, either workers or retirees (or both, in a combination of increased contributions and pension cuts) would bear the cost.

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13   Note that the so-called "Mechanism of Intergenerational Equity" (MIE) of 2021 that substitutes the "sustainability factor" of 2019 increases the payroll tax by 0,6% up to 2032, while we estimate an increase from 2022 of 1,64%, starting at a balanced pension budget payroll tax of 26,4%, higher than the actual effective payroll tax, which is around 21% (a tax already insufficient in 2015, according to Hernadez de Cos *et al.* (2017)'s discussion of the sustainability of the Spanish pension system, Figure 6, p.36). Furthermore, our model is in real terms, as 'indexed pensions' are now in the Spanish Economy, but wages are not indexed, making the Spanish pension system even more unsustainable (for a brief discussion of MIE see Ministerio de Asuntos Económicos y Transformación Digital, 2021; and De La Fuente *et al.,* 2022).

3. The transition to a new system

The problem of how to design a transition without losers (e.g. Aubuchon *et al.,* 2011) is aggravated by the existence of an ageing demographic transition in the coming decades. Fortunately, the long-term large welfare gains – of phasing out the PAYG, relaying only on private savings (PS), on a fully-funded defined contribution pension system (FF), or of having a Backpack pension system (BP) instead of the PAYG – provide fiscal space to articulate a transition without losers. However, the ageing process (see Figure 2) dictates the need to anticipate the social security reform, before the ageing demographic transition takes place. We show that this is possible, in the case of Spain, with front-loaded reform-transitions.

A *laissez-faire* 2100 economy – where households finance retirement consumption through private savings alone – with the 2100 demographic (i.e. age and education) structure, but without the PAYG pension system, would be much less distorted, more efficient in terms of production (higher employment) and thus achieve higher social welfare. We solve a reform-transition in which the main change is done in one year (2019, in our simulation): workers who enter the labour market for the first time do not enter the PAYG system, existing retirees and those retiring receive their PAYG pensions, all the other workers receive private assets that makes them at least as well-off in the economy with their private assets than in the economy with the PAYG with their accumulated pension claims. Unfunded PAYG pensions and compensations to employed workers in the system are financed with newly issued government debt. Without the PAYG system, output would be 23,5% higher, private consumption 25.0% higher, with 16 pp. more workers (67.3% of workers vs 50.8% in the economy with a PAYG system), when compared to the baseline PAYG economy in the same year (2100). Social welfare would be 26.5% higher (i.e., equivalent to more than a 1/4 increase in average lifetime consumption per household).

Similarly, in the front-loaded transition between the PAYG system and the BP system, all workers in the labour market at the time the reform starts (again 2019) switch to the BP system and receive an initial transfer of backpack asset, to compensate for their individual claims to the PAYG pensions (i.e., previous payroll tax payments). This transfer makes sure there are no losers from switching to the BP system in the working age population.[14] They stop contributing to the PAYG pension system via payroll taxes, limiting PAYG pension claims to those of the retirees alive at the time of the reform. Public debt finances the backpack asset transfers and these PAYG liabilities. In our calibrated Spanish economy this level of debt is relatively high: 200% of GDP in the first year, 2019, increasing to 340% at the end of the transition when there are no more PAYG liabilities (Figure 4).[15] On the other hand, the new capitalized pension system aggregates

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14   Our model economy allows us to calculate exactly the amount of initial BP claims that make each working age household at the time of the reform prefer the reform to the status quo (for details of this exercise see Brogueira de Sousa, Díaz-Saavedra and Marimon, 2022).

15   To put this number in perspective, Conesa and Garriga (2008) calculate that the implicit debt in the US Social Security system in 2005 at 2.2 times GDP, with the 2005 age structure. Also, if instead of a front-loaded reform, only the new entrants in the labour market join the new system – say, BP – the debt needed to finance it without losers is (circa) double.

a stock of additional savings in the economy worth 4.8 times output by 2100, making the net asset position (BP savings - reformed debt) positive. If, instead of the BP, a fully-funded defined contribution pension system (FF) is introduced (optimized, as in the BP case), in a front-loaded transition as in the BP case, the reform debt generated during the transition would reach 339% of output — almost the same as in the BP reform — but with different welfare implications, as explained below.

Table 2.
Output, Labour, Capital and Consumption percentage increase relative to the PAYG economy
(a) Pension assets and reform debt as a ratio of Output at factor costs;
(b) Pension assets are the sum of individual workers' pension savings in each
of the funded systems, BP or standard fully-funded pension plan.

	Output	Labour	Capital	Consumption	Pension Assets(a,b)	Reform Debt(a)
Private Savings	23.5	24.6	23.6	25.0	-	2.9
Fully Funded	10.7	10.7	10.7	43.4	8.9	3.4
Backpack	10.5	10.5	10.5	46.1	10.9	3.4

Figure 4. **The evolution of debt issued to fund the pension system reform in the Private Savings, Fully Funded and in the Backpack simulations at market prices.**
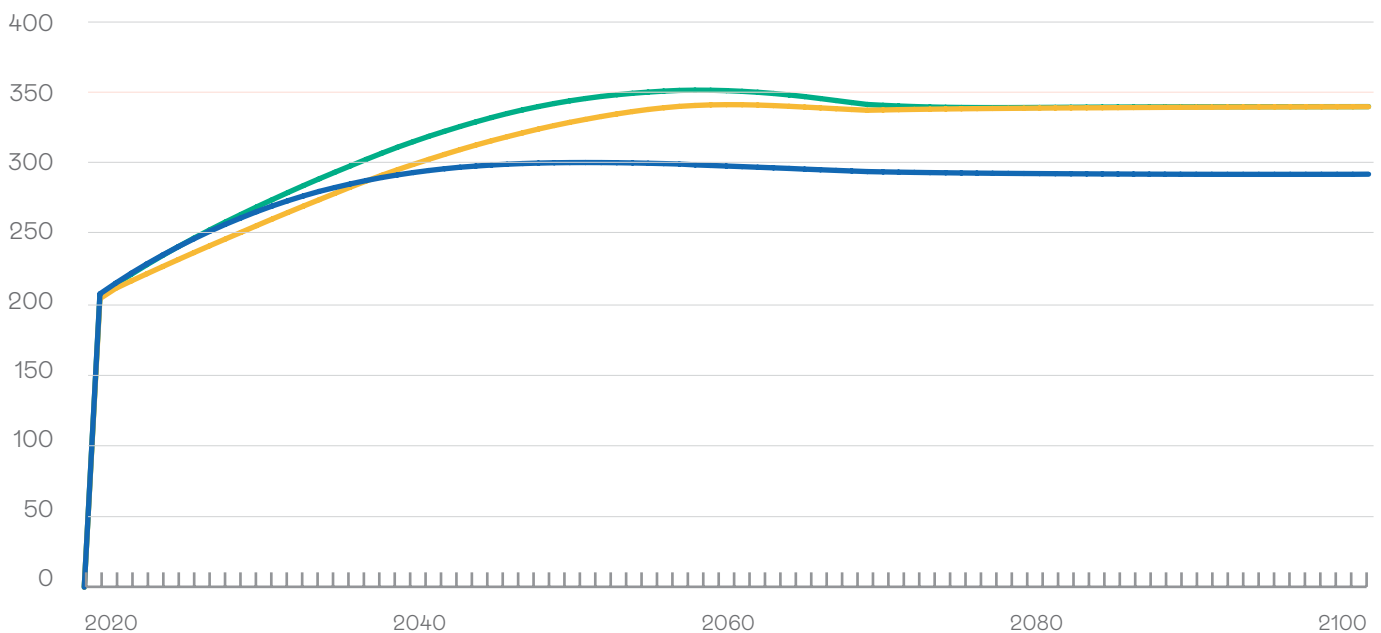
Source: (Brogueira de Sousa, Díaz-Saavedra and Marimon, 2022)

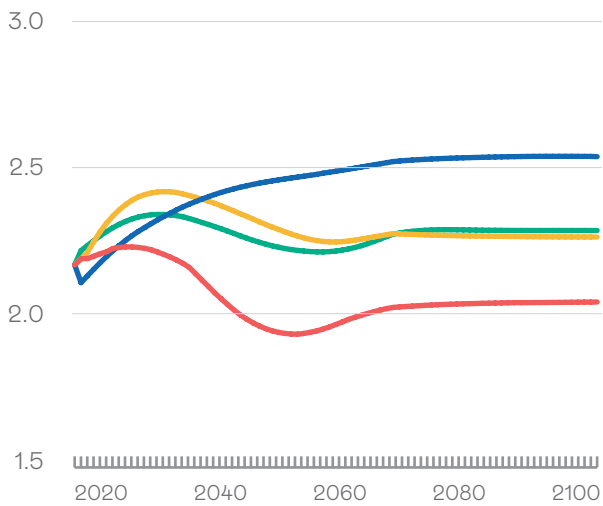**Simulation results under Private Savings, Fully Funded, Backpack and Pay-As-You-Go**

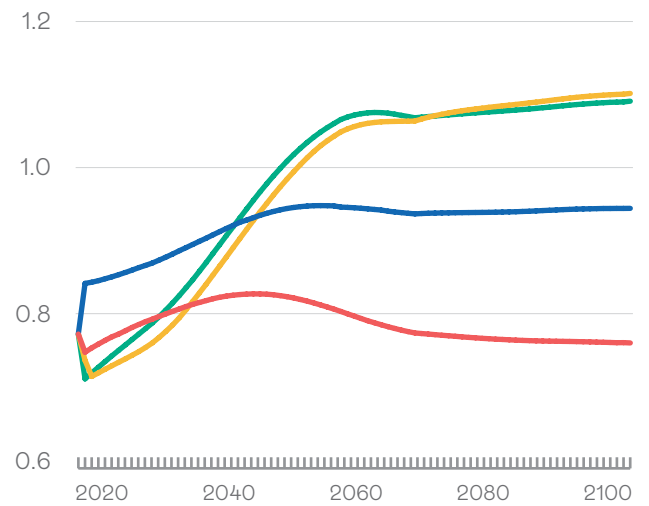Figure 5. **Output**

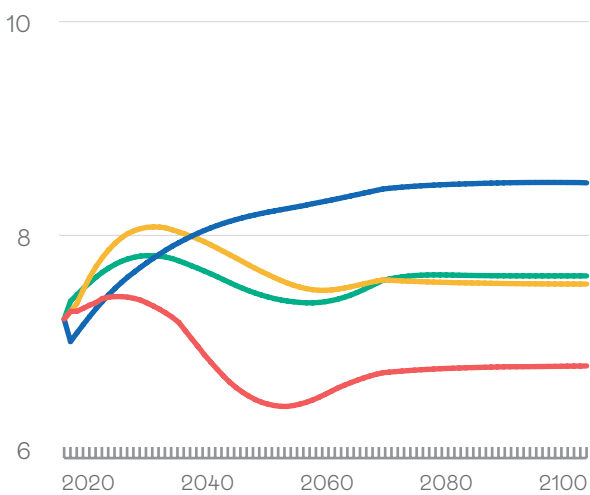
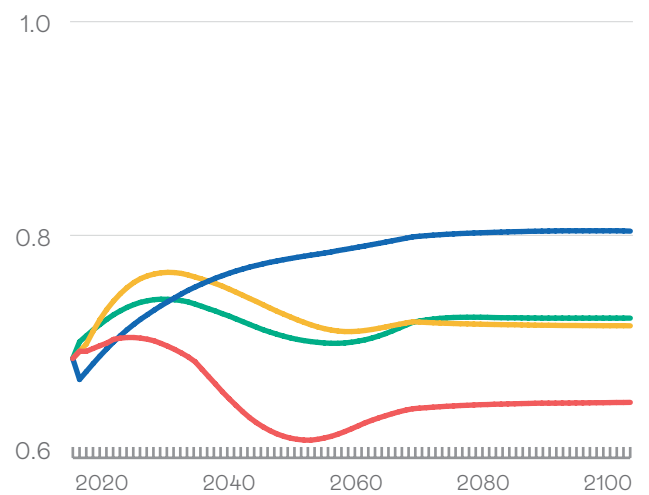Figure 7. **Consumption**

Figure 8. **Capital**

Figure 9. **Labour**

4. Taxes and welfare gains

We conduct a welfare analysis to determine the optimal BP mandatory individual savings rate, which is 22% of gross salaries. The large BP 'tax rate' is explained by the elimination of the PAYG system and corresponding decrease in payroll tax rate. In fact, the effective tax rate in the BP economy is only 47.6% (18 pp. lower than the PAYG counterpart).

Table 3. **Tax rates in three alternative economies in 2100.**
(a) The consumption tax rate adjusts endogenously in each alternative
to balance the government budget constraint.

Tax rates (%)	PAYG	PS	FF	BP
Consumption(a)	25.7	33.7	24.3	23.7
Payroll	51.1	3.1	2.8	2.8
Fund tax rate	--	--	16.0	22.0
Effective labour tax	65.5	37.8	43.9	47.9

We also compare the BP system to a *laissez-faire* economy, with only private savings, and to a standard defined-contribution fully-funded system. The BP system wins the horse race among the different pension systems, ranked by average social welfare, when compared to the status quo PAYG system (with a tax-rate that makes it sustainable). It delivers higher welfare than the laissez-faire economy because it provides valuable retirement consumption insurance, as the worker converts its employment savings into an annuity payment for retirement; and it outperforms an optimized funded DC system with a 16% contribution rate because of its additional flexibility during working years. Workers keep the backpack savings as they change jobs, and it is also possible to use BP savings partially or fully during jobless spells.

Table 4. **Welfare increase relative to the PAYG economy.**
(a) % increase in lifetime consumption.

	Welfare increase (a)
Private Savings	26.5
Standard FF	30.9
Backpack	36.1

Behind these aggregate welfare comparisons, not only are more consistent disaggregate welfare comparisons, but one can also observe important micro changes due to how agents, with rational expectations, behave in different social security systems (a strength of our approach). For example, comparing – after the demographic ageing and reform transitions – the retirement decisions of agents with rational expectations, we see that while average retirement age with PAYG remains at 65.1, with Private Savings (PS) it raises to 95.5 (maximum age in our model is 100!)[16], while, when pensions can be insured, with a Fully Funded (FF) or with the Backpack (BP) is 77.2, and 74.4, respectively (see Brogueira de Sousa, Díaz-Saavedra and Marimon, 2022) for further details.

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16   In our model, productivity is decreasing when agents face their retirement decisions and, within education groups, very low after 70, but we do not include other factors – such as dislike for work or health disruptions – which are likely to reduce the retirement age, but not to change the ranking of retirement ages across systems.

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