

Pension sustainability, adequacy and automatic adjustment mechanisms in the EU

The terms of automatic adjustment or balancing mechanisms, automatic pension system stabilisers were initially used in descriptions of some pension systems, for example in Sweden, Germany or Japan. Describing such systems as a trend in reforms started after the recent crisis¹, maybe not independently from the contingency measures of that phase. Italy, Portugal and Spain joined the textbook cases by that time.

At first sight, from the name and from the recent history, an automatic adjustment mechanism (AAM) appears to be a sustainability measure. Initially it was widely called automatic balancing mechanism, narrowly referring to decreasing the deficit of a balance. Indeed, adjustment and its balancing tools refer to income and revenues, and during the crisis stabilising meant primarily cutting expenditure and collect more income by restricting measures. However, pro-cyclical austerity measures often followed by corrections, together presenting higher risk to the pension system. Therefore, we are attempting to look at it in a more general view as opportunity to adjustments for sustainability and adequacy, aiming intergenerational fairness in long term.

As a working definition of the term we use the following:

“Automatic adjustment mechanisms

- are pre-determined measures **[automatic]**
- applied on selected* parameters of the system in conjunction with each other and successively in time in *systemic approach and in relation with the objectives **[systemic approach]**
- depending on the actual or projected status of the system, using its internal or external parameters as indicators **[conditionality, triggering]**
- to change present and future pension values **in relation with** the status of the system, the indicators, or the objective criteria of sustainability and adequacy, intergenerational fairness. **[subject to an explicit objective]”**

In a more general approach AAM is a characteristic of a pension system, using coordinated measures of indicators, trigger mechanisms, and applying automatic adjustments (according to predefined procedures) at intervention points. As all pension systems, AAMs also may also include non-automatic (predefined, fixed) measures.²

¹ See OECD (2012)

² Some papers (e.g. the Eurogroup Notes, see below) also refer to automatic balancing mechanisms as individual stabiliser mechanisms, activated on trigger mechanisms.

1 Relevance of AAM: The AAM framework of the Eurogroup

In 2016 leaders of the Eurogroup MSs agreed in four common principles “for strengthening pension sustainability”.³ These principles were aimed to become guidelines for future pension reforms, and were based on the 2015 issue of the Ageing Report and the Pension Adequacy Report. The first guideline is “Safeguard against demographic and macroeconomic risks”, and the proposed solution is the introduction of automatic balancing mechanisms.⁴ Other principles propose supporting [labour market] policies to extend working lives to achieve higher benefits and also cater for non-pension benefits, as well as increase labour productivity. Finally, achieving political and societal support has also been acknowledged to avoid the risk of policy changing. The Eurogroup required the Commission to prepare an analytical framework on benchmarking MSs’ pension system, and the EC presented the Note on benchmarking in April 2017.

One of the proposed measures is to introduce automatic pension adjustment mechanisms addressing the increases of life expectancy by rising retirement age proportionally, where it has not been done yet. It can be done using a direct link to retirement age or as included in a sustainability factor. This provision would also improve pension adequacy.⁵ According to the earlier Reports, a link between the retirement age and life expectancy, introduced also in Eurogroup Members where it has not been yet, this measure would decrease the public pension expenditure ratio by 0.5pps and would increase the benefit ratio by around 1½pps in the euro area.

1.1 Setting the objective

The Commission’s analysis for the Eurogroup used the 2015 Ageing Report. While the Report foresees improvements in pension spending, they have found the results too dependent on the demographic and macroeconomic assumptions. They claim that long-term phasing in of reforms and less favourable economic developments, higher life expectancy gains may endanger the expected decrease in pension expenditure. Also, pension expenditure might crowd out other social expenditure which, on the other hand would support broader labour market policies which are also included in the principles, and in the end leading to the risk of reform reversals. Therefore the Eurogroup reiterates the necessity of further actions to “strengthen the resilience of public pension systems to adverse demographic and macroeconomic developments [...] as well as reinvigorating the structural reform agenda to strengthen growth and employment.”

1.2 Benchmarking pension systems

The Eurogroup is proposing a benchmarking of the Members’ pension systems on how the systems fulfil the ‘common principles’, with a particular focus on the first two (‘Safeguard against demographic and macroeconomic risks’ and ‘Flanking policies’). There are three groups of indicators, and the indicators covering the application of AAMs are among the policy indicators. The assessment

³ Pension sustainability in the euro area – fiscal risks associated to demographic and macroeconomic uncertainties and policy options Eurogroup Issues note Ref. Ares(2016)2896019 - 22/06/2016, and Strengthening pension sustainability in the euro area: a benchmarking exercise Eurogroup Issues note, Brussels, 14 March 2017 EC DG ECFIN\Fiscal policy and policy mix\Sustainability of Public Finances

⁴ In the examples AAMs are listed as automatic balancing mechanisms, sustainability factors and/or links to life expectancy in pension systems. In this use automatic balancing mechanisms are adjustments based on trigger mechanisms, sustainability factors are adjustments using changes in demography/life expectancy.

⁵ If the service period and effective exit age is also increasing.

focuses on the retirement age and parameters of determination of the pension benefit, and uses policy indicators for:

- The standard retirement age (SRA)
- Automatic adjustment mechanisms
- Key parameters determining the pension: indexation, valorisation and pensionable earnings reference period

The Eurogroup Notes discuss these policy indicators, or, in fact parameters one-by-one. However, they also highlight the options how they might be used as an automatic adjustment, linked to a reference variable, as for example in the case of linking the SRA and benefit calculation to the increase in life expectancy, and they also appear under the automatic adjustment mechanisms heading, too.

Instead of the summary table of the Eurogroup Note, we exhibit the table of the Ageing Report (Table II.1.2):

1. Table Automatic balancing mechanisms, sustainability factors and links to life expectancy in pension systems

Country	Automatic balancing mechanism	Sustainability factor (benefit link to life expectancy)	Retirement age linked to life expectancy
Italy		X	X
Latvia		X	
Poland		X	
Sweden	X	X	
France*		X	
Germany	X		
Finland		X	X
Portugal**		X	X
Greece***			X
Denmark****			X
Netherlands			X
Cyprus			X
Slovak Republic			X
Spain	X	X	
Lithuania	X		
Malta*****			X
Norway (UK)		X	(X)

In all the NDC system the benefit is linked to life Expectancy through the annuity factor.

**Pension benefits evolve in line with life expectancy, through the coefficient of 'proratisation'; it has been legislated until 2035 and not thereafter.*

*** Only two thirds of the increase in life expectancy is reflected in the retirement age.*

**** An automatic balancing mechanism is applied in auxiliary pension system.*

*****Subject to parliamentary decision.*

****** Subject to parliamentary decision. A stable proportion between the contribution periods and life expectancy at retirement is to be kept (the Government is obliged to lay on the Table of the House of Representatives, within intervals not exceeding the period of 5 years, a report giving recommendations with a view of keeping a stable proportion between the contribution periods and life expectancy at retirement).*

Source: Commission services, EPC.

Notes: Column one might be a complex measure in itself. NDC is regarded as an automatism in column two. There are only five MSs with two adjustments.

Other points of intervention in maintaining pension adequacy and system sustainability are the key factors determining the pension benefit: *i)* valorisation, *ii)* indexation and *iii)* the pensionable earnings reference (or service) period.

As a general consideration, other parameters remaining the same, valorisation and indexation of pensions⁶ linked to wages is resulting in higher pensions and consequently in higher expenditure, and vice versa.⁷ An indexation rule with provisions smoothing the effect of an economic variable over time (“corridor”) may contribute to intergenerational risk sharing by reducing fluctuations.

Note, that valorisation and indexation are AAMs in the sense that they link the value of pensions to an external variable by a predefined rule. AAMs also may use additional stabiliser factors in the formula, which include GDP and demographic indicators in valorisation and indexation.

Increasing service period requirement is a proxy for increasing retirement age from adequacy point of view: both targeting later effective labour exit age.

We may use different categories for what is called by the Eurogroup policy indicators. For example according to points of intervention automatic adjustments may change eligibility criteria or benefits. In this case valorisation and indexation are changing the value of benefits (rights), indicators like retirement age and service period are eligibility criteria.

2 Introduction to the AAM framework

The first automatic adjustment was introduced in Denmark in 1922 for pension indexation, replacing ad-hoc increases.⁸ Other traditional automatic adjustments are valorisation and contribution ceilings, linked to wage or price indices. For our purpose we call AAM a consistent set of rules which may include trigger and application mechanisms which implement an objective.

Changes of parameters of the pension system effect the inter- and intra-generational distribution of pensions. Different AAM factors are aiming to use directly this solution for redistribution. The trigger indicators of the AAMs can be also used as signalling tools to check fulfilling the objectives and to draw attention risk processes in the pension system.

2.1 Setting objectives

AAMs may have the same objectives as ad-hoc changes, but the difference is having by definition long term processes including mechanisms with measurable indicators. This also means, that the

⁶ ‘Indexation’ refers to the adjustment over time of pensions in payment. ‘Valorisation’ refers to the adjustment over time of the value of pension contributions paid (in NDC systems) or the points accumulated or pensionable earnings of past years (in DC or point systems) (source: Eurogroup Note)

⁷ As a rule of thumb, in non-crisis periods supposing real wage growth $CPI \leq dW$, “wages and prices tend to move together”.

⁸ Elif Arbatli, Csaba Feher, Jack J. K. Ree, Ikuo Saito and Mauricio Soto: Automatic Adjustment Mechanisms in Asian Pension Systems? IMF Working Paper WP/16/242 December 2016

trade-offs between sustainability and adequacy, inter- and intra-generational redistribution might be intentional.⁹

The objectives of the changes to the pension system should be formulated from the present state of the pension system. Consistent and measurable variables are used to describe the present and expected future states. The trigger indicators and the points of interventions, and the adjustment mechanisms are derived from the required changes providing for the feedback in the system.

2.2 Variables and interventions

The two main mechanisms of an AAM are the trigger and the interventions. The first one is determining which, when and how an intervention should be applied. The second describes the changes to the pension system: the adjustment of the parameters in relation to the activated trigger.

2.3 Trigger mechanisms and variables

A quantitative approach is derived from the long term actuarial equilibrium of a pension system.¹⁰ In this case the system is in (actuarial) balance, i.e. the expected contributions and other revenues finance the expected pension expenditure over an adequately long period (usually 40/60/75 years).

Trigger mechanisms of the AAMs in operation are using sustainability indicators¹¹: present or future expenditure or deficit, dependency ratio, changes of life expectancy or contributory years to length of benefit. The latter ones implicitly suppose higher expenditure without intervention, as demographic ageing is a one-way trend. Most variables used ex-post: observing a change above a predefined level activates an action. Ex-ante use of the variables is meaning projecting. E.g. it can be the balance of the system, which might also involve projecting life expectancies, too. Linking the rising of the retirement age and benefit right indexation¹² are always using observed increases.

2.4 Points of intervention and parameter adjustments

As a consequence of the definition of the actuarial balance, the adjustment instruments are chosen to correct the actuarial imbalance. The points of intervention correspond to periods and events of insured career (earning pensionable income and paying contributions, accrual of rights, retirement, and drawing pensions). The three categories of interventions/adjustments are [changing] (1) contributions, (2) eligibility criteria and (3) benefit levels (values or rights).

2.4.1 1 Contribution rates

Contribution rates are exceptionally used in AAMs. It has been too frequently used as ad-hoc measure in the past, and according to mainstream opinions the undesirable labour market and adequacy side effects are overweight the sustainability results. However, it is a strong measure, and

⁹ Stand-alone or ad-hoc rules may wipe out each other or may have unintended side effects. In AAMs there is an option for building in stabilising and adequacy provisions intentionally. E.g. Generational redistribution is a basic adequacy tool in protecting low income, split/short career workers.

¹⁰ OECD (2012)

¹¹ An adequacy example is from outside Europe: in Japan if the replacement rate is below 50% automatic correction is called for.

¹² Valorisation meaning right accrual during active life, and benefit indexation after retirement is meaning changing pension rights during decumulation.

the most frequently quoted example is Germany: the contribution rate is adjusted to the medium term required balance.¹³

From actuarial or inter-generational fairness point of view, the case when contribution rates formally linked to benefit levels has to be mentioned. In this case actuarial fairness still depends on the details of rules of the scheme (below/at/over actuarial neutrality).¹⁴

2.4.2 2 Eligibility criteria: Pensionable age

Linking the pensionable age to increase in life expectancy has become widely used as the ageing of the society has been generally accepted. Still, there are two approaches. According to the first one the increase is added to the active period, for example in Greece, Finland and Portugal. In the second solution the ratio of the retired and active period is regarded as 1/3 to 2/3, and this proportion is aimed to be kept constant, like in France and the UK (in the future). Starting from a balanced situation the first solution provides higher gains to the actuarial position. Other eligibility criteria, such as required service period, are usually kept as fixed term periods.

2.4.3 Benefit levels

Benefit levels can be adjusted by (1) valorisation rules, (2) the benefit formula, (3) indexation of the benefits, and (4) direct financial stabilisers. These methods have been developed according to financial stabilisation lines, but some of them are used to improve adequacy.

2.4.3.1 Valorisation

Valorisation in DB social security schemes has retrospective effect on pension rights if calculated at retirement. However, valorisation factors are defined annually, based on external economic data, and never changed retrospectively.¹⁵ This makes the DB similar to the NDC case, where the nominal returns credited to the accounts during the course of the active life. Wage index valorisation and higher GDP growth share can be used to maintain future value of the contributions (as a means of deferred consumption). AAM systems use additional adjustment factors to take into account changes in labour market and economy (e.g. wage bill, dependency ratio, GDP growth).

2.4.3.2 Benefit formula

Taking into account the life expectancy in the DB benefit formula or the annuity factor in the NDC case, is an automatic adjustment. In the DB case the starting point is a base year when the system is in balance. Including the life expectancy in the formula protect against the effect of longer than expected benefit payment.

¹³ Outside Europe the best example is Canada: it is used as a deterrent for non-action by the Government. If there is no alternative proposal before the Parliament, the contributions raised and the benefits are frozen until the next actuarial valuation. Note: this is a forward-looking measure in both cases.

¹⁴ Even in NDC systems the result depends on nominal return patterns, and the theoretical fairness holds on the long term, in reality the sustainability is decided in short term.

¹⁵ For the same calendar year the past service of the new retirees in a given year have to be evaluated with the same valuation factor as for the future retirees for the same at their retirement.

The parameters of benefit formula are defining the inter- and intra-generational distribution of benefits, fairness, neutrality or solidarity.

2.4.3.3 Indexation of benefits in payment

As discussed before, indexation pensions differently from wage indexation changes the relative status of pensioners to active workers, as might be indicated by replacement rate or benefit ratio measures. Using different indexes might be justified, but as a minimum requirement the purchasing power of the pensions might maintained by price indexation. Note, that career patterns has changed during active life, while the pensions in payment are quasi riskless.

Member States (MSs) with full AAM systems also apply stabilisation factors reflecting the financing of the pensions (dependency ratio). The revaluation of the benefit using development in life expectancy is also used where the life expectancy is included in the benefit formula (life expectancy coefficient).

2.4.3.4 Automatic rebalancing

This adjustment mechanism is not necessarily a stand-alone category, but a subcategory of the before categories. Sweden, Italy, Poland and Latvia are operating NDC systems with regular valuation of the actuarial balance. In case of forecasted imbalance the benefit formula and the indexation are modified with a stabiliser factor, in proportion of the measure of the imbalance. In fact, this adjustment could be used in DB systems, too, had the actuarial balance been monitored and adjusted similarly.

3 Application of automatic adjustments in the EU

The Ageing Report and the Pension Adequacy Report also pointed out that pension reforms with sustainability objectives (contingency measures during economic and financial crisis periods) are often followed by reform packages aiming improving adequacy.

The gradual effect of earlier regulated changes in pension benefits, closing of early retirement schemes and ad-hoc rising of retirement age has been observed in this reporting period of 2014-2017. But this, together with the easing fiscal pressure made room for different reform patterns. While for some MSs sustainability issues remained on agenda, and extending working life also remained in focus, the adequacy aspects of rising retirement age (in line with life expectancy gains) were also supported by incentives (e.g. introducing flexible retiring rules, bonuses for retirement later than the pensionable age).

Other poverty protection and income maintenance measures included changing indexation rules, sometimes restating before-crisis regime or suspending temporary measures. Minimum guarantees have been strengthened, and access to pensions, or early pensions to specific categories of workers, arduous and hazardous jobs was introduced.

The pension reforms during this period aimed to rebalance the triangle of pension adequacy: income maintenance, poverty protection and pension duration. Of these areas poverty protection might be regarded as minimum requirement for special groups, and there are more room for rebalancing between income maintenance and pension duration. The latter is influenced by the inevitable increase in life expectancy in ages 55+.

3.1 Objectives: sustainability vs. adequacy

The 2018 Pension Adequacy Report has been prepared to analyse the adequacy of present and future pensions, in support of the MSs to improve the design of their pension systems including social and labour market objectives, while maintain financial sustainability. In this sense, the PAR is complementing the Ageing Report, where the main focus is on sustainability, but also has been reflecting the importance of taking into account the social and labour environment.

Among the Key conclusions of the PAR point out that working longer will be necessary to acquire adequate pensions: “People retiring in 2056 will have lower pensions compared to their work income than a similar career would have earned them in 2016.” This is a consequence of increase in life expectancies at retirement. Life expectancy is/has been increasing faster than effective exit age.

Taking into account life expectancy gains in changing retirement age is only one element in addressing this issue. Incentives for working longer (bonus/malus systems) and flexible retirement also might be promoted.

3.2 Indicators and measures

The Ageing Report and the Pension Adequacy Report might be regarded as regular evaluation of the MSs’ pension systems using forecasting and sensitivity tests. In the analysis they use standard indicators (dependency ratios, replacement rates, AROP, TRR, etc.), and decomposition of the 2016-2070 change of pension expenditure, and compare EU averages with distributions of MSs in areas supporting the analysis of the objectives of the Reports.

In the following we overview selected topics from the Reports in relation with automatic adjustments and/or AAM systems as used in the MSs.

3.3 Points of intervention and adjustment mechanisms

3.3.1 Pension system funding: contributions

Increasing social security contributions is facing both economic and political hurdles. According to the Ageing Report, the overall contribution payment level is not expected to change significantly over the projection period (2016-2070): 0.1pps (of GDP). However, increases will happen including legislated changes, consequences automatic balancing mechanisms (Germany), or state contributions proportional to GDP (Ireland). Increases occur in Germany (+2.6 pps)¹⁶, Cyprus (+2.5 pps), Ireland (+2.2 pps), Norway (+2.1 pps), and Finland (+1.9 pps). High decreases are planned in Greece (-2.9 pps), Malta (-1.8 pps), Hungary and Spain (-1.0 pp), Portugal (-0.8 pps), and Estonia and Lithuania (-0.7 pps). In Germany the automatic increase is built in as contributions aligned to expenditure development.

¹⁶ pps: in percentage points of GDP

3.3.2 Raising the pensionable age and increasing contributory period requirements

Raising the pensionable age was a measure during the crisis with the immediate effect on increasing contribution income and postpone benefit payments. The rules usually prescribe gradual introduction, making the effect prolonged. From adequacy perspective, if the employment is continued and working career made longer, this measure is leading to longer service periods and higher pensions. Depending on the parameters of the scheme, but usually this measure is still improving the financial position of the system.

This trend has been continued during this reporting period. Belgium, Bulgaria, Greece, Finland, the Netherlands and the UK have adopted increases in the pensionable age or introduced earlier decided plans. Some MSs adopt rules linking retirement age to life expectancy gains in the future, after a fixed increase.¹⁷ Finland will increase retirement age by 2 years until 2027, and start automatic adjustment in 2030. Bulgaria and the Czech Republic also planned to implement the automatism in 2030. Portugal implemented the link between life expectancy and retirement age in 2015 as part of the AAM system. However, an early retirement scheme was also part of the reform, with actuarial penalties, but also with age and service period exceptions.

In forecast, the average increase of effective retirement age will be 2.3 years, whereas in countries with automatic adjustment the average exit age is higher than 4 years: in Greece, Italy, Cyprus, Slovakia and Finland. Note, that exit age and retirement shows different outcome. The retirement age will be over 4 years in Denmark, Greece, Italy, Cyprus, Netherlands, Slovakia and Finland. The duration of retirement is estimated to increase less than the EU average in those MSs where the link to LE has been implemented: Italy, Cyprus, Denmark, Greece, the Netherlands, Portugal and Slovakia; Finland will be on average. The decrease will be about 2 years by 2070. In MSs with NDC systems and those who use sustainability factor, the link to longevity is supposed to be implemented indirectly, by adjusting the benefit level to life expectancy, thus providing incentives to work longer.

It should be noted, that working longer also means longer exposure to labour market risks. Without incentives given to employers, too, this risk is even higher than in earlier stages of the career.

3.3.3 Valorisation and indexation; stabiliser factors

The generosity and sustainability of the system, as well as its inter-generational fairness is influenced by the valorisation and indexation rules, and its expected vs. observed rates.

The significance of indexation mechanisms in income redistribution was demonstrated during the crisis. Besides raising retirement age, the secondly applied ad-hoc measure was suspending or changing for less favourable indexation mechanisms. The impact on the on the purchasing power of pensions, for low-income pensioners in particular, was depreciating. During the post-crisis period several of these measures were withdrawn, and/or more favourable mechanisms were introduced to rebalance adequacy of pension benefits. The valorisation and indexation rules of the MSs are summarised in the Annex (Ageing Report table).

Only Belgium and France apply price valorisation. Bulgaria, the Czech Republic, Germany, Spain, Cyprus, Lithuania, Luxemburg, Hungary, Austria, Slovenia, Slovakia, Sweden and Norway use wage or

¹⁷ The fixed increase might represent non-recognised gains in the past. The automatic adjustment will be based on future observations.

wage development related index. Mixed wage and price index is applied in Greece, Croatia, Romania, Finland, Portugal and the UK. Wage and GDP indicator mix is used in NDC systems, like Sweden and Italy. The sustainability factors of the AAM systems (Sweden, Germany) add to the effect of the valorisation.

The efforts for protection of the financial position of pensioners lead to more changes and also more form indexation than in case of valorisation.

More MSs apply price indexation: France, Italy, Hungary, Austria and Slovakia, Romania (from 2030), and also more mix price and wage indexation: Belgium, Bulgaria, the Czech Republic, Estonia, Croatia, Cyprus, Latvia, Malta, Poland, Slovenia, and Finland. Portugal and Greece mix prices with GDP growth.

In the United Kingdom a "triple guarantee" (the so called "triple-lock" system) is protecting the pensioners: pensions are being increased by the highest of wage growth, inflation or 2.5%.

Croatia is applying the wage-and-price indexation in a rotating formula. Indexations occur twice a year. The first using the Swiss formula (50% wages: 50% prices), but the second is the highest of three wage-to-price ratios (70:30, 50:50 or 30:70). Slovakia and the Czech Republic adopted rules that compensate different groups. Slovakia protects the lowest pensions, in the Czech Republic the changes influence all pensions, but with a slightly greater impact on above-average pensions. Latvia also introduced rules compensating for restrictions during the crisis, but only up to 50% of the average insured wage for the previous year.

Automatic balancing mechanisms use sustainability or reduction factors linked to indexation in Germany, Finland, Spain, Italy, Latvia, Poland, Portugal, Sweden and Norway. There is a proposal on the introduction of stabilizers (and, as a matter of fact, linking retirement age to change in life expectancy) in Estonia.

Minimum pensions and social allowances are aiming protection against poverty. These benefits are the consequence of low wages and short and fragmented careers, and lower than earnings related pensions. Most MSs adjust these benefits by higher rates than inflation, and France, Italy, Malta, Austria, Slovakia and Sweden use only price index. Ireland, Spain, Latvia, Lithuania and Hungary do not have formal indexation rules, but use ad-hoc increases, which is in effect on average higher than the wage index.

3.3.4 Benefit formula reforms

The most obvious changing the benefit formula using AAM means is planned in Belgium. That is to change to point system in the 2030s, for transparency, adequacy and sustainability reasons.

In Finland a life-expectancy coefficient has already been introduced, but its effect is planned to be mitigated from 2027.

4 Observation of the results of the measures on sustainability and adequacy

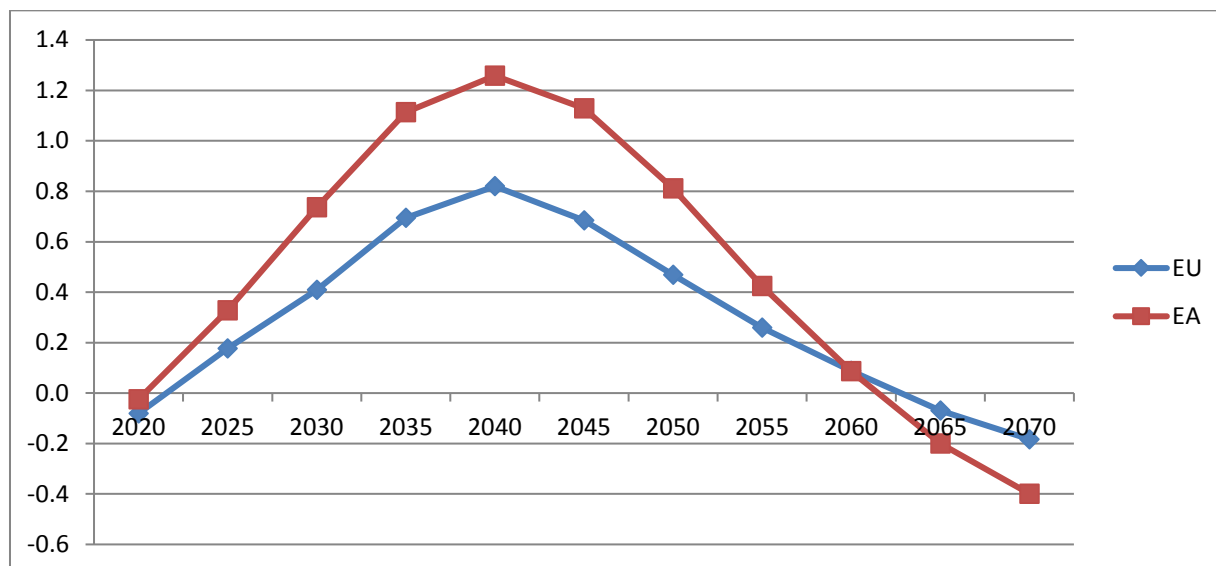
4.1 Development of the pension expenditure

The assessment of the pension systems in the EU is based on the projection of the MSs' pension expenditures. The pension expenditure will approximately remain the same at European level, but with big differences between MSs. The weighted average change resulting in -0.2pps (decrease). Throughout the whole period of 2016-2070 13 MSs will experience increase in pension spending. Luxembourg (8.9pps), Slovenia (+3.9 pps), Belgium and Malta (+2.9 pps), the Czech Republic (+2.8 pps), Germany (+2.4 pps), Cyprus (+2.3 pps) and Norway (+2.1 pps) will be the highest. On the other end, twelve MSs will observe decline in their pension spending, with Greece (-6.6 pps), Croatia (-3.8 pps), France (-3.3 pps), Latvia (-2.6 pps) and Portugal (-2.2 pps) being over -2pps.

Overall, the expenditures will increase by 0.8pps¹⁸ until 2040, and afterwards decline to -0.2pps, in all by 1.0pps during the second half of the period. By MS, in the first half the projected changes in pension expenditure range from -4.4pps in Greece to +3.2pps in Slovenia. In 2040-2070 the changes fall between -4.8pps in Italy and increase by +6.4pps in Luxembourg. Increasing expenditure is projected for 17 MSs before 2040 and for 12 after.

At the EU level, the graphical visualisation of the expenditure development is showing a two-phased trajectory, increasing until the 2040s and decreasing to about the same level until the projections period. In this examination the differentiation before and after the "peak year"¹⁹ might be of interest. The increase may be attributable to the higher dependency ratio, what is diminished during the period by measures linking retirement to life expectancy. The result is supported by other automatic adjustments (stabilizers) and other reforms which are taking affect gradually.

1. Figure



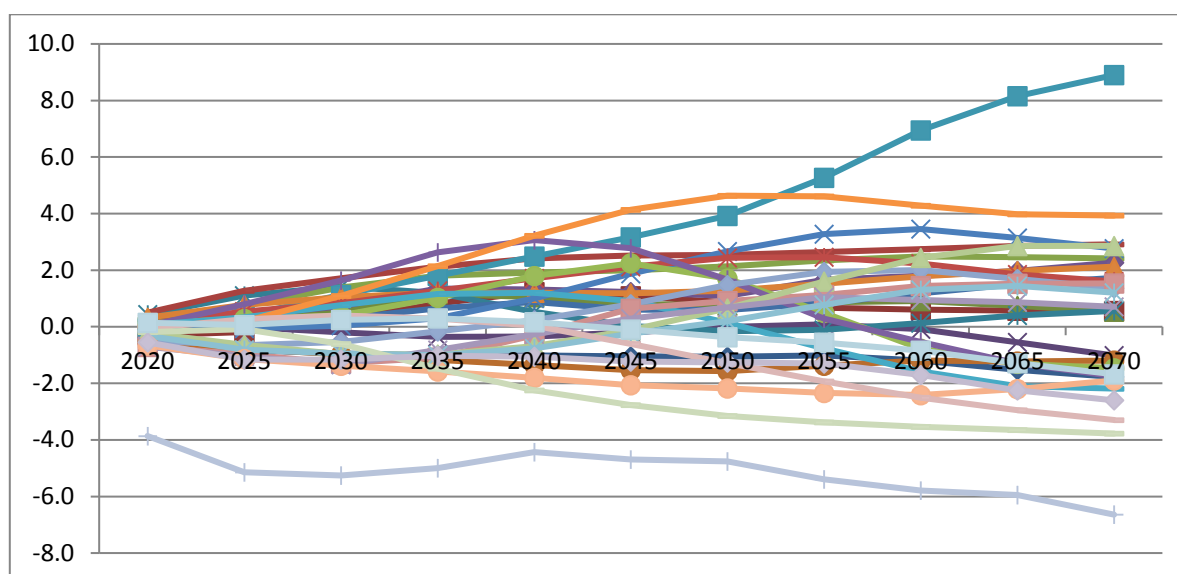
Source: AR2018, Commission services

¹⁸ Expressed in percentage points of GDP.

¹⁹ The „peak year“ is about 2040: the year of the highest age-related expenditures at European level.

However, the EU average is the aggregate of MS patterns over the projection horizon, as shown on the next graph.

2. Figure



Source: AR2018, Commission services

As the Eurogroup Notes point out, there might be a risk in deviating from the expected long term development of the economic and demographic parameters, i.e. the assumptions of the projections. Indeed, the MS-by-MS development (deviation from EU average) shows a different picture, just to demonstrate what simple algebra and stochastic processes would have been caused by applying common assumptions to the different development states of the MSs. That is illustrating the case for individual assessment²⁰ of, and common principles to MSs by the Eurogroup.

In the following we interpret the Ageing Report grouping of the MSs according to the development patterns into five groups: stable, up, up-down, down-up, down, so that we will be able to compare reform strategies (including automatic adjustments or not) and results.

An expenditure development is *stable* if the difference between maximum and minimum level is less than 2pps. Estonia, the Netherlands, Austria, Poland, Finland, Sweden and the United Kingdom (7 MSs) belongs to this category. However, the peaks of expenditure spread from 2016 (Sweden) to 2070 (the UK), with five being around 1pps between 2035 and 2045, and so contributing to the EU average picture.

Five MSs show an *upward* development: Belgium, Germany, Cyprus, Luxembourg and Norway. Not counting Luxembourg, the difference between the highest and lowest expenditure is also close to 2pps, but the peak values in the second half tend towards 2070.

The *up-and-down* MSs are the Czech Republic, Ireland, Spain, Italy, Portugal and Slovenia (6). The turning point for all MSs is in the second half of the period. But while the Czech Republic, Ireland and Slovenia close the period above the starting level, Spain, Italy and Portugal – implementing AAM reforms – decrease their initial spending.

²⁰ And working out country specific recommendations.

Down-and-up: The group of five MSs: Bulgaria, Hungary, Malta, Romania and Slovakia follow the opposite route: start the period by decreasing pension expenditure (mainly because of lagging effects of earlier reforms), and then have an upward turning point in the first half of the period, and ending above the starting level of expenditures, probably because of the new provisions enhancing adequacy. The range of expenditures of these MSs keep together throughout the projection period in a close to 1pps range (except Malta in 2070).

Finally, the *down* trend category includes Denmark, Greece, France, Croatia, Latvia and Lithuania. In this group Greece is the outlier, reducing expenditures in all sub-periods more than the other MSs. All MSs (Greece in the auxiliary system) applies an adjustment linked to life expectancy.

We find MSs applying automatic adjustments in all groups, but the development might be explained depending on the specific measure and the timing of the implementation.

4.2 Decomposition of the change in pension expenditure

The Ageing Report analysis projected the development of the pension system, based on forecasts of economic, labour market and demographic parameters, and the individual scheme rules and implemented pension reforms with future effect of the Member States. Therefore the assumptions on the development of these parameters explain the changes in pension expenditure.²¹ The Ageing Report gives the following explanations to the contributing factors:

- *The [demographic] dependency ratio effect* quantifies the impact of demographic changes, more precisely the relative change in old age versus working age population [using fixed age groups]. An increase in this ratio indicates a higher proportion of older individuals with respect to working age population, i.e. an ageing population. As the dependency ratio increases, the pension-to-GDP ratio moves in the same direction.
- *The [pensioner] coverage ratio effect* is defined as the number of pensioners of all ages [based on statistics from the pension administration] to the population over 65 years. The analysis of the coverage ratio provides information about how the developments of the *effective exit* age and the share of the population covered by the pension system influence pension spending. As the coverage ratio increases, the pension expenditure-to-GDP ratio increases as well.
- *The benefit ratio effect* indicates how the average pension (public pension spending divided by number of pensioners) develops relative to the average wage. It reflects the characteristics of the legal framework of pension systems concerning calculation and indexation rules.
- *The labour market effect* describes the effect labour market behaviour has on pension expenditure.
 - *The employment rate effect* is defined as the ratio of population aged 20-64 to the number of working people aged 20-64, i.e. the inverse of the employment rate. Under pay-as-you-go systems, a higher employment rate widens the contribution base, which enhances the sustainability of the pension system, at least in the short term. When the employment rate increases, the pension expenditure ratio falls.
 - *The labour intensity effect* is defined as the ratio of the working population 20-64 to the hours worked by the population 20-64, i.e. the inverse of labour intensity. As the labour intensity increases, the pension expenditure ratio falls.

²¹ See the decomposition formula in the Appendix (from the Ageing Report)

– *The career prolongation effect* is defined as the ratio of hours worked by the population 20-64 to the hours worked by the population 20-74, i.e. the inverse of the career shift. A decrease of this ratio captures the effect of a career prolongation beyond 65, e.g. because of reforms that increase the statutory retirement age or because of active ageing policies. An increase in the hours worked by people aged more than 65 brings the pension expenditure ratio down.

[End of quote]

2. Table Breakdown of change in gross public pension expenditure; 2016-2070 (pps. of GDP)

Country	2016 level	Dependency ratio contribution	Coverage ratio contribution	Benefit ratio contribution	Labour market effect contribution				2070 level*
					Employment rate (a)	Labour intensity (b)	Career shift (c)	Total rate (a+b+c)	
BE	12.1	6.6	-1.9	-0.7	-0.6	0.1	-0.3	-0.9	15
BG	9.6	6	-3	-1.1	0	0	-0.2	-0.2	10.9
CZ	8.2	5.4	-1.9	-0.5	0	0	0	0	10.9
DK	10	4.6	-3.9	-1.6	-0.3	0	-0.5	-0.8	8.1
DE	10.1	6.6	-1.3	-2.4	0	0	-0.3	-0.3	12.5
EE	8.1	4.6	-3	-3	0.1	0	0	0.2	6.4
IE	5	4.2	-0.9	-1.4	-0.1	0	-0.1	-0.1	6.6
EL	17.3	9.1	-1.9	-8.3	-4	0.1	-1	-4.9	10.6
ES	12.2	7.6	-0.4	-4.9	-2.4	0.1	-0.5	-2.8	10.7
FR	15	6.2	-2.9	-4.8	-1	0	-0.4	-1.4	11.8
HR	10.6	6.3	-3.3	-4.9	-1.2	0	-0.3	-1.5	6.8
IT	15.6	10.3	-4.5	-4	-1.4	0	-1.4	-2.8	13.9
CY	10.2	11.6	-2.4	-4.1	-1.4	0	-0.7	-2.1	12.4
LV	7.4	4.4	-1.4	-4.7	-0.4	0	-0.1	-0.5	4.7
LT	6.9	5	-1.8	-4	-0.3	0	0	-0.3	5.2
LU	9	10.4	-0.8	-0.6	-0.1	0.1	-0.1	-0.1	17.9
HU	9.7	6.4	-1.8	-1.6	-0.9	0	-0.2	-1.1	11.2
MT	8	5.7	0.6	-2.3	-1.1	0.1	0	-1	10.9
NL	7.3	4.2	-2.7	0	-0.4	0	-0.5	-0.8	7.9
AT	13.8	10.1	-3.3	-4.6	-0.7	0.1	-0.5	-1.1	14.3
PL	11.2	11.7	-3	-8.1	-0.2	0	-0.3	-0.4	10.2
PT	13.5	10.9	-3.3	-7.1	-1	0.1	-1	-1.9	11.4
RO	8	5.6	-1.7	-2.6	-0.1	0	-0.1	-0.1	8.7
SI	10.9	7.5	-2.1	-0.3	-0.7	0.1	-0.1	-0.7	14.9
SK	8.6	8.8	-4.1	-1.5	-0.6	0	-0.6	-1.2	9.8
FI	13.4	6.6	-2.5	-2	-0.7	0	-0.6	-1.3	13.9
SE	8.2	2.4	0.6	-4	-0.1	0	0	-0.1	7
UK	7.7	3.1	-1.1	0	-0.2	0	-0.1	-0.3	9.5
NO	10.7	7.6	-0.9	-3.9	-0.2	0	-0.1	-0.3	12.8
EU*	11.2	6.5	-2.1	-3.3	-0.7	0.1	-0.4	-1	11
EA	12.3	7.1	-2.2	-3.5	-0.9	0.1	-0.5	-1.4	11.9

Country	2016 level	Dependency ratio contribution	Coverage ratio contribution	Benefit ratio contribution	Labour market effect contribution				2070 level*
					Employment rate (a)	Labour intensity (b)	Care shift (c)	Total rate (a+b+c)	
EU27	11.9	6.7	-2.1	-3.7	-0.7	0.1	-0.4	-1.1	11.4

Source: AR2018, Commission services

* Interaction effect not shown

The factors of the expenditure breakdown contribute to the total differently.

The *Coverage ratio* will increase (more pensioner) the expenditure only in two MSs: Malta and Sweden and only by 0.6pps. In 10 MSs the development of coverage ratio fall between -4.5 (Italy) and -2.9 pps, and in other 15 MSs is still declining (below 0.0pps). Countries linking pensionable age to increase in life expectancy, eliminating early retirement schemes and introducing flexible retirement and bonus/malus schemes are by definition in these latter groups. In Sweden the NDC system does not seem to provide adequate incentives to prolong working.

The *Benefit ratio* effect will change pension expenditure in the EU by +3.3pps, and will be neutral only in the Netherlands and the UK. The contribution to expenditure decrease because of the Benefit ratio is falling into the range of 0.0 (neutral) and -8.3pps (Greece), followed by Poland (-8.1 pps) and Portugal (-7.1 pps). Spain, France, Croatia, Italy, Cyprus, Latvia and Sweden also over -4.0pps. In this group the reason behind the decline might be automatic balancing mechanisms and/or indexation rules linked to wage indexation. Slovenia, the Czech Republic, Luxembourg and Belgium will be above -1.0pps. Out of this group only Belgium introducing both sustainability and adequacy provisions.

The *replacement rate* (calculated and reported by the MSs) is a more precise adequacy measure than the *Benefit ratio* component of the pension expenditure decomposition formula. The total projection for the EU shows a decline of -8pps in this indicator compared to -11pps in the benefit ratio. At MS level, only Bulgaria and Hungary reported a limited rise in the rate. Spain (-31 pps.), Poland (-29 pps.), France and Croatia (-13 pps.), Romania (-12 pps.), and Greece and Norway (-10 pps.) reported the largest decreases. The largest decreases in Spain and Poland might be attributed to sustainability factors and the NDC system (in Poland).

Another decomposition compares pension expenditure results according to the 2015 and the 2018 Reports. It makes possible the comparison of the demographic and economic parameters (assumptions), modelling methodologies, and pension policies (different pension reforms) in the two Reports, as a consequence of the different the reporting periods.

3. Table Breakdown of pension expenditure change (report-to-report) showing pension reform effect

Country	AR2015	Change in assumptions	Improvements in coverage & modelling	Constant policy interpretation	Policy-related changes	AR 2018	AR2018-AR2015
EL	-1.30	-1.00	0.00	0.00	-3.60	-5.80	-4.50
LT	0.80	2.10	0.00	0.00	-3.70	-0.80	-1.70
PT	-0.90	-2.20	1.30	0.00	0.20	-1.60	-0.70
MT	3.10	-0.90	:	:	:	2.40	-0.70
SK	1.90	-1.60	0.90	0.00	0.00	1.30	-0.60
SE	-1.00	-0.20	0.00	0.00	0.00	-1.20	-0.20
NO	2.00	-0.20	0.00	0.00	0.00	1.80	-0.20

Country	AR2015	Change in assumptions	Improvements in coverage & modelling	Constant policy interpretation	Policy-related changes	AR 2018	AR2018-AR2015
DE	2.70	-0.40	0.00	0.00	0.10	2.50	-0.20
NL	0.60	0.10	0.00	0.00	0.00	0.60	0.00
FR	-2.60	0.40	-0.10	0.10	-0.30	-2.50	0.10
DK	-2.50	0.00	0.00	0.00	0.00	-2.40	0.10
HR	-3.70	0.30	-0.30	0.00	0.10	-3.50	0.10
PL	-0.20	-0.20	0.00	0.00	0.40	-0.10	0.10
EE	-1.40	0.20	0.00	0.00	0.00	-1.20	0.20
ES	-1.10	0.30	0.00	0.00	0.00	-0.80	0.30
LV	-2.00	-0.10	0.00	0.00	0.30	-1.70	0.30
IE	1.80	0.50	0.40	0.00	-0.10	2.50	0.70
FI	-0.60	1.30	-0.10	0.30	-0.70	0.10	0.80
RO	0.00	0.90	0.00	0.00	0.00	0.90	1.00
BG	0.80	1.10	0.00	0.00	0.00	2.00	1.20
IT	-1.80	1.20	0.00	0.00	0.10	-0.50	1.20
BE	1.30	1.60	0.00	0.00	-0.10	2.70	1.50
CY	0.10	1.80	0.00	0.00	0.00	1.80	1.70
CZ	0.80	0.70	0.00	0.00	1.90	3.50	2.60
LU	3.50	3.50	0.00	0.00	0.00	6.90	3.50
EU*	-0.10	0.40	0.10	0.00	-0.20	0.10	0.20
EA	-0.10	0.40	0.10	0.00	-0.50	0.10	0.20
EU27	-0.30	0.40	0.10	0.00	-0.20	-0.10	0.20

Source: AR2018, Commission services

Focusing on the pension reform effect, we may observe that Finland, Greece, France, Belgium, Bulgaria, Italy and Portugal were mentioned the most in previous paragraphs, implementing the most reform provisions. Indeed, they are shown on the tails of the list of countries, sorted according to changes linked to sustainability and adequacy. It is not surprising, the reforms in Greece and Lithuania added the most to decreasing pension spending (compared to 2015), -3.6pps and -3.7pps in GDP terms. The changing provisions in the Czech Republic increased the spending by 1.9pps.

From another – methodological – perspective it is also interesting to examine the relative importance of the different factors to the total change by MS.²² At European level the parameters and methodology factors together amounted to the same effect as reforms. The MSs where reforms contributed to the total changes by more than 50 percent are Lithuania, Poland, the Czech Republic, Latvia and Greece. It is illustrating the concerns of the Eurogroup about the risk of deviating from the supposed development of the parameters.

In all, the different assessment of the different factors underline that (a) during this period the continued experience to introduce measures linked to life expectancy gains and sustainability factors lead to reducing pension expenditure, replacement rate as well as benefit ration in several MSs, in

²² Unfortunately it shows that the changes in parameters and methodology had higher effect in more cases than reforms.

spite of (b) parametric reforms which aimed to change indexation rules, the status of special groups of workers and minimum guarantees. These kind of provisions (a and b) were applied sometimes in the same MSs, or only one (a or b) was dominantly applied.

From the perspective of the AAM systems, one could say that automatic adjustments are applied in ad-hoc manner rather than state of the art AAM systems. Their development is linked to introduction of sustainability measures. Therefore the support is coming from the “technocrats and professionals” rather than widespread support. So there is still large room for bringing forward the initiative of the Eurogroup, but bearing in mind the other/accompanying principles drawing attention to the importance of social, labour and adequacy aspects as well.

Budapest, August 2018

Tibor Párniczky

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5 Annexes

5.1 Key indexation and valorisation parameters of pension system in Europe (old-age pensions)

Country	Pensionable earnings reference	General valorisation variable(s)	General indexation variable(s)
BE	Full career	Prices	Prices and living standard
BG	Full career	Wages	Prices and Wages
CZ	Full career	Wages	Prices and Wages
DK	Years of residence	Not applicable	Wages Wages plus sustainability factor
DE	Full career	Wages	Prices and Social taxes
EE	Full career	Social taxes	No fixed rule
IE	Flat rate	Not applicable	Prices and GDP (max 100% prices)
EL	Full career	Prices and Wages	Index for pension revaluation
ES	Last 25 years	Wages	Prices
FR	25 best years (CNAVTS)	Prices	Prices and Wages
HR	Full career	Wages and prices	Prices
IT	Full career	GDP	Prices and Wages
CY	Full career	Wages Contribution wage sum index	Prices and Wages
LV	Full career	Wage sum	Wage sum
LT	Full career	Wages	Prices
LU	Full career	Wages	Prices and Wages
HU	Full career	Cost of living	Wages
MT	10 best of last 41 years	Not applicable	Prices and Wages
NL	Years of residence	Wages	Prices
AT	Full career	NDC 1st: Wages, NDC 2nd: GDP	Prices and Wages
PL	Full career	Prices and wages until 2030	Prices and GDP
PT	Full career up to 40 years	Prices and wages until 2030	Prices and wages until 2030
RO	Full career	Wages	Prices and Wages
SI	Best consecutive 24 years	Wages	Prices
SK	Full career	Prices and Wages	Prices and Wages
FI	Full career	Wages	Wages
SE	Wages Years of insurance contributions	Prices, wages and GDP	Prices, wages and GDP
UK	Full career	Wages	Wages
NO	Full career	Wages	Wages

Source: AR2018, Commission services

BG Pensionable earnings reference is full career starting from 1997. 3 Best years before 1997

CZ Pensionable earnings reference is full career back to 1986. Currently 30 years to be considered.

IE A price and wage indexation rule has been assumed in the projections.

EL Pensionable earnings reference is full career taking into account wages/income from 2002 onwards.

ES Pensionable earnings reference is last 25 years as of 2022. The maximum value of the valorisation rule is close to prices. The

IPR is established annually at a level consistent with a balanced budget of the Social Security system over the medium run. Depending on the balance of the system the indexation will be less than price (budget deficit) or price + 0.5% (budget balance).

FR The pensionable earnings reference is full career in AGIRC and ARRCO. Valorisation rule and indexation rules are price –1 pp. in both AGIRC and ARRCO in 2014-15, and also in 2016-18 but with a floor at 0. AGIRC: Association générale des institutions de retraite des cadres; ARRCO: Association pour le régime de retraite complémentaire des salariés; CNAVTS: Caisse nationale de l'assurance vieillesse des travailleurs salariés.

LT Pensionable earnings reference is full career back to 1994. Pensions are indexed to the seven-year average of the wage sum growth over the current, previous three and (projected) upcoming three years. The index is applied in case of balanced budget of Pension Social Security System in 2 consecutive years and conditioning positive growth of GDP or Wage Sum.

LU Indexation rule is wages if sufficient financial resources available, otherwise only cost of living indexation.

HU Pensionable earnings reference is full career back to 1988.

MT Pensionable earnings reference rule applies to people born as of 1969. Different rules apply for earlier cohorts.

PT Pensionable earnings reference is full career as of 2002. 10 best years out of last 15 before 2002. Price and wage valorisation rule applies to earnings registered between 2002 and 2011. The current valorisation rule is an index weighting 75% of the CPI (excluding housing) and 25% of the average evolution of the gains underlying the contributions declared to the social security, when this evolution is higher than the CPI (without housing), up to a ceiling of CPI+0.5p.p.

RO Price valorisation and indexation after 2030.

SK Pensionable earnings reference is full career back to 1984. From 2018 onwards, pension are indexed on CPI for pensioners.(consumption basket for pensioners).

NO Indexation rule is wage growth minus 0.75 pps.

UK Triple-lock indexation (highest of average earnings, CPI or 2.5%) is a commitment of the current government, but is not enshrined in law.

5.2 Decomposition of the change in pension expenditure-to-GDP ratio²³

The pension expenditure-to-GDP ratio is given as

$$\begin{aligned} \frac{\text{Pension expenditure}}{\text{GDP}} &= (\text{dependency ratio}) \cdot (\text{coverage ratio}) \cdot (\text{benefit ratio}) \\ &\cdot (\text{labour market effect}) \\ &= \frac{\text{population}_{65+}}{\text{population}_{20-64}} \cdot \frac{\text{number_of_pensioners}}{\text{population}_{65+}} \cdot \frac{\text{average_pension}}{[\text{GDP}/\text{hours_worked}_{20-74}]} \cdot \frac{\text{population}_{20-64}}{\text{hours_worked}_{20-74}} \end{aligned}$$

and the *labour market effect* is further broken down as

$$\begin{aligned} \frac{\text{population}_{20-64}}{\text{hours_worked}_{20-74}} &= \frac{\text{population}_{20-64}}{\text{working_pop}_{20-64}} \cdot \frac{\text{working_pop}_{20-64}}{\text{hours_worked}_{20-64}} \cdot \frac{\text{hours_worked}_{20-64}}{\text{hours_worked}_{20-74}} \\ &= \frac{1}{\text{employment rate}} \cdot \frac{1}{\text{labour intensity}} \cdot \frac{1}{\text{career shift}} \end{aligned}$$

where *coverage ratio* and *labour market effect* (by the *career shift* factor) are in relation with pension reforms through changes in old age employment. External factors of the *labour market effect* increase the contribution base.

- *The dependency ratio effect* quantifies the impact of demographic changes, more precisely the relative change in old age versus working age population. An increase in this ratio indicates a higher proportion of older individuals with respect to working age population, i.e. an ageing population. As the dependency ratio increases, the pension-to-GDP ratio moves in the same direction.
- *The coverage ratio effect* is defined as the number of pensioners of all ages to the population over 65 years. The analysis of the coverage ratio provides information about how the developments of the effective exit age and the share of the population covered by the pension system influence pension spending. As the coverage ratio increases, the pension expenditure-to-GDP ratio increases as well.
- *The benefit ratio effect* indicates how the average pension (public pension spending divided by number of pensioners) develops relative to the average wage. It reflects the characteristics of the legal framework of pension systems concerning calculation and indexation rules.
- *The labour market effect* describes the effect labour market behaviour has on pension expenditure.
 - *The employment rate effect* is defined as the ratio of population aged 20-64 to the number of working people aged 20-64, i.e. the inverse of the employment rate. Under pay-as-you-go systems, a higher employment rate widens the contribution base, which enhances the sustainability of the pension system, at least in the short term. When the employment rate increases, the pension expenditure ratio falls.
 - *The labour intensity effect* is defined as the ratio of the working population 20-64 to the hours worked by the population 20-64, i.e. the inverse of labour intensity. As the labour intensity increases, the pension expenditure ratio falls.

²³ in: The 2018 Ageing Report – Underlying assumptions and methods

– *The career prolongation effect* is defined as the ratio of hours worked by the population 20-64 to the hours worked by the population 20-74, i.e. the inverse of the career shift. A decrease of this ratio captures the effect of a career prolongation beyond 65, e.g. because of reforms that increase the statutory retirement age or because of active ageing policies. An increase in the hours worked by people aged more than 65 brings the pension expenditure ratio down.