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Pension reform in Sweden: Sustainability and Adequacy of Public Pensions

By Hanna Aspegren, Jorge Durán and Maarten Masselink

Abstract

The Swedish pension system was among the first to shift to a system of notional accounts. The aim was to render it fair, transparent, and sustainable and the reform enjoyed a broad consensus across the political spectrum. The reform was radical and complemented the public pension with an occupational pension. In addition, while the public pension remained pay-as-you-go, it became a defined-contribution scheme: contributions are fixed and benefits are later computed as a function of these contributions and life expectancy. This paper takes stock 20 years after the reform. It argues that the reform has rendered the system fiscally sustainable and politically stable but raises concerns about benefits' adequacy because the cost of ageing is shifted onto pensioners. Substandard pensions may lead to ad hoc interventions that go against the aim of automatism/transparency. These adjustments may be seen as hidden costs that could ultimately put pressure on the very sustainability the new scheme is supposed to guarantee.

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Introduction

Sweden was among the first EU Member States to reform in depth its pension system to meet the challenge of ageing.[1] In the context of a wider reflection on the welfare state, the current system stems from negotiations among all major parties in parliament and was adopted with a wide **consensus**. A series of legislative changes from 1994 to 1998 configured the scheme that came into force by the end of the decade. The reform was **radical**. The public pension reform changed the way benefits are calculated to account automatically for increases in life expectancy. In addition, the role of the semi-mandatory funded scheme provided by employers, the so-called occupational pension was strengthened and came to encompass a larger share of the work force. The main goal of the reform was to make the system fiscally sustainable in an ageing society while improving fairness and transparency.

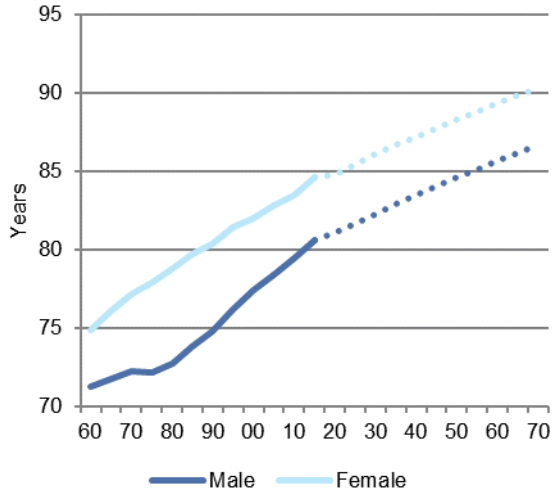
Although the Swedish reform represented a radical paradigm shift, the new system has proven to be quite stable, largely because of its automatism and its budget neutrality. To the extent that it inspires other reform projects across the EU, it is interesting to examine whether it has met its objectives, what are the potential risks of the system, and whether time has preserved the initial consensus.

This paper takes stock of the reform after 20 years. It argues that the design of the reform rendered the system transparent and therefore difficult to manipulate. The fathers of the reform were aware of the risk of pension benefit adjustments for short-term spurious (eventually electoral) reasons. Hence, the emphasis put on consensus and automatism of the new system. Indeed, automatism and budget neutrality, together with the broad political support for the reform, has so far immunised the system against reform reversals so common in other Member States. However, the adjustment mechanisms guaranteeing fiscal sustainability have shifted the financial burden of changes in longevity onto pensioners. While more affluent individuals will be able to compensate for a lower public pension with occupational or private pensions, less well-off individuals may see their pensions drop below adequate levels. If a large number of citizens were to receive sub-standard pensions, the resulting public pressure may force the government to take ad hoc actions to adjust the system.[2] Were that to happen, the transparency and fiscal sustainability of the system, two of the main goals of the reform, could be at risk. Recent reform steps aim at ensuring that the delicate balance between sustainability and adequacy is maintained.

Deep reform

The previous pension system was a standard pay-as-you-go (PAYG) defined-benefit system (see Box 1 for a discussion of various pension-related concepts). It consisted of a flat-rate universal benefit, *folkpension* (FP), for people with no contribution history, and an earnings-related benefit, *allmän tilläggspension* (ATP). In the latter, benefits

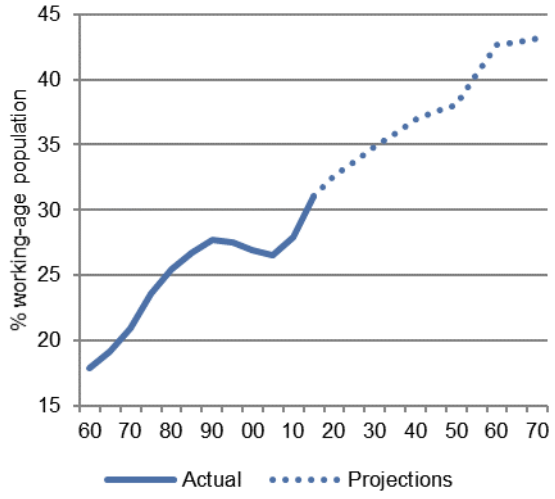
Graph 1: **Life expectancy**



Note: Life expectancy at birth.

Source: World Bank and Ageing Report 2018

Graph 2: **Old-age dependency ratio**



Note: The ratio is the population 65 or older as a percentage of those aged 15-64.

Source: World Bank and Ageing Report 2018

were calculated as a function of the highest earnings in the work life of the individual: 60% of average earnings of the best 15 years, with a minimum of 30 years of contributions to receive a full pension. For people with very low ATP benefits, there was a pension complement plus a housing allowance that provided minimum standards of living.[3] Benefits were funded primarily through payroll taxes. Pension rights were accrued up to a ceiling, beyond which the contribution became a simple tax and revenues were transferred to the general government's budget. Surpluses would feed public buffer pension funds *AP-fonderna*. The reform also affected the four broad fully-funded occupational pension schemes (most often offered via collective work agreements), which gradually shifted from a defined-benefit to a defined-contribution model with the eventual occupational pension depending not so much on the length of the career and the final wage level but rather on the level of the capital accumulated through contributions and yield developments.[4]

A system under stress

Demographic trends, the poor economic performance of the late 1980s, and the crisis of the early 1990s exposed crudely the **sustainability risks** of the old system. First, increases in life expectancy (Graph **1**) increased substantially the dependency ratio (Graph **2**) leaving relatively fewer workers contributing to the system. In barely twenty years, from 1960 to 1980, the dependency ratio went from 17% to 25%. Second, being a defined-benefit system, pensions depended disproportionately on past economic performance, not current capacity to pay of the economy—the ability to raise revenues via payroll taxes—, and this at a time when the economy displayed a dismal performance.

As a consequence, it became increasingly likely that, at some point, a relatively small generation with a relatively lower productivity growth would have to support the old age of a longer-living (and therefore larger) generation with high and fixed pension claims. Two additional problems damaged the **political legitimacy** of the system. First, the ATP benefit ceiling was indexed to prices, not income, thus not keeping pace with real growth of wages.[5] Over time, the gap between average wages and the ceiling became so large that most workers earned salaries above the ceiling for which they did not earn pension benefits. De facto, a *contributory* system was becoming *assistential*, where benefits were largely decoupled from earnings.[6] Second, the remaining link to earnings turned out to be regressive: benefits were calculated on the basis of the earnings of the 15 years with higher earnings. This method redistributed pension rights from blue-collar workers, with a flat pattern of earnings along their life cycle, to white-collar workers, with a high peak above their average earnings profile in their mid- to late-careers—so that the calculated benefit was above average earnings.

A radical reform

These tensions triggered a reflection period that culminated in a far-reaching reform adopted with a wide consensus. Unlike the old system, established by the Social-Democrats in 1958 with forceful opposition from most other parties, the current system stems from a long negotiation culminating in an agreement with a **broad consensus** across the political spectrum.[7] The reformed Swedish public pension system was prepared by a Parliamentary Committee in 1994-98 and entered into force in 1999. Political support was rooted in a shared analysis of the shortcomings of the old system. The reform would aim at achieving a sustainable and fair system. To this end, a system was devised with the following characteristics:

- became **defined-contribution**,
- calculates pensions based on the **entire work life**,
- benefits were linked to **life expectancy** at the time of retirement, and
- **retirement age** became flexible.

The first pillar of the present system is a so-called non-financial or notional defined-contribution (NDC) system.[8] It is still PAYG, retaining part of its intergenerational insurance nature, but introduces a system of notional accounts where contributions are fixed and benefits of the **basic pension** are calculated at the time of retirement as a function of those contributions and the life expectancy at that point in time. Pension rights are credited to the individual notional accounts for 18.5% of the annual pensionable income—mostly labour earnings—, of which 16 pps. are paid to the basic pension and 2.5 pps. to the fully-funded DC premium pension system (see below).[9] The first 16 pps. are actually used to pay current pensions but the individual's "notional account" is credited to this amount. The account then yields a notional return mimicking an actual savings account. The notional rate of return is determined by the growth rate of average nominal

BOX 1: SUSTAINABILITY VERSUS ADEQUACY (AND SOME PENSION JARGON)

Pension schemes can be broadly classified along two dimensions depending on how benefits are calculated and how they are funded. **Defined-contribution** schemes fix the contribution and later calculate the benefit in a way that relates to past contributions, whereas in **defined-benefit** schemes, it is the benefit that builds up along the worker's career and contributions are eventually adapted to the needs of the system. As for the way they are funded, **PAYG** use current social security contributions to finance benefits to the old, while **funded** schemes invest contributions today and use later investment income to pay benefits.

Cases in point are the Swedish first pillar's basic pension—PAYG and defined-contribution—and the Dutch occupational pensions—fully funded and defined-benefit. A priori, economic sustainability is better ensured by defined-contribution schemes provided that the formula used to calculate benefits is sensible. Expenditures in the Swedish basic pension are indeed projected to stagnate or even decrease by 1.5 p.p. from 8.2% to 6.7% of GDP by 2070 assuming unchanged retirement behaviour (see Graph **3** below). In turn, defined-benefit schemes like the Dutch occupational pensions are viewed as better suited to ensure adequacy, even if it is only because there is less uncertainty about the future benefit. However, expenditures are more difficult to contain. Expenditures in Dutch occupational pensions are expected to peak by 2040 above 8.4% of GDP compared to the current 5.2%. In addition, fixed benefits force frequent and ad hoc adjustments of the premia to adapt to changes in the interest rate of the economy (and therefore in the rate of return of the fund).

If it is easier to ensure sustainability in defined-contribution schemes, the downside is the risk of falling short on adequacy. In the Swedish basic pension the benefit is calculated in such a way that the cost of ageing is born entirely by pensioners. As discussed below, life expectancy is expected to increase by almost 5 years by 2060; correspondingly, the annuity is expected to contract by roughly 20% over the same period. Of course, this drop can be partially offset by working longer; below we discuss policy changes that are currently discussed to address these risks.

pensionable income—basically labour earnings—so that each contribution to the account remains constant relative to pensionable income (see the annex for details). Using average wages to determine the notional rate of return keeps the growth of pension claims and of actual pensions aligned with the living standards of the working population. To retain its redistributive nature, pension rights are still accrued only up to a ceiling—currently at around 115% of the average wage—, but the ceiling is now indexed to nominal income so appropriately updated.

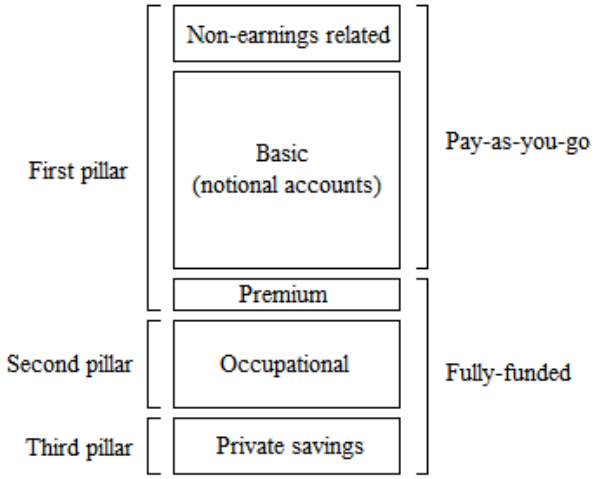
At the time of retirement, a constant annuity is calculated, roughly dividing the pension capital accumulated in the notional account by the expected remaining life length using the notional return as discount factor (see the annex for details). In real terms, this means that the pension is higher at retirement age (frontloaded). The underlying assumption is that, as we grow old, less income is needed for a decent life. The retirement age is flexible: currently, as from the age of 61, anyone can choose to retire completely or partially — still today this flexibility is unique to the Swedish system. Of course, early retirement entails a smaller income pension because less notional capital has to be spread over a longer period. Once persons qualify for the guarantee pension, it may be complemented up to that level. Individuals also have the choice to stay in employment until the age of 67.

The basic pension is complemented with the mandatory **premium pension**. Employees contribute an additional 2.5% of their income to a complementary fully-funded defined-contribution pension scheme. Employees can choose to invest it among a variety of pension funds, the default being a fund managed by the government.[10]

Finally, the public pension system is complemented by a non-earnings related **guarantee pension** financed by general tax revenues. The guarantee pension either tops up a low basic pension,[11] or is offered on a stand-alone basis to people without acquired pension capital. It offers a higher income standard than the minimum social benefits but it is proportionately reduced in case the individual has lived less than 40 years in Sweden at the moment of retirement. Somewhat surprisingly, the guarantee pension is indexed to prices, not to income. As other pension income, the guarantee pension is also fully taxed. While it is possible to claim earnings-related

pension benefits from age 61, it is not possible to receive the guarantee pension before the age of 65. Pensioners above 65 years of age may also benefit from income support for the elderly as well as from a dedicated tax-exempted housing supplement. While formally not part of the pension system, these offer additional support to seniors. Both are means-tested and the latter can at present amount to maximum SEK 5 560 (or EUR 522).

Last but not least, the first pillar becomes fully sustainable by the automatic balancing mechanism (ABM), a way to scale down the remuneration of notional accounts as well as benefits if indexing alone does not manage to keep assets and liabilities in line. When liabilities exceed assets plus buffer funds, all indexing is reduced proportionally to the balance ratio—basically the simple ratio of assets to liabilities—until financial balance is restored.[12] The mechanism first kicked in in 2010, following the financial crisis. Given the significant size of the required adjustment, the mechanism was amended in 2017 to allow limiting the adjustment to one third of the balancing effect per year in order to smoothen its impact.



The public system, or the first pillar, is complemented by the second pillar: most workers are covered by a fully-funded **occupational pension system**.[13] These are semi-mandatory and are part of the compensation of employees in collective agreements between the trade unions and the employers' confederations. The third pillar of the system consist of **private pension** plans, which by definition are fully funded. Until 2016, contributions to private pensions were tax deductible up to a cap, but this is no longer possible, except for self-employed, who are not eligible for occupational pension schemes. Currently, the occupational and private pension schemes represent 17.6% and 6% of total pension expenditures, respectively, and their respective shares are projected to increase to 20.5% and 11.6% by 2070 (see Graph **3** below). The system is summarised in the diagram below, where the size of the boxes is roughly proportional to the current weight of each benefit in the total expenditure on pensions.

Stocktaking twenty years on

While the present system features some important improvements with respect to the old system, it also entails risks, notably concerning public pensions' adequacy. Monitoring adequacy in Sweden leads naturally to a focus on the first pillar, because it is the most important part of pension expenditure in Sweden, where occupational pensions are still relatively modest.

Fairness

The previous system had two major equity problems: it did not base the pension on the entire work life, favouring high-income individuals, and it was increasingly decoupling pensions from earnings, thus in the long run losing its contributory nature that was at the heart of the political legitimacy of the system. In the current system, pensions are linked to all working-life earnings, ensuring an equal and actuarially fair treatment for every contributed krona independently of when or by whom the contribution was made, making the system more *contributory*.

The present system has also improved the situation of individuals who are on parental leave, unemployed, or disabled, because the government makes their contributions against the general budget. In addition, it has opened the possibility to share contributions within couples; this has the potential to improve the pension of spouses, typically women, who decide to reduce their employment intensity to care for children or relatives.

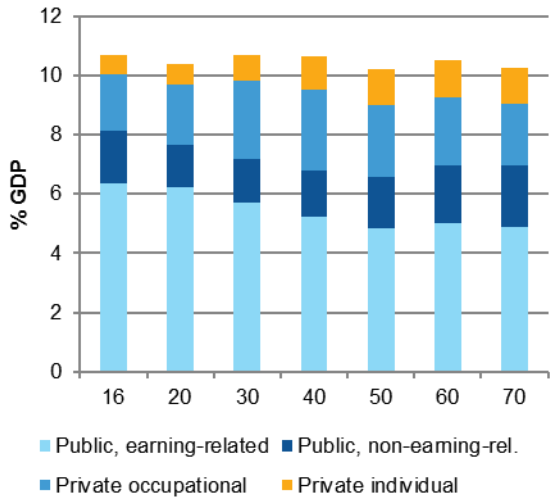
Sustainability

The system has a fiscal sustainability mechanism built in, which functions in a largely automatic way. So far, it has been quite successful in controlling pension expenditure, with only few interventions of the ABM. Long-term projections even foresee public pension expenditure to decrease by 1.5 p.p. of GDP until 2070 (see Graph **3**). This is mainly due to the followingtwo factors: First, changes in life expectancy are accounted for automatically by the

annuity ratio by dividing notional capital by life expectancy. Second, the ABM will automatically adjust any unusual events like large increases in unemployment during recessions. On the other hand, both the notional returns to the individual accounts and the pensions are indexed to average wages and therefore to national income: current and future liabilities are kept reasonably aligned with the actual capacity to pay of the economy.

Despite the inclusion of these sustainability mechanisms, the system retains the link between current pensions and past performance, because the balance of the notional account will reflect the contributions during the work-life of the individual. However, the ABM will scale down the expenditure of the system (reducing the annuities) in the event of a slowdown of the economy, thus guaranteeing sustainability.

Graph 3: **Projected pension expenditures**



Source: Ageing Report 2018

Transparency

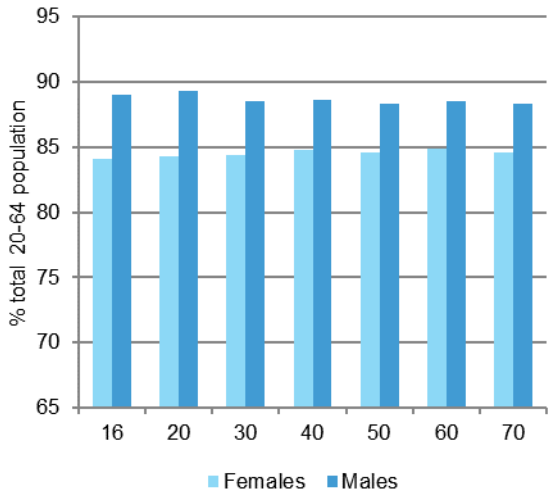
The simplicity and the large degree of automatism of the system improves its transparency. At any point in time individuals can have a fair idea of their pension rights and changes to the system are obvious. Citizens are sent regularly the so-called orange envelopes, a statement summarising accumulated (notional) pension rights.[14] In turn, transparency reinforces sustainability by making short-sighted manipulations or reform reversals more difficult. For example, in election periods it is always tempting to increase pensions, but with the current system, any rise in contributions is automatically and clearly associated with an increase in liabilities (future pension claims) increasing the visibility of the cost of the measure. However, as we shall discuss below, this does not render the system completely immune to political interference.

The gender pension gap

The reform entails significant shifts of income and risk across different population groups, notably across genders.[15] Quantifying the effect on future pension adequacy is difficult because of the complex interactions with demographic trends and labour market developments, but this section points at potential impacts and challenges.

Differences in work histories between men and women increase the pension gender gap when accounting for the entire work-life. The reason is that women have been more prone to have career interruptions than men.[16] However, it is difficult to assess future developments because the current system also brings changes that favour women. For example, the previous life-long widows' pension has been replaced by a temporary, gender-neutral adjustment-allowance, but the transition period is long so it will not affect women of generations in which economic dependency of the husband was more prevalent. In younger generations this situation of economic dependency is less prevalent with currently 80% of women aged 20-64 being in employment compared to 84% of men.

Graph 4: **Long-term projections of labor market participation in Sweden**



Source: Ageing Report 2018

Looking ahead, it is unlikely that the gender pension gap will decrease substantially. Women have pensions that are on average 68% of those of men. Projections foresee a persistent gender gap in labour market participation (Graph **4**) and, although part-

time work is becoming less prevalent, 22% of all women active on the labour market still work part-time.[17] The labour market also remains segregated: roughly 70% of all women work in sectors dominated by women and in positions characterised by lower salaries. Taken together, the fact that women are more likely than men to work part-time, take longer parental leaves and care for ill children and relatives results in sizeable difference in income levels. In 2016, the income of women was 88% of that of men, a situation which will affect future pensions.

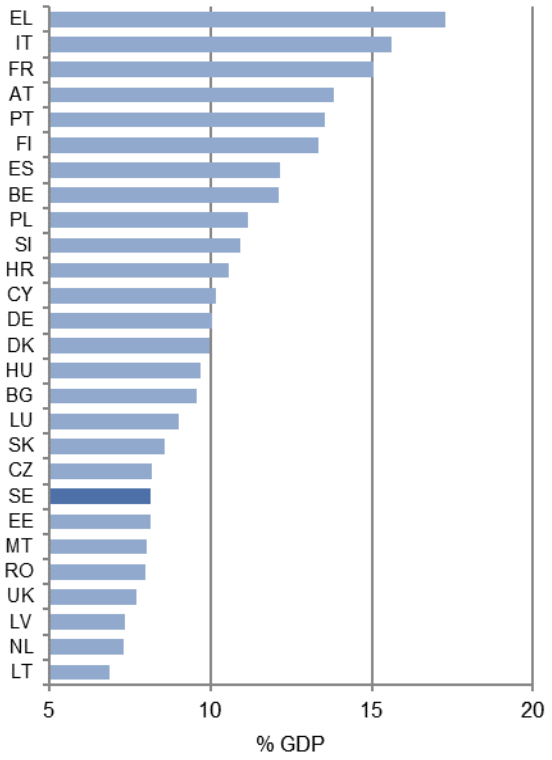
On the other hand, the gender gap is mitigated by the use of a unisex divisor or G-value for the calculation of the annuity. As women live longer than men, currently 84 and 80 years respectively, this constitutes de facto a significant transfer of pension income from men to women. For example, if a male and a female retire at 65 and have an expected survival of 18 and 21 years respectively, the average annuity for males is roughly 6% lower than the pension it would correspond to his lower expected survival, and vice versa for females. To illustrate this, take as a reference the current average monthly basic pension SEK 12 600 (EUR 1 184). To get equivalent notional capital gender-specific annuities a pension would yield SEK 12 800 (EUR 1 203) for men and SEK 11 268 (EUR 1 059) for women.[18] It may be worth noting that this kind of redistributions also happen across socioeconomic groups with sizeable differences in life expectancies.[19]

Adequacy

In principle, the indexing of the scheme ensures that pensions are aligned with the growth of the economy, and hence its ability to pay, improving sustainability of the system. Linking pension rights (and payments) to average wages contributes to maintaining the purchasing power of pensions (when the annuity is calculated) relative to the rest of the economy.

However, this rule entails some risk that the adequacy of pensions may become insufficient in light of **ageing** and its impact on the **replacement ratio**. As mentioned above, the entire impact of ageing is absorbed by the annuity via the larger G-value divisor. The impact on pensions can be illustrated with a simple calculation. Demographic projections foresee an increase of between four and five years in life expectancy at 65 from today to 2060. With the official discount value of 1.6%, this increase in life expectancy induces a contraction of 20% in the annuity (see Box 1). Hence, not surprisingly, official projections predict a contraction of the annuity of between 17% and 19% and it is also roughly what one would expect if the dependency ratio goes from 0.3 to 0.4 (see again Graph 2) leaving the expenditure-to-GDP ratio constant.[20] This drop will reduce further expenditure in public pensions, already low by EU standards (Graph 5).

Graph 5: **Expenditure on public pensions, 2016**



Source: Ageing Report 2018

Note, however, that these projections do not account for any eventual increase in the age of retirement. If people would work longer, the reduction in the public pension replacement rate could be lower: 4 pps. by 2070 instead of the 7 pps. foreseen in the baseline projections, and below the 8 pps. EU average.[21] In other words, the size of the future pension benefit crucially hinges upon the behavioural response of workers, and the design of policies that affect it (see also reform section below).

As occupational pension funds grow, the relative importance of the second pillar is expected to increase as well. For the average household, the modest increase in occupational pensions from 1.9% to 2.1% of GDP between 2016 and 2070 is far from offsetting the drop in basic pensions. In addition, it is likely that the contraction in basic benefit levels will affect disproportionately those who cannot rely

on occupational or private savings, typically the less affluent and vulnerable households.

In these cases the **guarantee pension** will likely play a key social security role. It reduces the risk of poverty among older people, even if it is a modest amount (SEK 7 363 (EUR 692) per month before tax for married persons in 2019 and SEK 8 254 (EUR 775) for singles, to compare with the average total pension of roughly SEK 17 200 (EUR 1 616)).[22] This income is complemented by other measures, like housing allowances, and by the relatively generous in-kind benefits of the Swedish welfare state, notably health services. However, the guarantee pension is indexed to prices, not average wages, so over time the minimum guaranteed becomes negligible compared to average wages because its value relative to incomes is eroded over time.[23] More on this below.

Political sustainability and reforms in the making

The pension reform in Sweden was aimed at improving transparency, fairness, and sustainability of the first pillar. The first objective has been attained with clear rules and formulas that make the system relatively autonomous, not requiring recurrent ad hoc adjustments. It has also succeeded in improving fairness by better linking benefits with contributions, compensating for periods off-work, and introducing flexibility in the retirement decision. Financial sustainability is achieved by tying benefits to the contemporaneous capacity to pay and adapting them automatically to changes in life expectancy. However, political sustainability may be compromised because the reform shifts the burden of ageing onto pensioners: average public pensions relative to average wages are expected to drop by 16.5 pps. in the coming decades. For low income individuals, the mitigating effect of the guarantee pension is gradually eroding because of the price indexing of the guarantee pension. Once the guarantee pension is perceived as inadequate, political ad hoc measures topping up the guarantee pension—like increasing the housing allowance, the specific income support for the elderly, or cutting taxes for pensioners—would become politically tempting. Ensuring a consistent development of the guarantee pension might then be a less costly option in the end.

The system has proved resilient and sustainable, but after two decades, it calls for fine tuning. Replacement ratios are shrinking, linked primarily to the increased life expectancy of the population. Also other unexpected demographic factors, such as the recent immigration flows, put some aspects of the system into question, mainly related to the adequacy of pensions in the long-run.

After a few years of deliberations, the intra-Parliamentary committee responsible for overseeing reforms of the pension system agreed on a reform package in December 2017 with the agreement of the major parties. The changes aim at strengthening incentives to work and to stay longer in the labour force in order to fund other measures, entailing increases in expenditures. They encompass in particular:

- A gradual increase in the minimum retirement age from 61 to 64, combined with giving job holders the right to continue working until the age of 69.[24]
- While not modifying the indexation rules, the guarantee pension, the housing allowance as well as the specific income support for the elderly will increase. The changes are expected to take effect in 2020.[25] In addition, the level of the benefits will increase further should the individual postpone retirement.
- The minimum age required to benefit from the guarantee pension is increased from 65 to 66 in 2023, but as from 2026 it will be tied to the average life expectancy suggesting a continuous increasing trend.[26]
- The age limits of social welfare measures such as unemployment and sickness benefits, disability benefits etc. will be correspondingly increased as well in order to reflect longevity developments.
- The premium pension system will be stream-lined to make the funds' marketplace more secure for the individual pension saver.

The measures are expected to be neutral in terms of public finances: on the one hand, increasing the age limit of the public welfare system entails additional expenditure, but this is expected to be offset by the effects of a longer working life.[27] Recent reforms include a simplification of the existing possibility to transfer premium pensions rights between spouses with the objective of increasing income equality of men and women in retirement.[28]

Finally, following the abolition of the income tax deductibility of contributions to private pension plans, it is difficult to say how private pension saving will evolve. If the replacement rate of the basic pension falls significantly, it may still foster

private saving in other forms in the future. Quicker amortisation of mortgage loans during the active work-life could be one option, to ensure smaller debt-servicing costs upon retirement, and hence diminish the vulnerability of households to interest rate hikes. However, today 65-year-old persons who take up new mortgage loans still have a loan-to-value ratio of roughly 50% in Sweden. Overall, the total debt of persons above 65 has increased quickly from SEK 146 bn to SEK 300 bn in 2010-16. At the individual level, this corresponds to a debt-to-income ratio of roughly 230% for 65-year-olds, which in itself could be a risk to pension adequacy in case of interest rate hikes or housing price falls.[29]

Final considerations

The announced modernisation measures address some of the key issues considered in this paper. Falling replacement ratios are restored by shortening the expected number of years that pensions are to be paid out. Increasing the income of the most vulnerable groups of pensioners is also a step towards keeping pension benefits at adequate levels.

As argued above, transparency was a key goal of the reform of the system, whose legitimacy relies critically on the public understanding of the automatic adjustments built into the system.[30] To preserve this transparency, however, it may be worth clarifying what measures constitute legitimate tools to adjust pensions benefits. While it is clear that discretionary tax measures may not address the root causes of the perceived limitations of the system, previous governments, both centre-right and centre-left, have chosen this approach in the recent past because it allows to retouch benefits without amending the system explicitly.

The intra-Parliamentary Pensions Group has come a long way with the agreement recently presented. However, going forward, the group already sees a need for a continued analysis focusing on the contribution rate as well as on the rules governing the occupational pension scheme. It also calls for measures promoting life-long learning and a healthy work place, to ensure that the labour force will actually be fit to contribute effectively until retirement.

Further avenues to be explored could be to give the individual job holder the possibility of making full pension contributions while working part-time, to increase the flexibility of the labour market and promote pension income equality between men and women (reduce the so-called pension gap). Further analysis of the consequences for the pension system of the late entry age on the labour market as well as of the recent demographic developments could also be considered.

Annex

Actuarial details render the original formulas governing the pension system quite cumbersome. However, assuming that every individual dies at his/her expected lifetime and retires at the end of the year, the formulas become relatively simple. The income index I_t is defined as the average of real pensionable income of the past three years plus last year's inflation. This rolling average smoothens the series. The notional nominal return n_t is defined as the growth rate of the income index $1 + n_t = I_t / I_{t-1}$. For the basic pension every year t a worker contributes $C_t = 0.16\, W_t$ to his/her notional account, where W_t denotes pensionable income, mostly labour earnings. The balance B_t is then

$$B_t = ((1 + n_t)B_{t-1} + C_t)\, A_t,$$

where A_t is the balance ratio: equal to one when assets of the system are larger than liabilities and equal to the ratio (smaller than one) when liabilities are larger. This simplified equation abstracts from administrative costs.

Let T be the last period of work so the notional capital is B_T. Abstracting from survival ratios and assuming that the individual will live exactly D years, a constant anuity $P_{T+j} = \bar{P}$ must verify

$$B_T = \sum_{j=1}^{D} \frac{P_{T+j}}{(1 + n^e)^j} = \bar{P}\left(\frac{1}{1 + n^e} + \cdots + \frac{1}{(1 + n^e)^D}\right) = \bar{P}G,$$

that is, the present value of all future payments must equal the notional capital of the individual. Since future yields are unknown at the date of retirement, the system chooses a constant guess $n^e_{T+j} = n^e = 0.016$. Factor G is the so-called G-value used to compute the annuity $\bar{P} = B_T / G$. Longer life expectancy affects pensions via the G-value. For example, an increase in five years in life expectancy would increase G from 16 to 21, and hence would decrease the annuity by 20 per cent. This gives an idea of the importance of this G-value in the system.

Finally, the system corrects deviations of actual n_{T+j} from n^e updating pension payments accordingly. Hence, actual payments stem from the formula

$$P_{T+j} = \frac{1 + n_{T+j}}{1 + n^e}\, P_{T+j-1} A_{T+j}$$

for $j = 2, \ldots, D$, with the first payment $P_{T+1} = \bar{P}$. Note that pension payments are also subject to the eventual ABM correction A_{T+j}. Of course, if $n_t = n^e$ every period, then the actual payments would simply be the constant annuity. To illustrate the mechanism, suppose inflation is 1% and real wage growth is 2%, then benefits are increased by (1 + 2) – 1.6 = 1.4%. In that sense, the choice of 1.6% is relatively irrelevant provided it does not deviate substantially from the actual rate.

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[1] The Dini reform in Italy adopted in 1995 introduced a notional defined-contribution (NDC) system at around the same time the Swedish parliament was implementing its own reform.

[2] Historically, when pensions have fallen short of ensuring a minimum level of life, ad hoc measures have been taken to amend the system. For example, the US federal pension system has its origins in the Great Depression, when many households lost their savings for their old age. Another example is the German pension system, which corrected for the hyperinflation in 1922-23 (Börsch-Supan and Wilke (2006)).

[3] See Könberg et al. (2006) for more details on the old system and on the reform by some of the authors of the reform themselves.

[4] Ministry of Health and Social Affairs (2009).

[5] Changes in nominal income stem from inflation plus real growth. Indexing to prices alone maintains the purchasing power but misses real growth. Hence, relative to others, as a percentage of wages, the ceiling becomes negligible in the long-run.

[6] Both the old and the new system are contributory, or Bismarckian, regarded as public old-age insurance systems with benefits related to earnings: payments to the system are not regarded as taxes but as contributions to the pension. This contrasts with assistential or Beveridgean systems where everyone receives the same (and basic) pension in their old age, not related to income. The unintentional shift from one system to the other because of inappropriate indexation is not uncommon (see e.g. Conde-Ruiz and González (2014)).

[7] The political process of the reform in Sweden is examined in detail in Anderson (2005) and Chłoń-Domińczak et al. (2012). In the reform and its stability consensus is key. A recent conference, "CORE Conference on Pension Reforms in Europe", Louvain-la-neuve, 11 November 2018, enjoyed the participation of some of the main pension economists behind recent pension reforms in the EU and elsewhere, including Edward Palmer, one of the fathers of the Swedish reform. At the conference, short-sighted reform reversals where identified as the main risk. In that sense, it may be worth recalling that, originally, the expression "pension sustainability" referred to political rather than financial sustainability. It could also be argued that the depth of the recession helped the reform being accepted by the public in the early years. These days, after 20 years of sustained growth, the consensus will be put to a test.

[8] For a primer on NDC systems see World Bank (2005). Note that a constant annuity implies that, in real terms, the pension payments are frontloaded. Compared to a payment stream that would be constant as a fraction of pensionable income, the constant annuity with a survival of 16 years would be roughly 12% higher in the first year of retirement.

[9] To be precise, the employer contributes 10.21% of the gross pensionable income, and the individual pays a pension contribution amounting to 7%. However, the contribution is calculated on earnings net of the employee contribution, i.e. (0.07+0.1021)/(1-0.07) = 0.185. As the individual's pension contribution is fully deductible against other income taxes, only Swedes with an income below roughly SEK 25 000 actually pay these contributions directly.

[10] This mandatory fully-funded complement was introduced as a result of the negotiation process. Political parties advocating a move to a fully-funded system were probably given the premium pension system as a concession in the negotiations. See again Anderson (2005). However, the structure of the premium pension system has led to difficulties in overseeing the numerous funds, and abuses on the part of some fund companies and advisors have occurred. As a consequence, the Pension Group of the Swedish Parliament has agreed on a reform of the premium system.

[11] The threshold above which no guarantee pension component is due is SEK 11 906 (EUR 1 119) per month for singles and and SEK 10 553 (EUR 991) per month for married persons.

[12] For example, if nominal average wages increase by 4% and the balance ratio is 0.99, then the net return is 1.04 × 0.99 = 1.0296, i.e. 2.96%. This does not work the other way around: a balance ratio above 1 does not lead to increases in pensions. For a non-technical description of the ABM, see Settergren (2001).

[13] The focus of this paper is public pensions. For details on the private so-called second and third pillars of the system, see Könberg et al. (2006).

[14] It may be worth noticing that there is no total consensus about this transparency. Despite the "orange envelopes" and other communication strategies, some pension economists believe many people are not aware of the drop in pensions that will happen due to ageing (see for example Dahlberg (2014)).

[15] The Pension Adequacy Report 2018 (European Union (2018)) identifies for Sweden the gender pension gap as an outstanding issue. As the Report mentions, and this paper shall discuss below, gender-equal pensions is one of the objectives of the December 2017 package.

[16] This is because now the whole work-life counts while before it was only the "best" years. However, this is not exclusive to NDC systems: many defined-benefit systems are modifying the way the benefit is computed in order to account for the entire work-life of the worker.

[17] In 2017, 22% of women worked part-time compared to 45% in 1987. The corresponding figures for men were 9% and 6%, respectively.

[18] More precisely, the Ministry of Finance (2017) estimates a pension 8% higher for women (at age 65) compared to the calculation based on sex-specific life expectancy. See Ståhlberg et al. (2006) for the gender dimension of pension reform in Sweden.

[19] This gap is not limited to gender or specific to the Swedish system. In general, using the same value for every individual entails large redistributions across population groups with different life expectancies. In general, it will affect any system that has longevity-insurance built in and does not discriminate between population groups. See Pijoan-Mas and Ríos-Rull (2014) and references therein, or the less technical summary in Tavernise (2016).

[20] In long-term projections, the main factor behind lower replacement rates (the relation between pension income and pre-retirement earnings) is increases in life expectancy (see Lundberg et al. (2012) and Ministry of Finance (2014)).

[21] See 2018 Ageing Report, Part II, section 1.8.3, Policy-change scenario, and Part II, Table II.1.18.

[22] SEK 14 200 (EUR 1 334) per month for women and SEK 20 700 (EUR 1 945) per month for men on average.

[23] As a matter of fact, long-term projections assume price indexation in the short-term, but then the guarantee pension is linked to income in order to keep its value at a credible level; otherwise the guarantee pension becomes very quickly negligible as a percentage of average income (see again Lundberg et al. (2012)).

[24] During the transition period 2020-2026, the minimum pensionable age gradually increases from 61 to 64, and the minimum age for legal dismissal because of age is increased from 67 to 68 in 2020, and from 68 to 69 in 2023 (Ministry of Health and Social Affairs (2017a)). Observe that early retirement comes at a cost for the individual but also for the government budget because support to low-pension households (guarantee pension, housing allowance, special income support, etc.) also increase.

[25] The proposed changes include inter alia raising the guarantee pension by SEK 200 (EUR 19) per month for all beneficiaries, and by an additional SEK 700 (EUR 65) and SEK 200 (EUR 18) per month for single and married beneficiaries with particularly low incomes. In addition, the maximum housing allowance is raised from SEK 5 560 (EUR 522) to SEK 6 540 (EUR 614) per month (Ministry of Health and Social Affairs (2019) https://www.regeringen.se/pressmeddelanden/2019/01/hojd-garantipension-och-hojt-bostadstillagg-for-pensionarer/).

[26] Ministry of Health and Social Affairs (2017 a). Persons having had a working life of at least 44 years will henceforth also be eligible for the guarantee pension as of the age of 65.

[27] The National Institute of Economic Research (NIER) estimates that the proposed reforms will increase labour market participation by 1% in 2030 compared to unchanged rules regarding pensionable age, etc. At the same time, NIER estimates that roughly half of this increase reflects an underlying trend towards a longer, healthier working life.

[28] Ministry of Health and Social Affairs (2017b).

[29] See Finansinspektionen (2019) and Swedish Riksbank (2018) respectively.

[30] Könberg et al. (2006).

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