

Architecture of pension systems and standard of living of retirees

Comparing pension systems is a delicate exercise and must be done with caution. The Conseil d'orientation des retraites (COR) regularly conducts comparative studies on a panel of ten countries, representative of the diversity of pension systems in developed countries: Belgium, Canada, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom and the United States. In these countries, the share of public and private pension expenditure ranges from around 10% of GDP (the Netherlands, Canada, Sweden and the UK) to 14-16% (France and Italy), with an average of around 12%.

While in some countries most of this expenditure is provided by public, pay-as-you-go schemes, in other countries private funded schemes play as important a role as public ones. This structure of pension expenditure between public and private schemes first reflects the choices made by countries regarding the objectives assigned to the public tier of the pension system. Broadly speaking, if the main objective of the pension system is to ensure a minimum income for all pensioners, generally through flat-rate pensions, then public pensions will be small and private schemes (voluntary or mandatory) will supplement these public transfers. Pensions will not reflect previous earnings and will not reproduce their differences: the redistribution provided by the public pension system will then be high. Conversely, if the public system is more intended to ensure continuity between earned income and pensions, through pensions proportional to earned income in an insurance perspective, then public transfers will tend to be larger and the use of private schemes less necessary. However, the redistribution provided by the public system may be less important than in the first case; solidarity measures may all the same mitigate this reduced redistributivity to a greater or lesser extent.

These choices are decisive for the specific rules of the public pension system (in terms of pension level and coverage rate), which in turn determine the results in terms of the share of public pension expenditure in GDP. This share also results from the demographic situation of the respective countries (the greater the demographic ageing, the higher the share of public expenditure in GDP, all other things being equal) and their economic performance (the greater the country's wealth, the lower the share of public expenditure in GDP).

Taking these different factors into account, it is then possible to distinguish three groups of countries. In the first group of countries (Canada, the Netherlands and the United Kingdom), the contributory effort is not taken into account (or only partially in Canada) and the pension is lump-sum: the size of the public system is small and private schemes are more developed. In the second group of countries (Germany, Belgium, Spain, France and Italy), the public system is contributory and quite large, with little private funding. Finally, the last group of countries (Japan, the United States and Sweden) concerns countries with a mixed approach. Here, the contributory effort is taken into account directly or indirectly, but the size of the public system is relatively small: private funds are also developed.

Finally, while there are substantial differences in the relative living standards of the over-65s between countries, these are relatively independent of the design of the pension system.

What are the ambitions assigned to the public pension system?

A pension system can be defined as a set of organisations, public or private, whose mission is to provide financial coverage for the old age risk of their members. These organisations are governed by rules defining the conditions under which individuals are eligible for a retirement pension and the methods of financing this coverage.

Coverage of the old age risk stems from the common aspiration of individuals to smooth their standard of living, their consumption capacity, over their entire life cycle. At older ages, there is a risk that people will no longer be able to engage in paid work or that working will become too demanding due to a potential deterioration in physical or intellectual capacities, even though the expected remuneration from work is reduced (due to lower productivity), and therefore that they will suffer a drop in living standards. A pension system thus makes it possible to cover the longevity risk, i.e. the fact that the length of time during which each individual will no longer be able to rely on work to ensure his or her standard of living is unknown.

It is possible to conceive that this double risk (decline in the ability to earn income through work, longevity risk) could be covered by individual savings: during their working life, everyone would save to smooth their consumption over their life cycle. However, it is to be feared that people with low earnings would not be able to accumulate the necessary savings, that the risk would be poorly understood by some, or that having correctly perceived it, they would not consent to a sufficient savings effort. Moreover, this savings, since it is individual, imperfectly covers the longevity risk, since it does not allow it to be pooled.

It is therefore possible to consider covering this risk through private insurance schemes, for example by subscribing to a life annuity contract with an insurer who mutualises the longevity risk. However, this market solution has its limitations.

On the one hand, individuals are generally reluctant to alienate all or part of the capital (which they cannot pass on to their children). On the other hand, the life annuity market is plagued by adverse selection: individuals with a high life expectancy are the most inclined to hedge against longevity risk. Insurance premiums must take into account this deviation from the average risk, which is likely to deter individuals who expect to die young from taking out a life annuity contract.

Because the insurance market does not optimally cover the old age risk, public pension systems have been developed in all countries at a certain level of economic development. However, the ambition assigned to these systems differs between countries.

In a first conception of social protection, described as Beveridgian (see box), the ambition of the compulsory public pension system is to ensure a minimum, or decent, standard of living for all during the retirement period and not to guarantee the maintenance of the standard of living experienced during working life. It is up to the insured to make an effort to save and to resort to solutions offered by the market to ensure continuity of their standard of living between working life and retirement.

In a second conception, described as Bismarckian, the emphasis is on the continuity of income between work and retirement. The aim of the public pension system is to respond in itself to the aspiration to smooth the standard of living and thus to guarantee pensions in relation to the income received from work during working life. It can do so either indirectly by linking the amount of the pension to the insurance record or the level of earnings, or directly by linking pensions to the amount of contributions paid. To this end, whereas Beveridgian systems tend to be redistributive, these systems are contributory.

Beveridgian and Bismarckian rationale

The Beveridgian rationale is based on three principles: universality, according to which all citizens should be covered for all social risks, regardless of their occupation; uniformity, whereby citizens receive identical, flat-rate benefits independent of the taxes that finance them; and uniqueness, whereby benefits are paid by a single public service.

In the Bismarckian rationale, the coverage of social risks (sickness, invalidity, work accident, old age) compensates for the loss of professional income, in return for contributions deducted from wages, co-managed by employees and employers in autonomous funds organised by professions.

This polar presentation of public pensions of course deserves qualification. In a system where the primary ambition is to guarantee a minimum pension, the public authorities can help, through taxation, to build up a private pension, and encourage the emergence, or even make compulsory, funded occupational schemes¹. These contributory schemes can, through solidarity mechanisms, compensate for career accidents, periods of sickness and unemployment, and thereby improve the level of retirement for those whose contributions would have been too limited by guaranteeing them access to a minimum/decent pension.

Whatever the ambition of the system, public pension systems are essentially pay-as-you-go systems²: working people contribute for current pensioners and expect future working people to do the same when they are retired. It is true that a public pension system could be built on a compulsory capitalisation system where everyone's pension is built up from their contributions invested on the financial market throughout their working life³. Since pay-as-you-go makes it possible to pay retirees pensions at the very inception of the system, without the first generation of retirees having to make any prior contribution effort, it is normal, for obvious political reasons, that pay-as-you-go has most

often been favoured. Obviously, only the public authorities, because of their sustainability, can organise a transfer between generations.

Institutional logic and taking into account the contributory effort differ from one country to another, which explains the differences in the share of public pension expenditure in GDP between them

In 2017 (the latest figures available), public and private pension benefits represented on average 11.8% of GDP (see Figure 1) for all the countries studied by the COR. Italy (16.7%) and France (13.9%) show the highest levels of pension spending as a share of GDP. The United States (12.4%), Japan (11.9%), Belgium (11.6%) and Spain (11.2%) are close to this average. Several countries spend a smaller share of their GDP on pensions. This is the case in Germany (11.0%), the UK (10.8%), Sweden (10.3%), Canada (10.3%) and the Netherlands (9.8%).

The figure below summarises the institutional set-up of the pension system in the different countries. The x-axis summarises the way in which the contribution effort is taken into account by the public schemes: it ranges from not being taken into account at all, through a totally lump-sum calculation of public pensions, to being fully taken into account through a linear relationship between pensions and contributions. The share of private pension expenditure in total expenditure is shown on the y-axis. Logically, the more flat-rate the pension and the closer it is to the poverty line, the higher this share is. Finally, the share of public

¹ Private retirement savings schemes refer to schemes explicitly designed for retirement purposes, even if personal retirement savings can be built up through other savings vehicles (such as real estate or life insurance).

² Some pay-as-you-go regimes may nevertheless accumulate large amount of reserves.

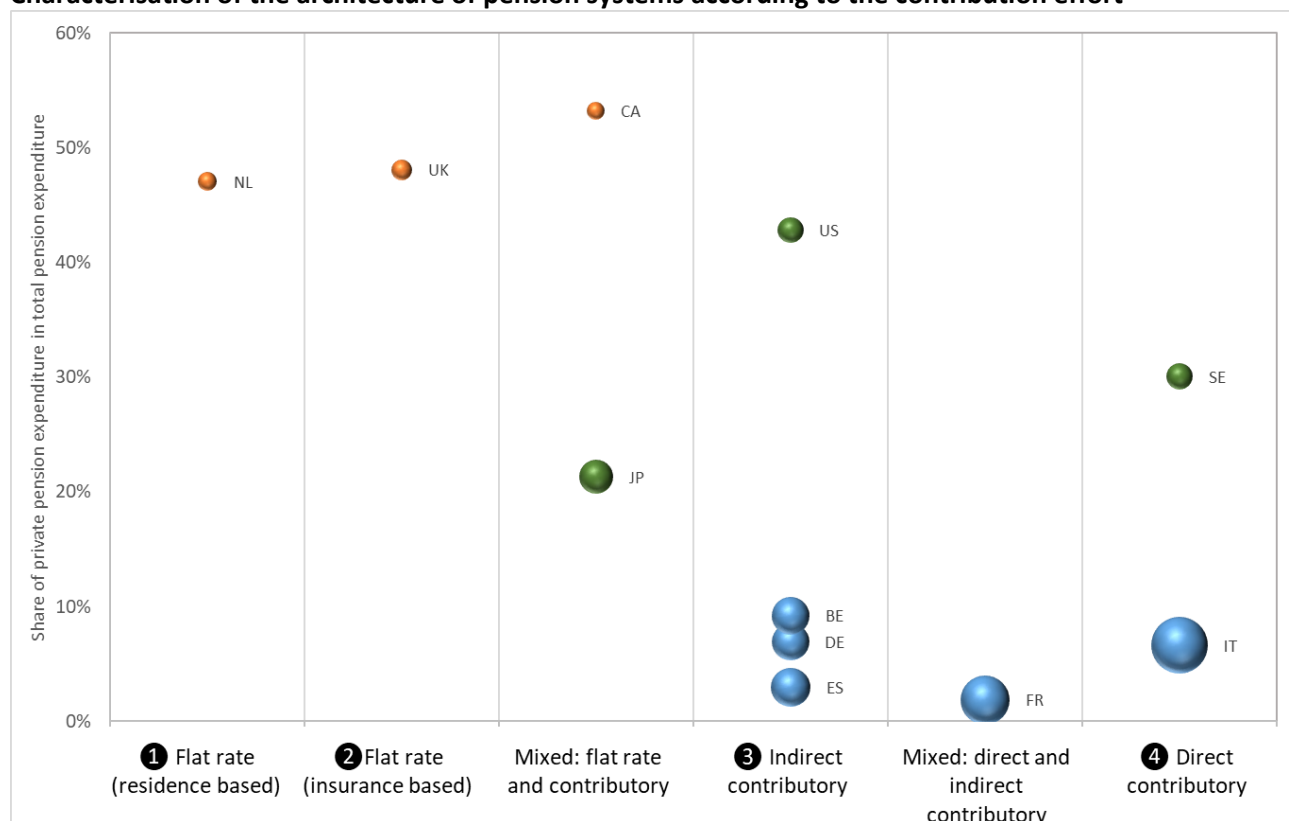
³ Chile is an emblematic example.

expenditure in GDP is indicated by the size of the bubbles.

Three groups of countries can be distinguished:

- In the first group (Canada, the Netherlands and the United Kingdom), the contributory effort is not taken into account (or partially as far as Canada is concerned) and the pension is lump sum (and partially earnings-related for Canada); the size of the public system is small and private funds are more developed;
- In a second group (Germany, Belgium, Spain, France and Italy), the public system is contributory and fairly large, and private funds are not very developed;
- Finally, in a last group of countries (Japan, the United States and Sweden), the contributory effort is taken into account directly or indirectly, but with a relatively small size of the public system: private funds are also developed there.

Characterisation of the architecture of pension systems according to the contribution effort



Reading: In the Netherlands, the public pension is flat-rate and residence-based. The country is characterised by a high share of private pension expenditure in total pension expenditure (47%, y-axis) and a relatively low share of public pension expenditure in GDP (5.2%, bubble size). Data for 2017.

Note: The architecture is represented by the size of the bubbles and the share of private spending in total pension expenditure. The scope of public and private pension expenditure corresponds to the OECD scope for cash benefits. In particular, it excludes expenditure on management fees, which are included in the pension expenditure usually presented in the annual reports of the NRC. For more details, see [The OECD SOCX Manual - 2019 Edition - A Guide to the OECD Social Expenditure Database](#).

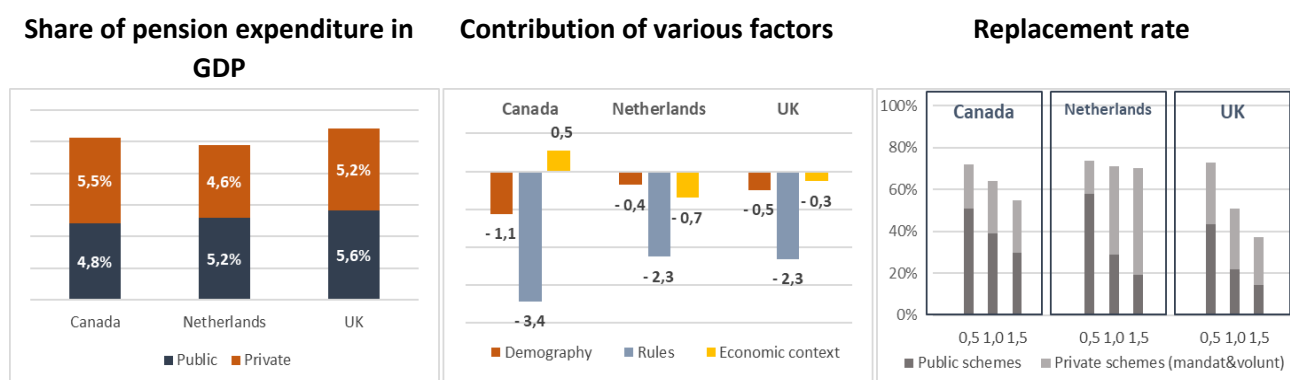
Sources: SG-COR calculations based on OECD Social Expenditure Database (SOCX).

In a first group of countries, the contributory effort is not taken into account and the pension is flat-rate

The first group concerns countries (Canada, the Netherlands and the United Kingdom) where social protection has been designed according to a Beveridgian conception. Contributory effort is not taken into account and the pension is a lump sum based on a residence criterion (Netherlands) or an insurance record (United Kingdom) without reference to earnings. In Canada, in addition to the

flat-rate part, there is a part based on insurance record and earnings (indirect contributory effort), but with a low base and a low replacement rate. The gross replacement rates provided by the public systems are relatively low. In order to preserve their living standards between working life and retirement, workers must resort to private savings. States can incentivize retirement savings through tax exemption, foster the emergence of funded contributory occupational schemes or even make them (quasi) compulsory (as in the Netherlands or more recently the United Kingdom).

Share of expenditure (public and private) in GDP, contribution of regulatory, demographic and economic components to the share of public expenditure and gross replacement rates in the pension system (public and private) in Canada, the Netherlands and the UK in 2017



Reading: in 2017, the share of public pension expenditure in GDP was 4.8% in Canada and the share of private expenditure was 5.5%. Compared with the other countries studied by the COR, public pension rules and the demographic situation contributed to lowering the share of public pension expenditure in this country by 3.4 points and 1.1 points respectively, compared with the average and all other things being equal, while the economic context contributed to increasing it by 0.5 points. The gross replacement rates offered by the public system varied from 51% for a person with a full career at half the average wage to 30% for a person with a full career at 1.5 times the average wage. Once private pensions were taken into account, gross replacement rates ranged from 72% to 55%.

Note: Countries are ranked in ascending order of the share of public pension expenditure in GDP in 2017. From the point of view of pensioners, it is the net replacement rate that is important as it compares income in retirement with working income. However, OECD data are only available for gross replacement rates in both public and private schemes.

Sources: SG-COR calculations based on OECD and Eurostat.

In the end, even if the coverage of the pension system is relatively broad, in line with the principle of universality (approximately 100% of people aged 65 and over receive a direct public pension), the average pension (which takes into account the pensions already paid and the indexation rules) relative to average earnings is low. This means that the rules specific to the public system reduce the share of public pension expenditure by 2 to 3 points compared to the other countries, other determinants being held constant.

In addition, these countries are characterised by relatively less demographic ageing than in the other countries under review, notably because their life expectancy at 65 is lower (United Kingdom and the Netherlands) and by a slightly more favourable economic context (except in Canada due to low labour productivity).

As a result, the size of the public system is relatively small: the share of public expenditure in GDP is around 5%; private pension funds are widely developed and account for around 50% of total pension expenditure.

As the pension does not depend on previous earnings, the public system tends to be redistributive in these countries. Replacement rates are thus strongly degressive with respect to wages, which allows for a redistribution towards low-wage earners. Private schemes can significantly improve replacement rates, sometimes as a counterpart for less redistribution (as in the Netherlands).

In a second group of countries, the contributory effort is taken into account and the pension reflects labour earnings

In a second group of countries (Germany, Belgium, Spain, France and Italy), social protection is rather of Bismarckian inspiration and stresses the insurance role of social protection. The contributory effort can be assessed by the insurance record and by labour earnings, without reference to the paid contributions (Germany, Belgium, Spain, basic schemes in France). It can also be assessed directly by calculating pensions on the basis of contributions (supplementary schemes in France and Italy).

The level of pensions at pension claiming will then depend on the existence of a ceiling on earnings generating pension rights, or even on contribution rates. Italy, Spain and France, where the ceilings are high, thus form a group of countries in which the gross replacement rate for a full career at average earnings is relatively high (close to 80% in Italy).

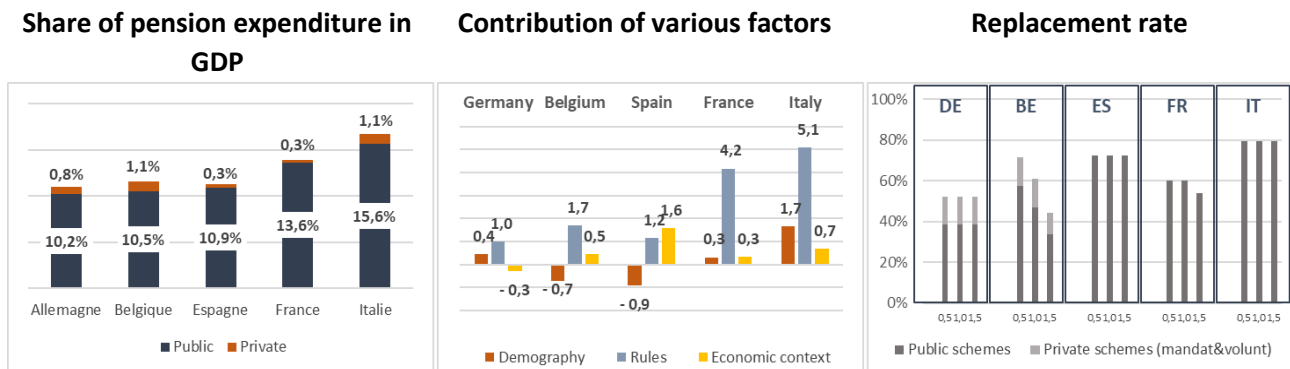
Retirement rates reflect retirement ages but also past labour force participation, which determines enrollment in a pension scheme in countries where the system is contributory. Thus, the rate of retirees (the number of retirees with respect to the total number of people aged 65 and over) is lower in countries where labour force participation rates, particularly for women, are or were lower, such as Spain and Italy. France stands out with the highest rate of retirees among the countries under review due to an earlier retirement age.

The rules of public pension systems ultimately contribute to higher than average shares of public pension expenditure in GDP, moderately for Germany, Belgium and Spain but much more clearly for France and Italy. For these two countries, the protection offered to the elderly helps to explain 4 to 5 percentage points of higher pension expenditure as a share of GDP.

The demographic ageing of these countries is also more marked (particularly in Italy, but with the exception of Belgium and Spain) than that observed on average in the other countries and their economic context is slightly less favourable (except in Germany).

Ultimately, pension expenditure has a higher share in GDP than in the other countries surveyed in 2017 and accounts for almost all pensions paid out. Private pension funds are little or not developed.

Share of expenditure (public and private) in GDP, contribution of regulatory, demographic and economic components to the share of public expenditure and gross replacement rates in the pension system (public and private) in Germany, Belgium, France, and Italy in 2017



Reading: in 2017, the share of public pension expenditure in GDP was 10.2% in Germany and the share of private expenditure was 0.8%. Compared with the other countries studied by the COR, public pension rules and the demographic situation contributed to lowering the share of public pension expenditure in this country by 1 point and 0.4 point respectively, compared with the average and all other things being equal, while the economic context contributed to decreasing it by 0.3 point. The gross replacement rates offered by the public system were equal to 39% for a person with a full career at half the average wage to 1.5 times the average wage. Once private pensions were taken into account, gross replacement rates were equal to 52%

Note: Countries are ranked in ascending order of the share of public pension expenditure in GDP in 2017. From the point of view of pensioners, it is the net replacement rate that is important as it compares income in retirement with working income. However, OECD data are only available for gross replacement rates in both public and private schemes.

Sources: SG-COR calculations based on OECD and Eurostat.

These systems are contributory, in the sense that pensions are proportional to earnings (Italy, Spain and Germany), which leads to a constant replacement rate at least up to the ceiling (France). Redistributions are *a priori* weaker than in the Beveridgian countries.

However, the existence of a ceiling means that, beyond this ceiling, wage differentials are no longer reproduced in pensions; the replacement rate then decreases slightly. Similarly, the existence of a minimum contribution can compensate for this lower redistribution for the lowest wage levels.

Thus, in Belgium the level of the floor (up to 0.7 times average income) and the ceiling (1.2 times average income) are fairly close, which brings the Belgian public pension system closer to a flat-rate system and allows for fairly marked redistribution between wage levels.

Finally, the replacement rates presented here are calculated on the basis of complete careers and may hide the fact that contribution can be modulated by a certain dose of solidarity, notably to compensate for career accidents.

A final group of countries relies on mixed rationales

Finally, in the last group of countries (Japan, the United States and Sweden), social security has evolved by alternating between a Bismarckian-inspired contributory rationale and a Beveridgian-inspired universal redistributive rationale.

The contributory effort is directly taken into account in Sweden since pensions are calculated to represent the actuarial equivalent of contributions. However, the existence of a minimum guaranteed pension and a relatively low ceiling reduces the scope for contribution. As contribution rates are relatively low, the replacement rates offered by the public system are low; 42% up to average

earnings, but decreasing thereafter due to the ceiling close to average earnings. The rate of retirees is relatively high due to an eligibility age set at 62 years but with the possibility of combining work and retirement while continuing to acquire rights (the age of definitive exit from the labour market is thus 4 years higher in this country). The contributory effort is considered indirectly through the insurance record and the earnings in the United States. However, the system introduces a significant redistribution via the pension calculation rules: there are three replacement rates corresponding to three income brackets, the highest bracket bearing the lowest replacement rate. The overall gross replacement rates offered by the public system thus vary from 50% for a full career at 0.5 times average earnings to 33% for a career at 1.5 times average earnings.

The Japanese system is relatively similar to the Canadian system (flat rate + indirect contributory) but the contributory part is more developed with a base and contribution rates in the average of the countries reviewed, which can be explained by the need to finance significant ageing.

Replacement rates remain relatively low but redistributive (to a lesser degree than if the system were solely flat-rate).

In the latter two countries, the rate of pensioners among people aged 65 and over is lower than average due to a relatively high retirement age.

In the end, the size of the public system remains relatively small in these three countries (between 7% and 9% of GDP) and private funds are developed (between 20% and 40% of total expenditure). The rules of the public pension system explain only a small part of the differences in public expenditure as a share of GDP compared to the other countries, while ageing is rather less marked (except in Japan) and the economic context is more favourable (except in the United States).

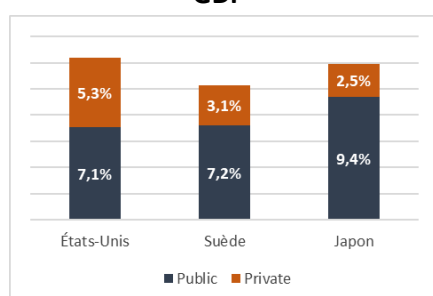
The redistributive objectives of the public pension system can however be mitigated by taking into account pensions from private schemes.

The replacement rates offered in Sweden by the public and private schemes represent a singular case: they are higher for managers in the private

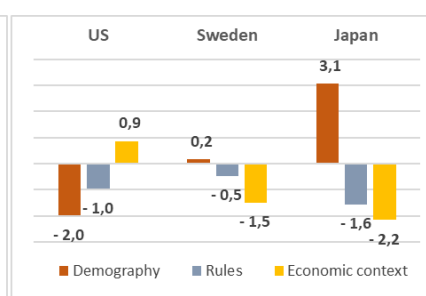
sector (above the average wage) who benefit, in addition to the compulsory schemes, from an occupational pension scheme with a relatively high premium (30% on income above a ceiling), which greatly increases the rights of these insured persons.

Share of expenditure (public and private) in GDP, contribution of regulatory, demographic and economic components to the share of public expenditure and gross replacement rates in the pension system (public and private) in the United States, Sweden and Japan in 2017

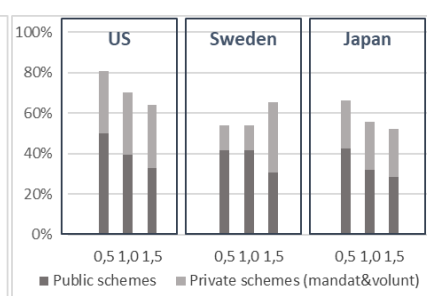
Share of pension expenditure in GDP



Contribution of various factors



Replacement rate



Reading: in 2017, the share of public pension expenditure in GDP was 7.1% in the United States and the share of private expenditure was 5.3%. Compared with the other countries studied by the COR, public pension rules and the demographic situation contributed to lowering the share of public pension expenditure in this country by 1 point and 2 points respectively, compared with the average and all other things being equal, while the economic context contributed to increasing it by 0.9 point. The gross replacement rates offered by the public system varied from 50% for a person with a full career at half the average wage to 33% for a person with a full career at 1.5 times the average wage. Once private pensions were taken into account, gross replacement rates ranged from 81% to 64%.

Note: Countries are ranked in ascending order of the share of public pension expenditure in GDP in 2017. From the point of view of pensioners, it is the net replacement rate that is important as it compares income in retirement with working income. However, OECD data are only available for gross replacement rates in both public and private schemes.

Sources: SG-COR calculations based on OECD, Eurostat and OASDI.

The standard of living of people aged 65 and over is between 80% and 100% of that of the general population and their poverty rate varies from country to country.

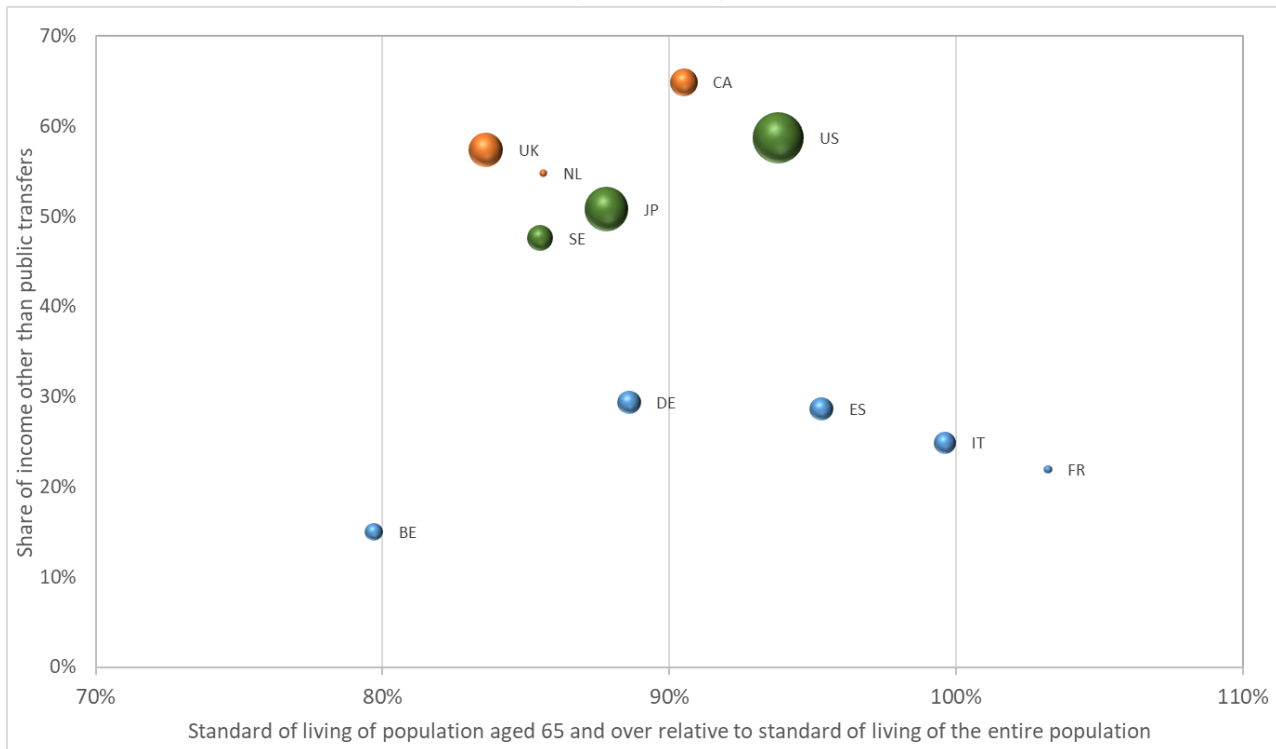
Retirees' living standard and poverty appear to depend little on the design and architecture of national pension systems.

Taking all incomes and household size into account, people over 65 had in 2016, on average in

the OECD, a standard of living corresponding to 87.4% of that of the entire population.

Although the relative living standard of the over-65s is highest among the reviewed countries in France and Italy, which are Bismarckian countries (103.2% and 100% respectively), it is also very close to that of working people in Canada, a Beveridgian country, or in the United States. Conversely, it was lowest in Belgium, representing only 79.7% of the living standard of the whole population.

Disposable income of the 65+ population relative to the total population (x-axis), share of income other than public transfers in the income of households with a person aged 65+ (y-axis) and poverty rate (bubble size)



Reading: in the Netherlands, the standard of living of people aged 65 and over is 85.6% of that of the entire population (x-axis). Funded occupational pensions, capital income from individual voluntary savings and labour income account for 54.8% of the total income of households with a reference person aged 65 and over. Finally, the poverty rate of the 65+ population is the lowest of all the countries studied (3.1%, bubble size).

Notes: Bubbles are coloured according to the groups defined in Part 1; for Japan, 2015 data.

Source: OECD Income Distribution Database, 2020.

In addition to public and private pensions, senior citizens have several sources of income, in particular income from capital and labour income. In Belgium, France, Italy, Spain and Germany, countries with a Bismarckian tradition, more than 70% of the total income of people aged 65 and over comes from public transfers. The poverty rate (at 50% of the median standard of living) of the over-65s is relatively low, close to that of the entire population (Germany) or lower (Spain, France). Income inequalities among the over-65s are therefore no greater than for the entire population.

The graph on the previous page summarises these different dimensions. The x-axis shows the standard of living of people aged 65 and over relative to that of the entire population. The y-axis displays the share of income other than public transfers (income from funded occupational pensions, capital income from individual voluntary pensions and labour income). The size of the bubbles indicates the poverty rate of the people aged 65 and over.

In Beveridgian countries, the relative weakness of public transfers, which represent between 35% and 45% of household income, is offset by the share of funded occupational pensions (the Netherlands, United Kingdom) or capital income from individual voluntary retirement savings (Canada). In Japan and in the United States, a high share of labour income also sustains the standard of living of the elderly.

This large share of supplementary income (which does not aim to reduce income inequality) explains, at least in part, why the poverty rate of people aged 65 and over exceeds 15% in the United States, Japan and the United Kingdom and is higher than the poverty rate of the entire population. The Netherlands, and to a lesser extent Sweden, are the exception: in the Netherlands, the poverty rate of older people is the lowest of all the countries reviewed, and lower than that of the entire population, which can be explained by the level of the flat-rate pension, slightly above the poverty line.

Methodological appendix

The share of public pension expenditure in GDP can be broken down as follows:

Share of public expenditure in the GDP =

$$\begin{aligned}
 & \frac{\text{Population of 65 and over}}{\text{Population between 20 and 64 years old}} && \Rightarrow \text{① Demographic factors} \\
 & \times \\
 & \left[\frac{\text{Average earnings}}{\text{Hourly labour productivity} \times \text{average number of working hours}} \right] && \Rightarrow \text{Share of labour and productivity} \\
 & \times && \text{② Economic context} \\
 & \left[\frac{\text{Population between 20 and 64 years old}}{\text{Employed population}} \right] && \Rightarrow \text{Inverse of employment rate} \\
 & \times \\
 & \left[\frac{\text{Total number of retirees}}{\text{Population aged 65 and over}} \right] && \Rightarrow \text{Rate of retirees} \\
 & \times && \text{③ Rules of pension system} \\
 & \left[\frac{\text{Average pension}}{\text{Average earnings}} \right] && \Rightarrow \text{Relative pension}
 \end{aligned}$$

About the [Conseil d'orientation des retraites](#)

Created in May 2000, the Conseil d'orientation des retraites (COR) is an independent and pluralist body of expertise and consultation, involving in particular the social partners, responsible for analysing and monitoring the medium and long-term prospects of the French pension system. On all pension issues (financial balance, pension levels, redistribution, etc.), the COR draws up the elements of a shared diagnosis. The COR formulates its analyses and recommendations in reports submitted to the Prime Minister, communicated to Parliament and made public.

The COR is a member of the network [France Stratégie](#).

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