A short note on pension reforms in the Member States in 2016 – 2018

Pension reforms proposed by governments are usually initiated during times of economic and financial crisis. In such periods government finances loosing revenues, but more easily obtaining mandate to take contingency measures to rebalance the budget. Social security pension expenditure is usually the largest item of national budgets, potentially providing room (buffer) for short term corrections. These measures might also improving long term sustainability, but by nature compromise adequacy of pensions. This is accentuated by the indisputable effects of the ageing society, which has the most evident consequences on pension finances. However, the measures, implemented without adequate preparations and support, often have undesirable side-effects.[1] Soon after the crisis, the number of reform initiatives decline and move towards adequacy improvements, even if not reform reversals. And when the next crisis comes, there will be room for corrections, causing fluctuations in levels of contributions and/or benefits again. Having realised this as risk, the regular Reports of the EU and the OECD are discussing pension system sustainability and pension adequacy in relation with each other.[2]

Indeed, it was the case with pension reforms during the examination periods of the 2015 and 2018 Reports of the Commission and its advisory Committees[3], identifying them as the aftermath of the crisis and post-crisis or recovery phases. According to the 2018 Reports, examining reforms in the 2016-2018 period, the main impact from sustainability perspective was on labour participation rates of workers close to and after retirement. The higher participation was driven by female and old age participation. With the exact effect depending on the parameters, these reforms increase the contribution base in short term and increase benefits and improve adequacy in longer term. There were also other reforms which directly addressed earlier downsizing of benefit levels.

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.

The pension expenditure will approximately remain the same at European level, but with big differences between MSs. In this examination the differentiation before and after the "peak year"[4] might also be of interest. Overall, the expenditures will increase by 0.8pps until 2040, and afterwards decline to -0.2pps[5] (by 1.0pps). The projected changes in pension expenditure ranges from -4.4pps in Greece to +3.2pps in Slovenia. In 2040-2070 the changes fall between -4.8pps in Italy and +6.4pps in

[1] OECD (2017)

[2] The Key conclusions of the Pension Adequacy Report invite the SPC and EPC „to jointly promote the findings of the 2018 Pension Adequacy Report and the 2018 Ageing Report."

[3] This paper relies on the Pension Adequacy Report 2018 of the Social Protection Committee and the European Commission, and The 2018 Ageing Report of the Economic Policy Committee.

[4] The „peak year" is about 2040: the year of the highest age-related expenditures at European level.

[5] Expressed in percentage points of GDP.

Luxembourg. Increasing expenditure is forecasted for 17 MSs before 2040, and for 12 after 2040, and the weighted average 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.

In spite of the similar end-points, the factors of decomposition of the pension expenditure also reveal large differences at MS level. Using this a decomposition of the pension expenditure-to-GDP ratio is given as

$$\frac{Pension\ expenditure}{GDP} = (dependency\ ratio) \cdot (coverage\ ratio) \cdot (benefit\ ratio) \cdot (labour\ market\ effect)$$

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

$$(labour\ market\ effect) = \frac{1}{employment\ rate} \cdot \frac{1}{labour\ intensity} \cdot \frac{1}{career\ shift}$$

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.[6]

1. 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

[6] See details in Annex

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)	
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
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 *Coverage ratio* will increase 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 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 this group.

The *Benefit ratio* effect will change pension expenditure in the EU by +3.3pps, and will be neutral in the Netherlands and the UK. The contribution to expenditure decrease because of the Benefit ratio is falling between 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. The reason behind 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.

Most of these MSs are to increase labour exit age with positive effect on adequacy on the long run. Labour market is at best in a dynamic relationship with the pension system, as showed in the decomposition formula. The total labour market effect is decreasing pension spending in Europe (by 1.0pps), similarly to most MMs, except Estonia (0.2pps) and the Czech Republic (0.0pps). The highest contribution to reduction is in Greece (-4.9 pps), Spain and Italy (-2.8pps both). In this effect the career shift factor is showing a contribution with all values from 0.0pps decreasing by 0.1 to -1.0pps;

but the largest decrease is -1.4pps of Greece. Estonia, the Czech Republic, Sweden, Lithuania and Malta experience no changes because of the career shift factor.

The overall contribution level is not expected to change significantly over the forecasting period (2016-2070): 0.1pps (of GDP). However, increases include legislated changes, consequences automatic balancing mechanisms, or state contributions proportional to GDP. Increases occur in Germany (+2.6 pps), 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).

Adequacy assessment

The aspects of pension adequacy might also be used to assess pension reforms. The Pension Adequacy Report introduced three inter-related aspects[7]: (i) poverty protection, (ii) income maintenance, and (iii) pension duration. The first two aspects are in consistency with the aims of the pension systems according to Nicolas Barr and Peter Diamond.[8]

The first aspect is in relation with the ability to prevent old age poverty, measured by AROP (at-risk-of-poverty, using equalised household income, which is in fact including other measurable income beside pensions). This is to measure a minimum income approach.

Income maintenance is traditionally using replacement rates, particularly at retirement. For this purpose the Report is using a simple average approach, the benefit ratio of the active and retired population and the aggregate replacement ratio (ARR) of the retirees. For a deeper analysis the Report is introducing the so called Theoretical Replacement Rates (TRR) methodology, capturing individual career patterns by the time of the Report and forty years after.

Finally pension duration is an aspect motivated by increasing life expectancies phenomenon at and after retirement. Among other features, this aspect is aiming to link sustainability of pension systems and maintain adequacy. More specifically it means an adequate and sustainable balance between the working career and retired period, which is measured by the duration of pension as a life annuity.

An important externality for the pension system is the labour market. Pension regulation may allow for early/late retirement and flexible part working and retiring arrangements (schemes), but it is dependent on the actual parameters,[9] the labour demand for elderly, attitude of the employers and informed decisions of the retirees (not always deciding on economic motives). The Pension Adequacy Report is taking into account this aspect in the TRR modelling.[10]

On the basis of the conclusions of the Ageing Report 2015 the Member States agreed that “further steps still need to be taken by Member States, though to varying degrees, to raise the effective retirement age, including by avoiding early exit from the labour market and by linking the retirement

[7] Because of the inter-relations of the aspects, the Report also refers to the aspects as dimensions.

[8] Barr, Nicholas, Diamond, Peter: Reforming Pensions: Principles and Policy Choices, Oxford University Press, 2008

[9] See actuarial neutrality in OECD (2017)

[10] The Ageing Report 2018 elaborated more on the effect of pension reforms on the labour force participation rate in the 55-64 and 65-74 age groups, and the OECD Pensions at a Glance 2017 report focus on flexible working/retirement arrangements.

age or pension benefits to life expectancy".[11] On the other hand, the AR forecasted decreasing pension expenditure pressure on the budgets because of the implemented reforms. In several countries the crisis management involved interventions by Central Banks and Governments aiming investment and consumption driven recovery. Most of these pension reforms were motivated by the financial and following economic crises, and aimed to improve sustainability, and in some cases compromising adequacy objectives of the pension systems, and also limiting consumption of significant part of the society. The Pension Adequacy Report 2015 to a certain extent, but the 2018 Report certainly covered the recovery from the financial and economic crisis, allowing a different direction of reform provisions.

These elements influenced the pension reforms during the examination period of the Pension Adequacy Report 2018, resulting in even more diverse solutions than before. The tendency to take into account the increasing life expectancy continued (pension duration), but more new measures were taken to reduce poverty and maintain adequacy in the form of minimum guarantees and more favourable indexation rules and withdrawal of temporary contingency measures also took place. Compared to the post-crisis period, some reversals of pensionable age rules, measures of (re-)introduction of schemes for special occupational categories and combining work and pensions may aim multiple and sometimes more general social and economic objectives.

Most Member States implemented just parametric reforms, changing pensionable age, qualifying conditions (service period) and indexation rules. Pensionable age and qualifying conditions fall in the category of rebalancing the equilibrium between the active and retired period; indexation rules became more favourable to pensioners.

2. Table Pension reforms in MSs in 2015-2017

Country	Contributions	Special categories	Eligibility conditions	Early retirement	Combining pension work and	Qualifying period	Pensionable age	Benefits in payment	Indexation rules	Minimum guarantee	No. of Measures*
Finland	X	X	X	X	X	X	X	X	X	X	10
Greece	X		X	X	X	X	X	X	X	X	9
France	X	X	X		X	X		X	X	X	8
Belgium			X	X	X	X	X	X			6
Bulgaria	X	X		X	X	X	X	X			7
Italy	X	X		X		X		X	X		6
Portugal			X	X			X	X	X		5
Czech Republic						X	X		X		3
Germany	X			X	X					X	4
Romania	X	X		X	X						4
Austria				X	X						2
Croatia	X	X							X		3
Latvia		X							X		2
Lithuania						X		X	X		3
Slovakia			X						X	X	3

[11] http://www.consilium.europa.eu/en/press/press-releases/2015/05/12/ecofin-ageing-populations/

Country	Contributions	Special categories	Eligibility conditions	Early retirement	Combining work and pension	Qualifying period	Pensionable age	Benefits in payment	Indexation rules	Minimum guarantee	No. of Measures*
Spain			X					X			2
United Kingdom						X	X	X			3
Ireland								X			1
Malta				X		X					2
Poland						X	X				2
Hungary	X										1
Netherlands							X				1
Slovenia					X						1

Source: PAR2018, Commission services, author

** Reform categories of Taxation, Supplementary pensions and Other excluded*

Rising the (normal) retirement age was decided in Belgium, Bulgaria, Greece, Finland, the Netherlands and the UK (six MSs), and other age-related measures were implemented in three MSs. More stringent service period requirements were put in place in Belgium, Bulgaria, Czech Republic, France, Lithuania, Malta, Spain and the UK (eight MSs). These measures were used in pair in seven MSs, although not always in the same direction. The Czech Republic and Poland relaxed the pensionable age, which might result lower pensions especially in the Polish NDC case. Austria, Belgium, Latvia and Malta also introduced protective measures for workers with long service period (early retirement, credits).

Five MSs (Bulgaria, Czech Republic, Finland, Greece and Portugal) linked the increase of retirement age to increase in life expectancy during this reporting period. For example, Finland formulated a smooth transition, changing the parameter 1-2 month a year from 2030.[12] Other MSs also postponed the introduction of this measure, although some haven't defined the details.

Another option to prolong working life is to facilitate deferred retirement, and Austria, Croatia, Denmark, Finland and France introduced such incentive or bonus measures. For example Austria decreased the contribution rate (incentive to the employers), Croatia increase accrual for additional month up to five years.

Along the line of continuation maintaining the sustainability of pension systems, several MSs have implemented measures reducing the early retirement options. The main instruments were raising the early (minimum) retirement age and/or cutting back early retirement schemes or introducing penalties for early retirement (malus schemes). MSs included Austria, Belgium, Bulgaria, Denmark, Finland, Greece, Luxembourg and Portugal. Austria and Luxembourg phasing out the early retirement scheme, Finland and Germany transforming them into flexible retirement (see above). Some countries (Austria, Belgium, Bulgaria, Denmark) changing disability and unemployment systems to stop using them as early retirement schemes. These measures usually include changing the definition working ability and requiring control examinations.

[12] The life expectancy will increase by 5.1/4.8 (m/f) in the 2016-2070 period in Finland (MS Country fiche)

However, for example Finland changed the unemployment rules for flexible retirement. Germany Italy and Romania opened up early retirement for specific groups of workers in or hazardous jobs.

These tendencies underline a more differentiated approach to maintaining the sustainability of the pension system during the post-crisis phase than before. In the case of Austria, Finland, Germany and Slovenia these measures together form a flexible retirement system, where reduced working hours/part time work is supplemented by reduced/part-pension benefit, the first decreasing and the latter is increasing until full retirement.

Rising retirement age and in general, deferring retirement might be regarded as improving adequacy of future pensions through more favourable career parameters.[13] Some articles using more articulate reasoning and refer to health life expectancy. However, maybe because of methodological (data) issues, this measure has been less used in practice. Still, if we examine the reform measures of the MSs, we see that in several cases the sustainability provisions have been implemented together with adequacy and socially motivated measures, like implementation of early and flexible retirement schemes. Early retirement and flexible pensions was implemented together in Finland, Greece, Belgium, Bulgaria, Germany, Romania and Austria. Early retirement and flexible pensions was dealt together with deferred retirement (qualifying requirements and pensionable age) in Finland, Greece, Belgium, Bulgaria, and at least in one aspect in France and Italy.

To make the reform approach even more complex, MSs addressed adequacy by (re)-introducing favourable indexation and providing for basic pensions and minimum guarantees. Access to pensions for non-standard contract and self-employed groups also might also be associated to these latter provisions.

Indexation amendments were into improve the real value of pensions in Bulgaria, Cyprus, Czech Republic, Latvia, Lithuania, Portugal, Romania and Slovenia. For example Latvia adjusted its pension accrual rates during the economic downturn; a new indexation rule, however favourable, of pensions in payment limit the indexation to 50% of the average wage. Croatia introduced a so-called rotating indexation system, indexing pensions twice a year, the second one being the highest combination of the price and wage indexes given fixed weights; Romania, Cyprus, Austria, Hungary, Ireland, Bulgaria, Belgium, the Czech Republic, Slovenia and Luxembourg increased, Malta and Slovakia decreased generosity, but still in the increasing spending zone; Lithuania changed from increasing do decreasing spending; finally the MSs strengthening their saving position were Sweden, Portugal and Greece. The remaining MSs only slightly changed their positions: Croatia, Denmark, Latvia, Estonia, France, Poland in the negative zone, and the Netherlands, the UK, Norway and Germany still in the positive zone. The outliers on the increasing spending side were Luxembourg (+3.5 pps), the Czech Republic (+2.6 pps) and Cyprus (+1.7 pps). The highest savers were Greece (adding -3.5pps to the 2015 position) and Lithuania (-1.7pps).

Basic and minimum pension rules were changed in Greece, Austria, Belgium, Bulgaria, Cyprus, Ireland, Malta, Poland, Romania, Slovakia and Slovenia. Targeted additional benefits aimed to improve low benefits by ad-hoc increases in the Czech Republic, Estonia, Italy and Sweden. Changing

[13] In most cases the main argument has been increase in life expectancy. Ad hoc increases argued by past experience. Linking future changes to increase argued by the expected tendency, but the rules still stick to observation of future experience.

old age benefit taxation (raising the non-taxable minima) had similar effect in Latvia, Malta and Romania.

Assessment of the reforms

In all, the forecasted/projected change in pension expenditure[14] has not changed significantly, compared to the 2015 exercise: +0.1ppsand -0.1pps, but as one might expect, the change is pointing to the more adequate direction, and the MS-by-MS changes are larger. Majority of the MSs increased their spending. Increasing spending, but still keeping their stabilising position (in the negative zone) include Italy and Latvia. In Finland spending will increase to a close to neutral position. The pension expenditure will change to generous from neutral in Romania and Cyprus. Austria, Hungary, Slovenia, Bulgaria, Ireland, Belgium, the Czech Republic and Luxembourg is forecasted to spend more from an already increasing position in the 2015 Report. Lithuania, Slovakia and Malta are improving their positions with new reforms in this reporting period, but still remaining in the positive increase zone. Greece and Portugal continue decreasing their spending according to the new Report. The outliers Greece (adding -4.5pps) and Luxembourg (+3.5pps) to their already tail positions.

Croatia, France Denmark, Estonia, Sweden and Spain are keeping their saving position with negligible changes in the negative zone, similarly to the Netherlands, the UK, Norway and Germany on the positive (increasing spending) side.

Decomposition of the changing of the results in 2015 and 2018 makes possible the comparison pension reform effects in the 2018 Report by assigning differences to chaned demographic and economic parameters (new assumptions), modelling methodology improvements, and new reforms.

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
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

[14] That is the difference between the end-of-period and beginning-of-period expenditure

Country	AR2015	Change in assumptions	Improvements in coverage & modelling	Constant policy interpretation	Policy-related changes	AR 2018	AR2018-AR2015
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

Finland, Greece, France, Belgium, Bulgaria, Italy and Portugal were mentioned the most in previous paragraphs, implementing the most reform provisions. 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 perspective it is also interesting to examine the relative importance of the different factors to the total change by MS.[15] 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.

The tendency is certainly was to introduce more adequacy measures linked to different career patterns, while the highly measurable provisions were still linked to improve sustainability of the pension system. Assessing the results could be done only by individual qualitative analysis.[16] For example, in case of measures improving the sustainability of the system the short and term and long term effect might be different from the perspective of actuarial balance and adequacy. The effect of bonus-malus and flexible retirement schemes' effect is highly dependent on the actual parameters. The use of incentives and options based on employer and individual decisions on retirement economically are usually adversely rational with respect to the adequacy of the resulting pension. Overall the sustainability of the systems improved since the 2015 Ageing Report, partly because of the crisis measures, mainly changing the effective retirement age, accepted in the previous examination period. However, the life expectancy in retirement is growing faster. The TRR calculations of the PAR 2018 show that retirees in 2056 will have lower pensions to wages than in 2016, despite the poverty protection and adequacy provisions of the pension reforms.

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

[16] PAR 2018 4.2. Impact of recent pension reforms on present and future adequacy

Budapest, August 2018

Tibor Párniczky

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ANNEX

Decomposition of the change in pension expenditure-to-GDP ratio[17]

The pension expenditure–to-GDP ratio is given as

$$\frac{Pension\ expenditure}{GDP} = (dependency\ ratio) \cdot (coverage\ ratio) \cdot (benefit\ ratio) \cdot (labour\ market\ effect)$$

$$= \frac{\text{population}_{65+}}{\text{population}_{20-64}} \cdot \frac{\text{number\_of\_pensioners}}{\text{population}_{65+}} \cdot \frac{\text{average\_pension}}{[\text{GDP}/\text{hours\_worked}_{20-74}]} \cdot \frac{\text{population}_{20-64}}{\text{hours\_worked}_{20-74}}$$

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

$$\frac{\text{population}_{20-64}}{\text{hours\_worked}_{20-64}} = \frac{1}{\frac{\text{population}_{20-64}}{\text{working\_pop}_{20-64}}} \cdot \frac{1}{\frac{\text{working\_pop}_{20-64}}{\text{hours\_worked}_{20-64}}} \cdot \frac{1}{\frac{\text{hours\_worked}_{20-64}}{\text{hours\_worked}_{20-74}}}$$

$$= \frac{1}{employment\ rate} \cdot \frac{1}{labour\ intensity} \cdot \frac{1}{career\ shift}$$

[17] in: The 2018 Ageing Report – Underlying assumptions and methods

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.
>
> − *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.