Croatia

Country fiche on pension projections prepared for the Economic Policy Committee

Update of the 2018 Ageing Report
(in line with changes in the pension system legislation
that came into force in 2018 and 2019)

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Contents

1. OVERVIEW OF THE PENSION SYSTEM

1.1. Description

The Croatian pension system is based on three pillars:

- Public PAYG scheme (I pillar)
- Mandatory private fully-funded scheme (II pillar)
- Voluntary private fully-funded scheme (III pillar)

The current system is the result of comprehensive structural reform enacted in 1998. The reform started with thorough changes within the existing public PAYG system in 1999 and continued by introduction of mandatory and voluntary private schemes in 2002.

1.1.1. The first pillar: public PAYG scheme

The first pillar is the core pension insurance scheme based on principles of reciprocity and solidarity. It is mandatory for all employees and the self-employed, based on the PAYG principle. It is a point system in which workers earn pension points based on their individual earnings for each year of contributions. The scheme covers the risks of old age, disability (including work-related injury and diseases) and also provides for survivors' rights upon the insured person's or pensioner's death. It is administrated by the Croatian Pension Insurance Institute and financed by employees' and employers' contributions and state budget transfers.[1]

In addition to pensions paid according to general regulation on the basis of the Pension Insurance Law (OG 157/2013 and its amendments), the first pillar also provides pensions determined by a number of specific laws that stipulate retirement conditions for specific categories of population. Pension entitlement conditions are in most cases looser and benefits calculated under special regulation are higher than those determined under general conditions. Police and military personnel, Members of Parliament, government officials, Constitutional Court judges, Homeland War Veterans (HWV), academics, veterans from the World War II, and former political prisoners receive benefits that are determined by special laws. The number of pensioners receiving pension determined by special legislation reached around 14% of all pensioners in 2016. The most important special law is the Law on the Rights of Croatian Defenders from the Homeland War and the Members of their Families (Official Gazette no. 121/2017 and its amendments), according to which disability and survivor pensions for around 71,000 pensioners are defined, mostly for veterans from the 1990-1996 war. These pensioners are relatively young, and their benefits are higher than the average pension. Although a part of these benefits is "covered" by regular contributions to the public pension scheme for the period spent as employed or self-employed, the other part is approved as merit pension. The Government is obliged to cover cost of additional pension expenditures due to special regulations, which is covered by transfers from the State Budget to the Croatian Pension Insurance Institute.

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[1] Average share of state budget transfers in total pension system revenue in the period 2014 – 2018 was 43.0% (4.6% of GDP).

1.1.2. The second pillar: mandatory private funded scheme

The second pillar is a mandatory fully-funded defined contribution scheme established in 2002. It covers predominantly the risk of old age, but also the risks of disability and death under specified circumstances (if the fund member is older than 55 and the membership is longer than 10 years and if the amount of disability or survivors' pension from two pillars would be higher than the amount from the first pillar only). Within the second pillar, the accumulation phase is institutionally separated from the pay-out phase and these phases are regulated by separate legislation. In the accumulation phase, mandatory pension funds manage individual accounts of contributors. Pension funds are run by licensed pension fund management companies. At the moment of retirement, the accumulated individual savings are transferred to the private pension insurance company. Benefits are paid in the form of life-long pensions, individual or joint benefits for both spouses, with or without a guaranteed payment period. Currently, there are four mandatory pension funds and one pension insurance company, which is also responsible for payment of pensions from the third (voluntary) pillar.

Participation in the second pillar is mandatory for all employees and the self-employed born in 1962 and later. At the time of the introduction of the second pillar, in 2002, the employees born between 1953 and 1962 were given an option to choose between staying in the one-pillar regime (public PAYG scheme only) or entering the two-pillar regime (participation in both public PAYG scheme and the private second pillar scheme). Persons born before 1953 had to remain insured only in the first pillar.

Calculation of pension benefits in the first pillar (the public PAYG scheme) differs between mono-pillar and two-pillar participants. This difference has been the major cause that the combined two-pillar pensions were lower than the mono-pillar pensions for the vast majority of pensioners that retired in the early 2010s. Therefore, in 2011 the pension legislation was amended to provide the possibility for persons who voluntarily chose for a two-pillar regime (those born between 1953 and 1962) to opt out of that regime at the moment of retirement. In the case of opting out, they would receive their complete pension from the public PAYG scheme based on the rules for those insured in the first pillar only. Their savings accumulated in the second pillar private pension fund are then transferred to the public scheme. At the end of 2016, less than 1% of the retired two-pillar participants decided to receive combined two-pillar pensions, while all others chose to return to the first pillar. According to pension legislation that was in effect until December 2018, those born as of 1963 did not have an option to choose between mono-pillar and combined two-pillar pension benefits. However, recent pension regulation amendments that apply since 2019, also allow the cohorts born in 1963 and later to opt out from the 2nd pillar. A detailed description of those recent legal changes in the pension system is presented in section 3.3.

1.1.3. The third pillar: voluntary private funded scheme

The third pillar is a voluntary private pension scheme that started operating in 2002. This is a fully-funded, defined contribution, privately managed pension scheme. In the accumulation phase, open-ended and close-ended pension funds exist. Contributions to the third pillar are voluntarily paid by the members themselves and/or by their employers. Coverage of the third pillar is relatively low but is steadily increasing. At the end of 2018, net assets of voluntary pension funds were 5.1 billion of kunas, which is around 5% of net assets accumulated in the mandatory pension funds. There were around 305,000 members of open-ended funds and 40,000 members of close-ended funds. With a total of 345,000 it covers around 22% of all

employees, though these numbers include also those who stopped paying contributions on a regular basis but remained members. There were some 10,000 pensions paid out of the third pillar insurance at the end of 2018. However, in this scheme, payment of pensions is possible as of the age of 55 without other qualifying conditions. Overall, the third pillar provides for a rather small portion of overall retirement incomes and, therefore, it is not modelled in the current projections.

1.1.4. Social assistance

The Croatian social care system aims to assist socially vulnerable people as well as people living in unfavourable personal or family circumstances. There is no special social care program for the elderly. They can apply for social assistance according to the general rules. The social care system is financed by the State Budget. The most important program for poverty alleviation is the Guaranteed Minimum Benefit (GMB). It is a means-tested program and the benefit amount is determined on the basis of household income. In 2018, around 8,100 beneficiaries of the GMB were of age 65 years and more, which is around 11% of all beneficiaries.

The GMB benefit bill for the elderly was around HRK 80 million (0.02% of GDP). The pension for 15 years of service of the large majority of such beneficiaries might be higher than the GMB threshold. However, the eligibility for GMB is depends on the income per family member. Other social care programs are targeted to protect the disabled and other vulnerable persons and families and they are also means tested. Social care benefits are not modelled in the current projections.

1.1.5. Statutory retirement age, early retirement and qualifying conditions for retirement

The *statutory retirement age* in Croatia is set to be 65 years until 2027. For women, however, old age retirement is possible at the age of 62 years and 4 months in 2019. The pensionable age for women will increase by 4 months every year as of 2020, reaching the age of 65 in 2027. As of 2033, the pensionable age (for both women and men) will be 67 after completion of the transitional period starting from 2028, when the retirement age gradually rises by 4 months per year. The minimum contributory period for both genders remains at 15 years (Table 1).

In case of a *contribution period of 41 years and more*, retirement is possible at the age of 60 (61 years from 2027) for both genders without reduction of pension benefit.

Persons working in arduous or hazardous occupations are granted special treatment and can retire earlier without reductions of pension benefit. In such cases the insurance periods are calculated in extended duration (each 12 months of work, the insurance period is counted as 14, 15, 16 or 18 months) and the age prescribed for the entitlement to the old-age pension is decreased, depending on the degree of increment of the insurance periods and the length of such periods. Employers' contribution rates for such occupations are higher than the standard rate.

Early retirement is possible maximum 5 years prior to the statutory retirement age, under the condition of a minimum contributory period of 35 years (or less for women until 2027; 32 years and 4 months in 2019). In 2019, the earliest retirement is possible at the age of 60 for men and 57 years and 4 months for women. In case of early retirement, the pension benefit

linearly decreased by 0.3% per month of anticipation (3.6% per year, 18% for the maximum of 5 years). For example, in 2019 men (women) at the age of 60 (57 years and 4 month) can retire with 35 (32 years and 4 months) years of contribution and his/her pension benefit will be permanently reduced by 18%. On the other hand, it is possible to defer retirement beyond the statutory retirement age. For every year of deferment, the bonus of 4.08% per year is applied, up to a maximum of 20.4% for 5 years of deferment.

Disability pensions are provided from the first pillar on condition that the insurance period is equal to one third of working life. Working life is the full number of years between the age of 20 (23 for persons with post-secondary education and 26 for persons with university degree) and the day of the contingency that caused disability. Persons under the age of 30 are entitled to disability pensions, if they have completed at least 1 year of insurance; whereas for those aged 30 to 35, the entitlement is conditional upon an insurance period of 2 years (1 year, if graduated from university). There is no minimum insurance period requirement if the disability is the consequence of a work injury or an occupational disease. To qualify for a disability pension, changes in health must occur before the age 65. In the case of partial incapacity, the benefit is lower than in the case of total incapacity, and partially incapacitated pensioners can be employed while simultaneously receiving a reduced disability pension.

Survivors' pensions are provided to family members of the deceased person if the deceased was a pension beneficiary, a beneficiary of occupational rehabilitation or an insured person who had completed a five-year insurance period or ten-year qualifying period. After the death of the pension beneficiary, the pension base is the old-age or disability pension that the deceased beneficiary actually received. The survivor's pension goes from 70% to 100% of the pension, depending on the number of eligible survivors. For example, the surviving partner, who already receives the pension benefit, may chose the survivor's pension instead of his/her own, amounting to 70% of the deceased beneficiary's pension, provided that such benefit is higher than the survivor's own pension. The children of the deceased beneficiary are eligible if under the age of 15, or under the age of 18 and out of employment or in regular education, until reaching the maximum age of 26. The benefit depends on the number of eligible survivors - 70% of the pension base for one child, 80% for two children, 90% for three and 100% for four or more beneficiaries.

Table 1 – Retirement qualifying condition									
			2016	2020	2030	2040	2050	2060	2070
Qualifying condition for retiring with a full pension	Minimum require-ments	Contributory period - men	41	41	41	41	41	41	41
		Retirement age - men	60	60	61	61	61	61	61
		Contributory period - women	41	41	41	41	41	41	41
		Retirement age - women	60	60	61	61	61	61	61
	Statutory retirement age - men		65	65	66	67	67	67	67
	Statutory retirement age - women		61y6m	62y8m	66	67	67	67	67
Qualifying condition for retirement WITHOUT a full pension	Early retirement age - men		60	60	61	62	62	62	62
	Early retirement age - women		56y6m	57y8m	61	62	62	62	62
	Penalty in case of earliest retirement age*		1.20%-4.08%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%
	Bonus in case of late retirement*		1.8%	4.08%	4.08%	4.08%	4.08%	4.08%	4.08%
	Minimum contributory period - men		35	35	35	35	35	35	35
	Minimum contributory period - women		31y6m	32y8m	35	35	35	35	35
	Minimum residence period - men		-	-	-	-	-	-	-
	Minimum residence period - women		-	-	-	-	-	-	-

Source: Ministry of Labour and Pension System

[*Figures show penalties/bonus for each year of retirement before/after the statutory retirement age]

Tables 2a, 2b and 2c contain data on actual new retirement from registries of the Croatian Pension Insurance Institute. Data cover the age distribution of pension take-up in 2017 by gender. Most new retirees start receiving a pension at the age of 60-64 years, while among women there is a significant proportion of retirees aged 55-59 because early retirement for women in 2017 was possible at the age of 56 years and 9 months.

Table 2a – Number of new pensioners by age group in 2017 - administrative data (MEN)					
Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	1,391	282	640	469	0
50 - 54	622	183	399	40	0
55 - 59	1,001	297	636	68	0
60 - 64	9,778	9,002	681	95	0
65 - 69	11,565	11,462	18	85	0
70 - 74	267	195	0	72	0

Table 2b – Number of new pensioners by age group in 2017- administrative data (WOMEN)					
Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	1,284	11	581	692	0
50 - 54	999	16	365	618	0
55 - 59	5,577	4,298	297	982	0
60 - 64	10,510	9,091	86	1,333	0
65 - 69	4,659	3,238	1	1,420	0
70 - 74	1,319	74	0	1,245	0

Table 2c – Number of new pensioners by age group in 2017 - administrative data (TOTAL)					
Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	2,675	293	1,221	1,161	0
50 - 54	1,621	199	764	658	0
55 - 59	6,578	4,595	933	1,050	0
60 - 64	20,288	18,093	767	1,428	0
65 - 69	16,224	14,700	19	1,505	0
70 - 74	1,586	269	0	1,317	0

Source: Croatian Pension Insurance Institute

1.1.6. Pension benefit calculation rules

Pension benefits paid by the public PAYG scheme (first pillar) are determined by a point system. There are certain differences in pension formulas for those insured only in the first pillar compared to those who retire in both mandatory pension pillars.

1.1.6.1. Pension formulas for those insured in the first pillar only

The new pension benefit (PB) is calculated according to the general pension formula:

PB = personal points (PP) x pension factor (PF) x actual pension value (APV) x 1.27

Personal points (PP) valuate earnings and employment record of the insured person by:

PP = insurance period (IP) x average value point (AVP) x initial factor (IF)

Insurance period (IP) is the effective work history period for which the pension contributions were paid. Insurance period is expressed in years (months and days are expressed as decimals).

The average value point (AVP) is one of the key parameters in the formula by which the pension benefit is linked to the earnings history. It is calculated by dividing the annual wage earned in each year of insurance by the economy-wide average wage in that year. This ratio is averaged over the entire insurance period. For example, a person who received a wage equal to the average national wage in her/his entire career will have a average value point of 1.0. The economy-wide average wage is published by the Central Bureau of Statistics (CBS).[2]

The initial factor (IF) aims to valuate the timing of retirement. For old-age retirement at the statutory retirement age it takes the value of 1. For early retirement, it is lowered by a decrement rate of 0.3% for each month of earlier retirement compared to the statutory age. The qualifying period requirement is lower for women, but gradually increasing in transition period up to 2027 (in 2019, it is minimum 32 years and 4 months). In case of deferred retirement, i.e. at an age exceeding the statutory retirement age and with qualifying period of at least 35 years, the initial factor increases by 0.34% per month of deferment, with maximum deferment bonus set at 5 years (20.4%). The initial factor for disability pension is 1.

The pension factor (PF) accounts for the type of pension. It takes a value of 1 for old-age and early retirement pensions. For disability pensions, the pension factor equals 1 in case of total disability; in case of partial disability it amounts to 0.8 if the person is unemployed and 0.5 if the beneficiary is employed or self-employed.

Actual pension value (APV) is the monetary value of one personal point. In the first half of 2019, the APV was HRK 66.35. The APV is the channel for pension valorisation. It is adjusted twice a year according to specific rules that take into account the average wage and consumer price developments (see below).

The pension supplement of 27% (factor 1.27 in the formula above) is granted to all new mono-pillar pensions.[3]

The calculation of the pension benefit could be illustrated in an example. For a man with a career of 40 years in which he earned wages equal to the economy-wide average wage in each year, the monthly gross pension benefit (PB) would be as follows in case of retirement at the age of 65 in the second half of 2019:

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[2] Up to 2015, the official figure for the average wage was based on the establishment survey of the incorporated sector conducted by the CBS. In 2016, the data source was changed to the tax form JOPPD, what resulted in a gross average wage of around 5.5% lower than before. This change is of importance for the pension system because it increases the average value point on the basis of higher value points for wages earned in 2016 and later. New official average wages are incorporated in the current projections.

[3] The Law on the Supplement on Pension Acquired According to the Pension Insurance Act (OG no. 79/2007 and its amendments) stipulates an increase that affects the pensions acquired from 1999 to 2010, which are increased from 4% to 27%, whereas the post-2010 new pensions paid from the first pillar are increased by 27%, on top of the benefit determined by the point formula defined by the Pension Insurance Law (OG no. 157/2013). The purpose of the supplement was to balance the benefits between older and younger cohorts due to a gradual switch in the calculation of pension rights from the best consecutive 10 years to lifetime earnings. The pension supplement is applied neither in the calculation of the minimum pension, nor that of the maximum pension.

PB = 40 x 1 x 67.97 x 1.27 = 3,452.88 kunas (approximately 467 euro)

Minimum pension

The calculation formula for minimum pensions in Croatia is roughly the same as that for earning-related pensions. However, the minimum pension is defined as a flat rate per qualifying year and therefore the amount depends on the length of the qualifying period completed. The eligibility for minimum pension is not means-tested. Minimum pensions are an integral part of the insurance in the public PAYG scheme and financed by its regular revenues. The minimum pension (MP) is calculated as follows:

MP = insurance period (IP) x initial factor (IF) x pension factor (PF) x actual minimum pension value (AMPV)

The formula resembles the general pension formula, but previous earnings are not taken into account and there is no pension supplement for minimum pensions. The actual minimum pension value was approximately 97% of the actual pension value (APV) used in the general formula, but was increased by 3.13% to the actual pension value as of the second semester of 2019. For illustration, the minimum monthly pension for a man with 40 years of service taking old-age retirement at the age of 65 in the second half of 2019 would be 2,719 kunas (40x1x1x67.97) (approximately 368 euro).

Minimum pensions cover all types of pensions – old-age, early, disability, survivors. It is provided to persons whose regular pension as calculated by the pension formula (with pension supplement) is lower than the minimum pension. Valorisation and indexation of the minimum pension is subject to the same rules as for all other pensions. Through the initial factor, the minimum pension is subject to penalty/bonus in case of early/late retirement.

A special type of minimum pension concerns war veterans that served in combat units for more than 100 days. Their pension is determined on the basis of 45% of the average net wage in 2016 and increased on the basis of the number of days spent in the combat sector during the Homeland War. The pension base is increased every year using the same formula as for the indexation of the actual pension value.[4]

In the 2015 round of AWG projections, minimum pensions were separated from earnings-related pensions paid by the first pillar and projected as "other pensions". It should not be neglected that pensioners with minimum pensions account for a large part of total number of pensioners, about 1/3. Following an in-depth peer review carried out by the AWG members and the European Commission, and their proposals for further improvements of the projections, the 2018 projections results as well as the current update are prepared using a different approach. Minimum pensions are now incorporated in earnings-related pensions. This change causes that the main results by pension types are not comparable with the results of the 2015 projection round. However, the results at the aggregate level (all public pensions and total expenditures) are not impacted.

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[4] The Law on Homeland War Veterans and their Family Members (OG no. 121/2017)

Maximum pension

The maximum pension is the maximum amount at which pension benefits can be determined. It is calculated on the basis of the general pension formula, but limited to the value of 3.8 times the average value points (AVP) in calculation of personal points. Like the minimum pension, the maximum pension is subject to penalty/bonus in case of early/late retirement and refers to all types of pension benefits paid out from the public pension scheme.

1.1.6.2. Pension formulas for those insured in the first and the second pillar

Participants in both mandatory pillars receive their pensions from both the public PAYG scheme and the pension insurance company in the second pillar scheme. The pension benefit paid out from the second pillar is determined according to actuarial rules. The pension benefit paid out from the first pillar for two-pillar participants is called the *basic pension* and is determined in a similar manner as for mono-pillar participants with two differences: a) a pension supplement of 20.25% is used in the calculation of the pension benefit[5] and b) in calculation of personal points the basic pension factor is added.

PB = personal points (PP) x pension factor (PF) x actual pension value (APV) x 1.2025

PP = insurance period (IP) x average value point (AVP) x initial factor (IF) x basic pension factor (BP)

For the insurance period prior to the introduction of the second pillar (pre-2002 period), the pension benefit paid by the PAYG scheme is determined in the same way as for mono-pillar pensions, with a pension supplement of 27% and the basic pension factor set at 1 for that insurance period.

For insurance periods as of -2002, the pension benefit paid by the PAYG scheme is calculated by applying the point formula as shown above, using the pension supplement of 20.25% (27% x basic pension factor) and with personal points multiplied by the basic pension factor of 0.75.

The basic pension factor is calculated as an average share of the first pillar contribution rate in the total (first and second pillar) contribution rate in the period from 2002 until the current year. Currently, this factor equals 0.75 for the post-reform period (15%/20%).

The minimum and maximum pensions also apply to pensioners with combined pensions but only to the basic pension, i.e. the pension benefit paid from the public PAYG scheme. It is calculated according to the general formulas for the pre-2002 period. For post-2002 insurance periods, minimum and maximum pensions are calculated by applying the basic pension factor of 0.75. It is worth noting that the pension supplement is not applied to minimum and maximum pensions, neither for mono-pillar nor for two-pillar pensioners. There are no minimum and maximum pensions for benefits paid out from the second pillar.

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[5] The 2018 pension reform introduced the pension supplements of 27% and 20.25% for two-pillar participants.

1.1.7. Valorisation, indexation and taxation of pensions

1.1.7.1. Valorisation of pensions

The actual pension value (APV) is adjusted twice a year, in January and July, hence influencing valorisation of previous earnings/contributions. On 1 January and on 1 July of each calendar year, the APV increases by a rate that is a combination of the average gross wage and consumer price index growth rate in the previous semester. A simple interpretation of the APV adjustment mechanism is that it is regularly adjusted with wage and price change in a 70%:30% proportion, where the 70%-weight is given to the indicator that has increased the most. If the above adjustment rule results in a negative value, there will be no change in the APV.

1.1.7.2. Indexation of pensions

Indexation of pensions, i.e. adjustment of pensions in payments, is subject to the same rules and the same rates as the valorisation of pensions. Pension payments from the second pillar are adjusted twice a year in line with changes in the consumer price index.

1.1.7.3. Taxation

Pension benefits are subject to income taxation, but pensioners have a more favourable tax treatment and a large majority of pensions go untaxed in practice. Pensioners with benefits higher than the economy-wide average net wage pay a health insurance contribution of 3% of gross pensions. The personal tax deduction is applied on pension income and pensions are taxed according to general income tax rules, but the calculated income tax is reduced by 50%. The result is that the majority of pension benefits are untaxed and that the average gross and the average net pensions are very similar (the difference is around 1%).

1.2. Recent reforms of the pension system included in the projections

As compared to the 2015 projection round, there was only one important legislative change in the pension system that was taken into account in the 2018 Ageing Report projections. Previously, pensions or portions of pensions that are determined by special regulation[6] were indexed, given the positive trends of GDP growth and the State Budget, at the rate determined by the Government and such rate could not exceed the general rate of valorisation/indexation. With the amendments to the Pension Insurance Law valid from the beginning of 2017, separate valorisation/indexation was abolished and pensions determined by special regulation have been indexed based on the general indexation rules.

In 2018, Croatia made significant changes in the pension system legislation that came into force in 2019. The pension reform legislation package covers amendments of six laws: the Pension Insurance Act, the Act on Pension Supplement provided under Pension Insurance Act, the Act on Insurance Periods Counted with Increased Duration, the Mandatory Pension Funds Act, the Voluntary Pension Funds Act and the Act on Pension Insurance Companies.

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[6] Police and military personnel, Members of Parliament, government officials, Constitutional Court judges, Homeland War Veterans (HWV), academics, veterans from the World War II, and former political prisoners that receive benefits determined by special laws.

The following summarizes the most important legislative changes:

1. Acceleration of the equalization of age requirement for women by 4 months per year for old-age (to 65) and early pension (to 60) in the transition period from 2019 until 2027 and raising the age requirement for both genders to 67 years by 2033.[7]

The following table provides information on the legislated increase in statutory and early retirement age starting from 1 January 2019:

Table 2d – Transitional period for statutory and early retirement age for women and men

Year	Transitional period to reach statutory retirement age (67 years of age and minimum 15 contributory years)		Transitional period to reach early retirement age (62 years of age and minimum 35 contributory years)		
	Females years + months	Males years + months	Females years + months	Contribution period (females)	Males years + months
2019	62+4m	65	57+4m	32+4m	60
2020	62+8m	65	57+8m	32+8m	60
2021	63	65	58	33	60
2022	63+4m	65	58+4m	33+4m	60
2023	63+8m	65	58+8m	33+8m	60
2024	64	65	59	34	60
2025	64+4m	65	59+4m	34+4m	60
2026	64+8m	65	59+8m	34+8m	60
2027	**65**	**65**	**60**	**35**	**60**
2028	65+4m	65+4m	60+4m	35	60+4m
2029	65+8m	65+8m	60+8m	35	60+8m
2030	66	66	61	35	61
2031	66+4m	66+4m	61+4m	35	61+4m
2032	66+8m	66+8m	61+8m	35	61+8m
2033	**67**	**67**	**62**	**35**	**62**

Source: Croatian Pension Insurance Institute

The increase of the age requirement for women is accelerated from 3 to 4 months per year until 2027, when the statutory retirement age will be equal for women and men at the age of 65. From 1 January 2028, the age requirement for old-age and early pensions will start rising at a pace of 4 months per year for both men and women, reaching 67 and 62 in 2033.

2. Penalization and bonification. The penalization for early pension is set at a linear 0.3% decrease per month of anticipation (3.6% per year; 18% for maximum of 5 years). The bonification for deferred pension is increased to 0.34% per month of deferment (20.4% for maximum of 5 years) after fulfilling the age requirement for the old-age pension. [8]

3. Old-age pension based on a long insurance period is possible under the condition that a person has attained 60 years of age and completed the effective contributory period of 41 years. The condition of 61 years of age and 41 years of effective contributory period will apply from 1 January 2027.[9]

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[7] According to the legislation effective until 31 December 2018, the transitional period for both old age and early pension was ending in 2038.

[8] According to the legislation effective until 31 December 2018, the penalization ranged from 0.10% up to 0.34% per month of anticipation depending on the length of qualifying period, and bonification was set at 0.15% per month of deferment.

[9] According to the new legislation, for the fulfilment of the condition of 41 years of insurance period only effective contributory period is counted, while the previous legislation included contributory periods counted with extended duration, completed on arduous and hazardous jobs.

4. The group of pension beneficiaries who may work and receive pension is extended to beneficiaries of:

- old-age pension for long insurance periods and early old-age pensions – in case of part-time work that does not exceed daily half-time of normal working hours – they may receive the full pension payment;

- old-age pensions according to the Act on Pension Insurance Rights of Active Military Persons, Police Officers and Authorized Officials – in case of part-time work that does not exceed daily half-time of normal working hours they may receive the full pension amount, or in case of work of 8 hours a day the pension is reduced by 50%.

5. Minimum pension is increased by 3.13%, that is, it will be determined for each year of qualifying period in the amount of the actual value of pension which is used for the calculation of 1st pillar pensions. The increase is applied from **1 July 2019** to all new and current minimum pension beneficiaries.

6. The category of the credited child-raising period has been introduced – from 1 January 2019 six months per child is added to the total of contribution periods, if all other pension requirements are fulfilled, at pension take-up. Entitled are primarily mothers for each born or adopted child, and exceptionally fathers who used a major part of the maternity leave (mother has to use maternity leave for the first 70 days of child's life; after that period, the father can use the maternity leave instead of mother).

7. Changing the method of pension indexation – a more favourable pension indexation model is introduced, according to which pensions will be adjusted on 1 January and on 1 July of each calendar year in such a way that the rate of adjustment of the Actual Pension Value will be determined as the sum of the rate of changes in the consumer price index and wage growth index during the previous semester, at a ratio of 70:30 or 30:70 (instead of 50:50), depending on whether there was a higher growth of average gross wages or consumer prices. This indexation model applies since 1 July 2019.

8. Mandatory Pension Funds Act (2nd pillar), with the purpose of increasing pensions of pension beneficiaries, provides for the possibility of **opting for the more favourable pension amount at the pension take-up** by choosing between:

-   the pension from the 1st pillar pension system only with the supplement of 27%, or
-   a pension combining the 1st and 2nd pillar (with the supplement of 27% for 1st pillar contributions up to 31 December 2001, and the supplement of 20.25% to the basic pension calculated for the contribution period from 1 January 2002).

In the first case the capitalized funds are transferred from the 2nd pillar personal account to the State Budget and the Croatian Pension Insurance Institute provides payment of 1st pillar pension. In case of opting for the combined 1st and 2nd pillar pension, the pension insurance company is competent for the payment of the 2nd pillar pension and the Croatian Pension Insurance Institute for the basic 1st pillar pension.

9. Change in the indexation method of 2nd pillar pensions. The indexation formula for 2nd pillar pensions under the so-called 'Swiss formula' is abandoned and according to new legislation pensions are adjusted twice a year in line with changes in the consumer price index.

10. Possibility of partial lump sum payment to mandatory pension fund members that opted for combined pension, based on the pension contract between the Pension Insurance Company and the beneficiary of old age and early retirement pension. **This payment equals 15%** of the total amount on the individual saving account. This payment is allowed only if the basic pension from the 1st pillar amounts at least 115% of the minimum pension according to the Pension Insurance Act.

11. Reduction in the list of arduous or hazardous jobs and occupations on which the insurance period is counted with extended duration (from 106 to 65 jobs and occupations).

Pension projections in this document are prepared in line with the above listed legislative changes, although it is worth noting that amendments to the Pension Insurance Act are currently in the parliamentary procedure and should come into force starting from 1 January 2020.[10] The proposed amendments are shown in the last column of Box 1.

	Box 1 – Proposed legislative changes that should become effective in 2020		

		Current legislation	Proposed amendments
1.	Acceleration of the equalization of age requirement for old-age (to 65) and early pension (to 60) for women	65 years until 2027 at the pace of 4 months per year	65 years until 2030 at the pace of 3 months per year
2.	Increase in the pensionable age for old-age (to 67) and early pension (to 62), for both genders	Increase by 4 months per year in the period 2027 - 2033	Fixed at 65 years for old age pension and 60 years for early retirement from 2030
3.	Penalization of early retirement	0.30% per month of anticipation	0.20% per month of anticipation
4.	Age requirement for old-age pension based on a long insurance period (41 years of insurance)	61 years of age from 2027	Fixed at 60 years of age

1.3 Description of the actual "constant policy" assumptions used in the projection

It is assumed that the current legislation will remain in force over the entire projection period. The valorisation and indexation rules set in the laws defining the first and the second pillar pensions are assumed to remain applicable until 2070. Under normal economic conditions, these rules will lead to adjustments that are below average wage growth and therefore will lead to declining benefit and replacement rates unless other changes compensate for that, for example, longer contribution periods.

The results of the current projections indicate notable reductions of the benefit ratio and replacement rate in Croatia and one may ask whether the above assumptions on *unchanged* legislation are in line with the "constant policy" assumptions required to use in the projections.

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[10] The reason behind the proposed change in the pension legislation is related with the fact that trade unions started an initiative to amend the Pension Insurance Act through a referendum, in line with the proposals described in Box 1. Considering that the initiative received strong public support, the government decided to accept all proposals and send legal amendments to the Parliament for adoption.

For this reason, an alternative scenario was developed that assumes pension valorisation and indexation to be in line with the wage growth. The projection results are shown in the sensitivity analysis in section 3.6.

2. OVERVIEW OF THE DEMOGRAPHIC AND LABOUR FORCES PROJECTIONS
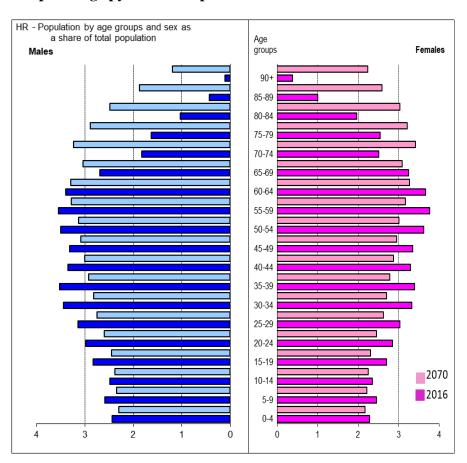
2.1. Demographic development

The Croatian population is rapidly declining and ageing. In the period 2016-2070, the *population* is projected to decline by around 19%, from 4.2 to 3.4 million. In parallel, *life expectancy* should increase significantly. At the age of 65, life expectancy is projected to increase by 6.4 years for men and by 6.2 years for women between 2016 and 2070. *Survivor rates* at 65+ and 80+ are also expected to increase notably. The *old-age dependency ratio* (15-64) will almost double by 2070 when it reaches 56.2%. The ratio of older old-age population (80+) to total old-age population (65+) is expected to reach 41.5%, up from 25.4% in 2016. *Net migration*, on the other hand, is expected to be negative until 2020, after which it will become positive. However, it is expected that net migration will have a rather small impact on the overall demographic developments (Table 3).

Table 3 – Main demographic variables evolution								
Demography	2016	2020	2030	2040	2050	2060	2070	Peak year*
Population (thousand)	4,173	4,083	3,949	3,813	3,668	3,527	3,395	2016
Population growth rate	-0.8	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	2031
Old-age dependency ratio (pop65/pop15-64)	29.3	32.8	40.3	45.0	50.4	53.7	56.2	2070
Ageing of the aged (pop80+/pop65+)	25.4	26.2	26.0	33.4	35.4	37.9	41.5	2070
Men - Life expectancy at birth	75.0	75.8	77.8	79.6	81.3	82.9	84.4	2070
Men - Life expectancy at 65	15.6	16.1	17.4	18.6	19.8	21.0	22.0	2070
Women - Life expectancy at birth	81.1	81.8	83.4	84.9	86.3	87.6	88.9	2070
Women - Life expectancy at 65	19.1	19.6	20.8	22.0	23.2	24.3	25.3	2070
Men - Survivor rate at 65+	80.2	81.5	84.6	87.3	89.4	91.2	92.7	2070
Men - Survivor rate at 80+	43.8	46.6	53.5	59.8	65.6	70.7	75.2	2070
Women - Survivor rate at 65+	90.8	91.4	92.7	93.9	94.8	95.6	96.3	2070
Women - Survivor rate at 80+	66.2	68.2	73.1	77.4	81.0	84.1	86.7	2070
Net migration	-21.5	-1.7	4.2	5.0	6.0	5.2	4.6	2049
Net migration over population change	0.6	0.1	-0.3	-0.3	-0.4	-0.4	-0.3	2016

Source: EUROSTAT and Commission Services

The projected demographic trends will put strong pressure on the pension system sustainability, in particular on the public PAYG scheme. Although there is no automatic adjustment mechanism in pension formulas, the increase of the statutory retirement age for women from 62 and 4 months in 2019 to 65 by 2027, and for both men and women from 65 to 67 between 2027 and 2033, should release some of the pressure.

Graph 1: Age pyramid comparison: 2016 vs 2070

2.2.   Labour force

Croatia is characterized by rather low participation and employment rates in general, and that can also be said for participation and employment rates of older cohorts (55-64 and 65-74 years), as shown in Table 4.

Table 4 – Participation rate, employment rate and share of workers for the age groups 55-64 and 65-74								
Labour force	2016	2020	2030	2040	2050	2060	2070	Peak year*
Labour force participation rate 55-64	42.3	43.5	48.9	53.6	54.0	54.2	54.7	2066
Employment rate for workers aged 55-64	38.4	40.0	45.2	50.2	51.3	51.5	52.0	2066
Share of workers aged 55-64 on the labour force 55-64	90.9	91.9	92.4	93.6	94.9	95.0	94.9	2060
Labour force participation rate 65-74	4.8	6.1	8.3	13.5	14.5	14.7	14.4	2063
Employment rate for workers aged 65-74	4.8	6.1	8.3	13.5	14.5	14.7	14.4	2063
Share of workers aged 65-74 on the labour force 65-74	100.0	100.0	100.0	100.0	100.0	100.0	100.0	2018
Median age of the labour force	39.0	39.0	40.0	41.0	41.0	41.0	41.0	2035

Source: Commission Services

Both the *labour force participation rate* and the *employment rate* for workers aged 55-64 are projected to increase over the projection horizon (with a peak in 2066). This is partly due to the increasing retirement age for both early and statutory retirements. Also, fewer retirements

among specific population groups that currently retire relatively young, should further increase the participation rate for older workers. However, even with an increase of the participation rate by more than 12 percentage points and the employment rate by more than 13 percentage points in the period 2016-2070, the participation rate for this age group will be around 55% in 2070, while the employment rate is projected to be around 52%. For the 65-74 age group both the participation and employment rate are projected to more than double by 2070 in comparison to 2016; from 4.8% in 2016 to 14.4% in 2070 with its peak in 2063. Such projected increase is in line with legislated increase in the statutory retirement and expected economic growth.

The *median age of the labour force* would rise until 2035 and stay constant thereafter at around 41 years.

According to the Cohort Simulation Model, the average *effective exit age* is projected to increase for both men and women (Tables 5a and 5b). For men, it starts at 62.4 years in 2017 and should reach its peak in 2033 and stay constant thereafter at 64 years. For women, it starts at 60.7 years in 2017 and should reach its peak in 2039 and then stay constant at 63.7 years. The increases up to 2033 are related to rising statutory retirement ages, for men from 65 to 67 in period 2027-2033, and for women from 61 years and 9 months in 2017 to 67 years in 2033.

Table 5a – Labour market entry age, exit age and expected duration of life spent at retirement - MEN								
	2017	2020	2030	2040	2050	2060	2070	Peak year*
Average effective exit age (CSM) (II)	62.4	62.6	63.3	64.0	64.0	64.0	64.0	2033
Contributory period	32.0	32.2	33.4	34.6	34.7	34.7	34.7	2064
Duration of retirement**	17.9	17.6	18.9	19.4	20.6	21.8	22.9	2070
Duration of retirement/contributory period	0.6	0.5	0.6	0.6	0.6	0.6	0.7	2070
Percentage of adult life spent at retirement***	28.7	28.3	29.4	29.7	30.9	32.1	33.2	2070
Early/late exit****	2.0	2.3	1.4	2.1	2.8	1.6	1.9	2016

Source: Commission Services and Ministry of Labour and Pension System

*This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2016 to 2070. ** Duration of retirement is calculated as the difference between the life expectancy at average effective exit age and the average effective exit age itself. *** The percentage of adult life spent at retirement is calculated as the ratio between the duration of retirement and the life expectancy diminished by 18 years. **** Early/late exit, in the specific year, is the ratio of those who retired and aged less than the statutory retirement age and those who retired and are aged more than the statutory retirement age.

In the period 2017-2070, the average contributory period is projected to increase from 32 to 34.7 years for men and from 30.2 to 34.9 years for women. At the same time, the expected duration of retirement and the projected share of adult life spent at retirement are increasing for both men and women. The duration of retirement for men is projected to increase by 5.0 years, from 17.9 years in 2017 to 22.9 years in 2070. For women it is projected to increase by 3.5 years, from 22.7 years in 2017 to 26.2 years in 2070.

Table 5b – Labour market entry age, exit age and expected duration of life spent at retirement - WOMEN								
	2017	2020	2030	2040	2050	2060	2070	Peak year
Average effective exit age (CSM) (II)	60.7	61.1	63.0	63.7	63.7	63.7	63.7	2039
Contributory period	30.2	31.7	34.2	34.9	34.9	34.9	34.9	2064
Duration of retirement	22.7	23.1	22.6	22.9	24.1	25.2	26.2	2070
Duration of retirement/contributory period	0.8	0.7	0.7	0.7	0.7	0.7	0.8	2016
Percentage of adult life spent at retirement	34.7	34.9	33.4	33.4	34.5	35.5	36.4	2016
Early/late exit	1.6	2.1	1.8	1.9	2.6	1.5	1.9	2046

Source: Commission Services and Ministry of Labour and Pension System

Over the projection horizon, the expected duration of retirement increases by less than the projected increase in life expectancy at the age of 65 years (Table 3), but by more than the expected contributory period for men. For women, the contributory period is projected to increase by 3.7 years between 2017 and 2070, while the duration of retirement would increase by 3.5 years. It is also projected that early retirement will continue to be more prevalent in comparison with late retirement throughout the entire projection period.

3. PENSION PROJECTION RESULTS

3.1. Extent of the coverage of the pension schemes in the projections

The projections cover all pensions from the public pension scheme, as well as pensions from the mandatory private second pillar. Up until 2014 (Table 6), all pension expenditures were entirely within the public pension scheme because payments under the second pillar were of marginal importance at that time.

The AWG projection covers almost all pension expenditures included in the Eurostat (ESSPROS) official figures. The marginal difference between AWG and Eurostat figures of about 0.1% of GDP (Table 6) is due to the fact that the Eurostat figures include some minor categories of pension expenditures not covered by the AWG definition, such as: compensation allowance for a physical injury, costs of a professional rehabilitation program, as well as Christmas bonus and some other benefits paid according to discretionary Government decisions.

Table 6 - Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)							
	2008	2009	2010	2011	2012	2013	2014
1 Eurostat total pension expenditure	9.3	10.4	10.6	10.4	10.6	10.9	11.0
2 Eurostat public pension expenditure	9.3	10.4	10.6	10.4	10.6	10.9	11.0
3 Public pension expenditure (AWG)	:	:	:	:	:	10.9	10.9
4 Difference (2) - (3)	:	:	:	:	:	0.0	0.0
5 Expenditure categories not considered in the AWG definition:	*:*	*:*	*:*	*:*	*:*	*:*	*0.1*
5.1 Compensation allowance for a physical injury, care allowance, costs of a professional rehabilitation, pension payment as a result of court disputes	*:*	*:*	*:*	*:*	*:*	*:*	*0.1*

Source: EUROSTAT and the Ministry of Labour and Pension System

3.2. Overview of projection results

In the baseline scenario, *gross public pension expenditures,* measured as a proportion of the GDP, are projected to increase modestly until 2025, from 10.6% in 2016 to 10.9% in 2025, and then to decline continuously, to 8.1% in 2070 (Table 7). Although demographic trends, foremost the increase in life expectancy and a higher share of elderly in the total population, tend to push up future pension expenditures, in Croatia there are other important factors working in the opposite direction:

a. 30% of the population is already in retirement, due to insufficient incentives for postponing early retirement in the past, loose conditions for achieving disability pensions and war veterans from the Croatian Homeland War. As a result, population cohorts which represent the base for future retirement are reduced.

b. Due to the introduction of the second pillar mandatory private pension system, as of the late 2020s, the majority of new pension beneficiaries can be expected to choose receiving the basic pension from the first pillar plus the pension from the second pillar. This fact will cause the average pension paid out from the first pillar to gradually decline (as fewer pensioners would return to the public scheme) and hence public pension expenditures will decline. The statutory retirement age for women will gradually rise by four months

per year to 67 by 2033 and also for men by four months per year in the period from 2027 to 2033 so that from 2033 the retirement age for both genders will be 67. This measure will slow down the inflow of new beneficiaries into the pension system.

c. Disability pension beneficiaries are projected to remain at relatively lower levels than was the case several years ago as a result of the new system for acquiring disability pensions, with much stricter medical assessment rules, improved occupational rehabilitation system and the fact that the number of war veterans with disability pensions will gradually decline in the future.

d. Survivors' pension beneficiaries are also projected to decrease due to demographic trends and increased female participation and employment.

e. Decrease in the benefit ratio and the aggregate replacement rate due to the fact that the projected rate of valorisation and indexation of pensions is lower than the projected wage growth rate.

The *mandatory private scheme* is projected to have growing importance as it matures. Potential new pensioners of this scheme have an option to return to the public scheme and receive pension only from the first pillar and we assumed that in the beginning of the projection period the majority of them will use this option as the public pension is projected to be somewhat higher than combined ones. The share of new retirees that will opt for pensions from the funded scheme will gradually increase over time and therefore the number of private pensions will increase.

The *net pension expenditures* are following the trends of gross pension expenditures as it is assumed that taxes on pensions remain constant at 1.1% of pension expenditures.

Table 7 - Projected gross and net pension spending and contributions (% of GDP)								
Expenditure	2016	2020	2030	2040	2050	2060	2070	Peak year*
Gross public pension expenditure	10.6	10.8	10.5	9.3	8.5	8.3	8.1	2025
Private occupational pensions	:	:	:	:	:	:	:	:
Private individual pensions	0.0	0.0	0.2	0.6	1.0	1.2	1.3	2070
Mandatory private	0.0	0.0	0.2	0.6	1.0	1.2	1.3	2070
Non-mandatory private	:	:	:	:	:	:	:	:
Gross total pension expenditure	10.6	10.8	10.7	9.9	9.5	9.4	9.4	2026
Net public pension expenditure	10.5	10.6	10.4	9.2	8.5	8.2	8.1	2025
Net total pension expenditure	10.5	10.6	10.6	9.7	9.4	9.3	9.3	2026
Contributions	2016	2020	2030	2040	2050	2060	2070	Peak year*
Public pension contributions	5.8	5.7	5.6	5.6	5.6	5.6	5.6	2017
Total pension contributions	7.3	7.3	7.4	7.4	7.4	7.4	7.4	2035
Transfers of funds in the 2nd pillar to the public scheme	0.1	0.2	0.5	0.6	0.6	0.6	0.6	2047

Source: Commission Services and the Ministry of Labour and Pension System

Contribution to the public PAYG scheme were 5.8% of GDP in 2016 and will somewhat decline towards 5.6% by 2030 due to an increasing proportion of employees insured in both mandatory pillars (they pay 15% of contributions to the public scheme and 5% to the private scheme) and a declining proportion of employees insured only in the public scheme (they pay 20% of contributions to the public scheme). After the two-pillar system reaches its maturity, around 2030, and the most of employees will pay combined insurance, contributions to the public scheme will stabilize at 5.6% of GDP. The gap between public pension expenditures

and public pension contributions is financed from the State Budget, and it is projected to decline from 4.8% of GDP in 2016 to around 2.5% of GDP in 2070.[11]

Table 8a reveals the *composition of gross public pension spending by pension type*. Public expenditures for old age and early pensions are projected to increase until 2026 in terms of GDP, after which they would decrease to 6.0% of GDP in 2070, predominately as a consequence of the maturation of the two-pillar system. In 2016, disability pensions accounted for a rather high 1.8% of GDP. High spending on disability pensions in GDP is due to loose conditions for achieving disability pension rights in the past and the relatively large number of war veterans. However, disability pension expenditure will decline over the projection period, falling back to 0.9% of GDP in 2070, mostly because of the expected decrease in the number of disability pension beneficiaries, as it is projected that disability rates will remain at a relatively low level as a result of the tightened system for acquiring disability pension. In addition, rather limited inflows of new disability pensions on the grounds of participation in the Homeland War are expected. Gross public pension spending on survivor's pensions is also declining, mainly due to the projected increase in female labour market participation and earnings, meaning that for more and more women survivor's pensions under the current rules will not be more favourable than their own pension benefit.

Table 8a - Projected gross public pension spending by scheme (% of GDP)								
Pension scheme	2016	2020	2030	2040	2050	2060	2070	Peak year *
Total public pensions	10.6	10.8	10.5	9.3	8.5	8.3	8.1	2025
of which								
Old age and early pensions:	6.9	7.3	7.3	6.4	6.1	6.0	6.0	2026
Flat component	:	:	:	:	:	:	:	:
Earnings related	6.9	7.3	7.3	6.4	6.1	6.0	6.0	2026
Minimum pensions (non-contributory) i.e. minimum income guarantee for people above 65	:	:	:	:	:	:	:	:
Disability pensions	1.8	1.7	1.5	1.3	1.0	0.9	0.9	2016
Survivor pensions	1.8	1.8	1.7	1.5	1.4	1.3	1.3	2016
Other pensions	:	:	:	:	:	:	:	:

Source: Commission Services and the Ministry of Labour and Pension System

3.3.   Description of the long-term effects on the public pension system of the legislated pension reform package and the possibility to opt-out the 2nd pillar

As explained in section 1.2., numerous changes in the pension system legislation were introduced with the aim to improve pension adequacy. The most important measures include: pension supplements of 27% and 20.25% to two-pillar beneficiaries, possibility to opt for the more favourable pension, more favourable pension indexation in the first pillar, credited child-raising period, and an increase of the minimum pension. These measures resulted in an increase in projected pension expenditure and higher average pension benefit compared to the previous round of projections (Table 8b).

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[11] Pension contributions in Table 7 do not include accumulated funds in the 2nd pillar transferred to the State Budget.

Introduced legislative changes will result in the increase in average pension over the long run in comparison with the pre-reform scenario, by 3.5% in 2020, rising to 19.3% in 2070. The increase in total public pension expenditure follows the increase in the average pension, with pension expenditure is projected to be higher by 3.5% in 2020 and by 19.5% in 2070.

Table 8b - Total impact of the pension reform on the projection results

Public pensions		2016	2020	2030	2040	2050	2060	2070
Total pension expenditure (in millions €)	Before (1)	4821.8	5448.7	6831.9	7974.2	10294.1	13517.4	17749.2
	After (2)	4821.8	5638.1	7253.4	8908.2	11819.4	15859.3	21205.7
	% (2)/(1)-1	0.0%	3.5%	6.2%	11.7%	14.8%	17.3%	19.5%
Monthly Average pension (in €)	Before (1)	325.8	366.8	457.7	567.0	736.3	975.8	1293.6
	After (2)	325.8	378.9	495.9	632.2	844.0	1142.7	1542.8
	% (2)/(1)-1	0.0%	3.3%	8.4%	11.5%	14.6%	17.1%	19.3%
Number of pensioners (in 1000)	Before (1)	1233.4	1237.8	1244.0	1172.1	1165.0	1154.4	1143.4
	After (2)	1233.4	1240.2	1218.8	1174.2	1167.0	1156.5	1145.4
	% (2)/(1)-1	0.0%	0.2%	-2.0%	0.2%	0.2%	0.2%	0.2%
Number of contributors (in 1000)	Before (1)	1453.0	1468.5	1400.4	1386.0	1339.2	1258.0	1188.7
	After (2)	1453.0	1469.0	1409.7	1395.6	1339.5	1258.0	1188.7
	% (2)/(1)-1	0.0%	0.0%	0.7%	0.7%	0.0%	0.0%	0.0%

Note: The row "Before" shows the projections from the 2018 Ageing Report
Source: The Ministry of Labour and Pension System

In this round of projections, the total number of pensioners is projected to be lower by 2.0% in 2030 due to the faster increase in the statutory retirement age, while in the period 2040-2070 the projected number is slightly higher by 0.2% because new pension legislation extended the group of pension beneficiaries who may work and receive pension.[12] It was assumed that a certain share of pensioners will be inclined towards this option and that they will retire at earlier age than they normally would.

The number of contributors is projected to be higher in the period until 2040 because of the faster increase in retirement ages, and after the transitional period is over, it gradually converges towards the numbers in the previous round of projections because the standard retirement age and the effective retirement age after 2040 remained unchanged compared to the pre-reform scenario.

As explained in section 1.2., recent changes in the pension system legislation introduced the option of choosing between a mono and a dual pillar pension at the moment of retirement for people born as of 1962. Considering that the introduced opting possibility has significant impact on pension system expenditure and revenue it deserves more detailed elaboration of long-term fiscal effects.

In case that an individual opts for a pension only from the public scheme, the funds on the individual saving account in the pension fund will be transferred to the State Budget. This option has a dual effect on the public pension system. On the one hand, public pension expenditure will be significantly increased. For illustration, an old–age, average earner retiree

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[12] Old-age pensioners with long-term insurance periods and early retirement pensioners performing part-time work may receive the full pension payment, and military and police officers can receive full old-age pension in case of part-time work; in case of full-time work, the pension will be reduced by 50%.

in 2019, will receive for every year of insurance HRK 86.32 in case of the purely 1st pillar pension, and HRK 61.30 in case of the basic pension under the dual pillar. Hence, the 1st pillar pension is 41% higher than the basic public pension.

On the other hand, pension system revenue will also significantly increase because of the transferred funds from pension funds to the State Budget. So, the long-term negative impact on pension expenditure is partially mitigated by the lump sum transfer of the accumulated funds on the individual's savings account in the year he retires as discussed below and shown in Table 7.
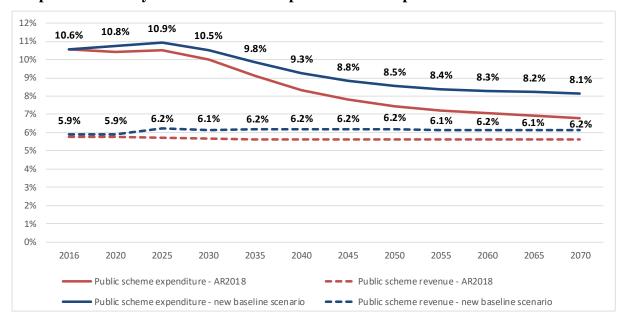
The following underlying assumptions regarding people opting for either returning to the public scheme or keeping their 2nd pillar savings were used. It was assumed that the share of new pensioners that will choose two-pillar pensions will gradually increase until 2040, in line with the increase in the average contributory period to the second pillar and the longer period of capitalization of the invested funds. In 2040, around 70 percent of new earnings-related pensioners would opt for a two-pillar pension while around 30 percent of new earnings-related pensioners would choose to receive their pension only from the first pillar, and this share remains relatively stable until the end of the projection horizon. Some new earnings-related pensioners will continue to receive mono-pillar pensions because certain contributors will remain insured only in the public scheme (mainly special schemes; military and police officers). In addition, for the majority of minimum pensioners, opting for the first pillar pension will remain the more beneficial option. This category of beneficiaries would receive relatively small pension benefits from the funded scheme (due to low wages and contributions paid into the scheme) that wouldn't compensate for the difference between full first pillar and basic public pensions. Note that minimum pensioners receive additional pension amount from the public scheme on top of what they would receive if their pension was determined entirely on the basis of their earnings over working life, while their 2nd pillar annuity is directly linked with previous earnings and entirely depends on the contributions paid (and rate of return on invested funds).[13]

Graph 2 shows the projections of pension system revenue and expenditure until 2070 in the new baseline scenario that includes revenue related to the transferred funds from the funded scheme to the State Budget, compared to the baseline scenario from the 2018 Ageing Report (transfers from the funded scheme were not included in the 2018 projections).

According to the updated projections, pension expenditure will amount to 10.5% of GDP in 2030 (0.5 p.p. higher than in AR 2018) and pension revenue will amount to 6.1% of GDP (also 0.5 p.p. higher than in AR 2018). At the end of the projection period, public pension expenditure is projected at 8.1% of GDP (1.3 p.p. higher than in AR 2018) and pension revenue at 6.2% of GDP (0.6 p.p. higher than in AR 2018).

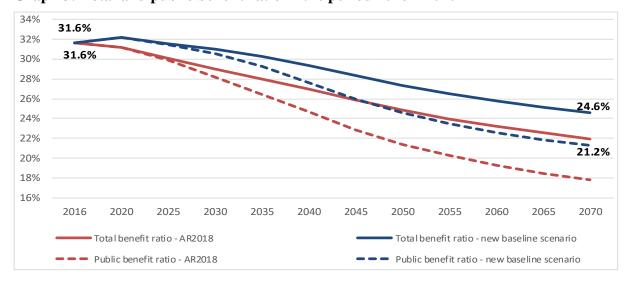[13] The assumption that the majority of minimum pensioners would return to the 1st pillar is based on the underlying assumption that this option would be more favourable for individuals whose lifetime earnings were less than 70% of the economy-wide average wage. Historical data show that around 30% of new earnings-related pensioners received income over working life that was less than 70% of the national average wage.

Graph 2: Pension system revenue and expenditure in the period 2016 – 2070[14]

Although the new projections thus show an upward impact on public pension expenditure as compared to the pre-reform projections, it is worth noting the positive impact on the adequacy of pension benefits compared to the previous projections. The public benefit ratio in 2070 is projected at 21.2% in 2070 (increase of 3.4 p.p.) and the public replacement rate is projected at 20.6% (increase of 4.3 p.p.) (Table 10). Notwithstanding this improvement in terms of adequacy as compared to the pre-reform outlook, the long-term trend of declining adequacy as shown by the total benefit ratio remains (Graph 3).

Graph 3: Total and public benefit ratio in the period 2016 – 2070

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[14] Public scheme revenue – new baseline scenario includes both social security contributions and transfers from individual saving accounts to the State Budget of 2nd pillar participants that opted for the pension benefit only from the public scheme.

3.4. Description of main driving forces behind the projection results and their implications for main items from a pension questionnaire

According to the decomposition results reported in Table 9[15], demographic trends will exert a strong upward pressure on public pension expenditures. Other things being constant, the *dependency ratio* (elderly/working age population) alone would lead to an increase in the pension expenditure-to-GDP ratio by 6.7 percentage points between 2016 and 2070, with about half of the effect arising in the period up to 2030. However, other factors related to the pension system reforms and labour market developments will more than compensate for the demographic impact and drive public pension expenditures in the opposite direction.

The *benefit ratio[16]* has a strong downward effect on public pension expenditures, 3.7 percentage points between 2016 and 2070. The benefit ratio for the public scheme is set to decline from 32% in 2016 to 21% in 2070 (Table 10, Graph 3). The main reasons for this fall are: i) valorisation and indexation of pensions at a rate lower than wage growth, ii) growing importance of two-pillar pension regime that results in lower expenditure of the public scheme, iii) change in the composition of pensioners, as pensioners with higher pension benefits acquired earlier will pass away and will be replaced by new pensioners with lower pensions, and iv) the share of pensioners from special schemes that have higher pensions compared to the general pension scheme is projected to decline.

Table 9 – Factors behind the change in public pension expenditures between 2016 and 2070 (in percentage points of GDP) – pensions

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70	Average annual change
Public pensions to GDP	0.2	-0.2	-1.3	-0.7	-0.3	-0.1	-2.4	-4.5%
Dependency ratio effect	1.1	2.4	1.1	1.1	0.6	0.4	6.7	12.0%
Coverage ratio effect	-0.6	-1.5	-0.8	-0.4	-0.1	0.0	-3.5	-6.5%
Coverage ratio old-age	0.2	-0.3	-0.4	-0.3	-0.1	0.0	-0.9	-1.7%
Coverage ratio early-age	-1.4	-3.5	-2.4	0.2	0.3	0.1	-6.7	-13.3%
Cohort effect	-1.1	-2.2	-0.6	-1.1	-0.6	-0.4	-6.0	-11.3%
Benefit ratio effect	0.1	-0.5	-1.0	-1.0	-0.7	-0.5	-3.7	-6.8%
Labour Market/Labour intensity effect	-0.4	-0.4	-0.5	-0.3	0.0	0.0	-1.6	-3.0%
Employment ratio effect	-0.4	-0.3	-0.4	-0.2	0.0	0.0	-1.3	-2.4%
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Career shift effect	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.4	-0.7%
Residual	-0.1	-0.2	0.0	-0.1	0.0	0.0	-0.4	-0.2%

Source: Commission Services and the Ministry of Labour and Pension System

The *coverage ratio effect* (pensioners/elderly population) is estimated to decrease the pension expenditure-to-GDP ratio by 3.5 percentage points in the period 2016-2070. This is the result of reforms, foremost the rising statutory and early retirement ages that are projected to increase average exit ages, but also stricter rules for disability pensions. Due to a rising employment rate, particularly in the first half of the projection horizon and for older workers (career shift), the *labour market effect* is estimated to lower the expenditure-to-GDP ratio by 1.5 percentage points over the 2016-2070 period.

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[15] The decomposition of public pension expenditures on the basis of the number of pensioners gives the same results as that based on the number of pensions reported in Table 9. Therefore, those results are not reported here. Detailed formulas explaining the decomposition are provided in Annex.
[16] The *benefit ratio* is defined as the average pension benefit divided by economy-wide average wage.

The *replacement rate at retirement*[17] in the public scheme is projected to steadily decline over the projection horizon (Table 10). Two main reasons for this are i) the already mentioned valorisation and indexation of pensions at rates below the wage growth, and ii) increasing numbers of two-pillar pensioners. The replacement rate in the mandatory private scheme will steadily increase to 10% until 2040 when this scheme should reach its maturity, and from 2040 it is projected to gradually decline to 8% until 2070. The projected decline is due to increase in life expectancy that will have negative impact on the value of 2nd pillar annuity. Note that retirement age remains stable after 2040 while life expectancy continues to increase. The total replacement rate will gradually decline from 29% in 2016 to 24% in 2070. The longer expected contribution period due to the rising statutory retirement age is projected to be relatively weak in driving the replacement rate up compared to other factors that drive it down. The similar trend is projected for the *benefit ratio*.

Table 10 - Replacement rate at retirement (RR), benefit ratio (BR) and coverage by pension scheme (in %)							
	2016	2020	2030	2040	2050	2060	2070
Public scheme (BR)	32%	32%	31%	28%	25%	23%	21%
Public scheme (RR)	29%	31%	27%	24%	23%	21%	21%
Coverage	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Public scheme old-age earnings related (BR)	32%	33%	31%	28%	25%	23%	22%
Public scheme old-age earnings related (RR)	31%	34%	29%	25%	24%	23%	22%
Coverage	63.9	66.1	67.2	67.8	69.6	70.4	70.8
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual scheme (BR)	3%	4%	7%	8%	8%	8%	8%
Private individual scheme (RR)	3%	5%	8%	10%	9%	8%	8%
Coverage	0.0	0.3	6.9	21.1	33.0	39.1	42.9
Total (BR)	32%	32%	31%	29%	27%	26%	25%
Total (RR)	29%	32%	30%	29%	27%	25%	24%

Source: Commission Services and the Ministry of Labour and Pension System

The low replacement rate and benefit ratio and their significant decline raise serious concerns about pension adequacy and poverty among the elderly in the long run. It is worth mentioning that the replacement rate and benefit ratio expressed in net terms are notably higher than in gross terms due to a much lower tax burden on pensions than on wages. For example, in 2016 the benefit ratio in the public scheme in gross terms was 32%, while in net terms it is estimated at 43%. In 2070, the total benefit ratio, with included the private individual scheme, is projected at 25% in gross terms, while in net terms it is likely to be at around 33%. Declining benefit and replacement ratios are likely to lead to increasing pressures to change certain parameters of the pension system, which is a challenge for our constant policy assumption.

The public PAYG scheme is mandatory and its coverage is 100% over the entire projection period. The coverage rate of private pension scheme increases from virtually 0% in 2016 to 42.9% in 2070. Less than full coverage of the private scheme is due to old-age pensioners that will opt to receive pension from the mono-pillar system, but also because the majority of disability and survivors' pensions should be paid out only from the public scheme, just as

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[17] The *replacement rate at retirement (RR)* is defined as the average first pension of those who retire in a given year over the average wage they earned before retirement.

pensions of military and police personnel as well as pensions granted under special regulations.

The number of pensioners, as well as the number of employees, is expected to decrease from 2020 onwards and the pension system dependency ratio will generally increase in the period until 2070 when it will reach 89%. However, the increase in the pension system dependency ratio will be slower than that of the old-age dependency ratio, mostly thanks to pension system reforms. The rising statutory retirement age, especially in the period 2028-2033, will slow down the inflow of new pensioners. The constant decrease in the number of pensioners from 2020 is due to an increase in the retirement age, but also due to many people retiring before the statutory retirement age (reflected in currently large share of disability (including war veterans) and early retirement pensioners) reducing thereby inflow of new pensioners in the future period. The inflow of new disability pensioners is also projected to decline due to stricter eligibility conditions for disability pension.

System efficiency seems to be improving in the sense that the ratio of system dependency ratio and old-age dependency ratio is decreasing up to 2050. In the period 2050 to 2070, the system efficiency ratio should stay constant at 1.6%.

Table 11 – System Dependency Ratio and Old-age Dependency Ratio							
	2016	2020	2030	2040	2050	2060	2070
Number of pensioners (thousand) (I)	1233.4	1240.2	1218.8	1174.2	1167.0	1156.5	1145.4
Employment (thousand) (II)	1591.5	1590.7	1525.7	1510.2	1449.5	1361.5	1286.6
Pension System Dependency Ratio (SDR) (I)/(II)	77.5	78.0	79.9	77.7	80.5	84.9	89.0
Number of people aged 65+ (thousand) (III)	808.2	861.3	979.3	1026.5	1067.1	1070.2	1060.3
Working age population 15 - 64 (thousand) (IV)	2755.3	2628.1	2432.1	2282.4	2117.7	1993.2	1886.6
Old-age Dependency Ratio (ODR) (III)/(IV)	29.3	32.8	40.3	45.0	50.4	53.7	56.2
System efficiency (SDR/ODR)	2.6	2.4	2.0	1.7	1.6	1.6	1.6

Source: Commission Services and the Ministry of Labour and Pension System

The *age distribution of pensioners* in the public PAYG scheme is shown in Tables 12a and 12b, while the age distribution of female pensioners is shown in Tables 13a and 13b.

The *coverage ratios of pensioners to inactive population* in the current projections differ somewhat in comparison with the 2015 projection round, especially in age groups 60-69 (higher in the latest projections than in 2015 round), 55-59 and 70-74 (lower in the latest round). This is mainly because of the use of new population projections and changes in our modelling assumptions related to the disability entry rates and the exit rates of war veterans and non-resident pension beneficiaries.

Disability entry rates are assumed to remain at the level attained in recent years, following several legislative and administrative changes that reduced the inflow of new disability pensioners. The new system for acquiring disability pensions with much stricter procedure and medical assessment rules, as well as the improved occupational and rehabilitation system were established in 2014. In addition, the Law on Unique Body of Expertise was endorsed, founding the Institute for Medical Assessment and Professional Rehabilitation to ensure standardisation of the assessment practice. Finally, new disability pensions for war veterans can only be acquired in very specific circumstances, which have had an impact on the falling number of new disability pensioners. The abovementioned reforms have resulted in a significant decrease of new disability pensioners, which led us to revise the disability entry rates assumption compared to the 2015 round of projections.

Following recent developments, the model assumes a continued decrease in the number of non-resident pensioners that resulted in the decrease of coverage ratios of older age groups, especially in the later years. The reason is that pensioners that live in other countries of former Yugoslavia but receive a Croatian pension on the basis of their working history in Croatia will gradually pass away. In addition, the inflow of new non-resident pensioners that have spent a part of their insurance period in Croatia is assumed to decline in future. Their number peaked in 2006 (around 28% of new pensioners) and has been steadily declining to around 17% of new pensioners in the last couple of years.

Younger pensioner cohorts (up to the age of 60) represent a relatively large share of both the inactive and the overall population at the beginning of the projection period. This is mainly due to disability pensions, particularly those of war veterans. The shares of these younger cohorts should decline in the future as the average retirement age will increase and inflow of new disability pensions will fall. It is interesting to note that the pensioner-to-population ratio for the 65+ group in 2016 is above 100%, particularly in the age groups 65-69 (107.0%) and 70-74 (107.7%). This reflects the recent past in Croatia, with a number of pensioners receiving pensions from the Croatian pension system, but living in other countries, particularly countries of former Yugoslavia. Workers' flows were intensive in former Yugoslavia and Croatia was one of the most developed states, thus attracting workers from other states. In addition, there were very intensive migration flows in the early 1990s. As a consequence, in 2016, around 11% of pension beneficiaries are living abroad (8% in countries of former Yugoslavia). Demographic projections indicate that migration flows will be rather moderate in the future and pension projections show that the initial imbalance will gradually disappear, i.e. toward the end of the projection horizon the number of pensioners and the old-age population tend to be aligned. Possible future non-resident pension claimers are not specifically modelled, but the model implicitly takes them into account as one of the key parameters of the model, the rate of retirement in the initial period, already includes a number of non-resident claimers.

Table 12a – Pensioners (public schemes) to inactive population ratio by age group (%)							
	2016	2020	2030	2040	2050	2060	2070
Age group -54	8.4	7.0	4.8	4.5	4.6	4.5	4.4
Age group 55-59	64.7	52.4	33.9	25.1	26.2	26.7	26.7
Age group 60-64	94.3	87.1	77.8	64.9	65.6	67.9	70.9
Age group 65-69	114.3	112.1	101.3	101.2	101.3	101.8	102.8
Age group 70-74	110.5	119.8	104.5	102.9	101.5	102.0	102.0
Age group 75+	101.6	103.9	112.8	107.7	102.6	100.1	99.9

Source: Commission Services and the Ministry of Labour and Pension System

Table 12b – Pensioners (public schemes) to population ratio by age group (%)							
	2016	2020	2030	2040	2050	2060	2070
Age group -54	3.7	3.0	2.0	1.9	1.9	1.9	1.9
Age group 55-59	28.6	22.1	13.6	9.7	9.6	9.8	9.8
Age group 60-64	67.7	61.5	48.1	35.2	36.1	36.6	37.9
Age group 65-69	107.0	102.1	89.2	80.2	79.9	79.4	80.2
Age group 70-74	107.7	116.8	99.9	96.6	93.9	94.5	94.3
Age group 75+	101.6	103.9	112.8	107.7	102.6	100.1	99.9

Source: Commission Services and the Ministry of Labour and Pension System

Table 13a – Female pensioners (public schemes) to inactive population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	4.7	4.2	4.0	4.1	4.1	3.9	3.8
Age group 55-59	60.8	42.4	24.0	23.4	24.8	24.3	24.0
Age group 60-64	95.3	84.2	69.5	64.4	63.7	65.6	68.6
Age group 65-69	105.0	107.1	88.5	98.6	98.5	97.7	99.5
Age group 70-74	100.3	110.6	97.6	94.3	95.6	97.0	96.7
Age group 75+	95.3	98.8	111.7	106.2	101.5	100.4	100.4

Source: Commission Services and the Ministry of Labour and Pension System

Table 13b – Female pensioners (public schemes) to population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	2.2	1.9	1.8	1.8	1.8	1.7	1.7
Age group 55-59	31.6	20.5	10.3	9.7	9.7	9.5	9.4
Age group 60-64	75.9	66.1	44.1	36.3	36.0	36.5	37.9
Age group 65-69	100.4	99.4	80.0	79.1	78.8	77.0	78.5
Age group 70-74	99.0	109.0	95.1	88.8	88.8	90.2	89.7
Age group 75+	95.3	98.8	111.7	106.2	101.5	100.4	100.4

Source: Commission Services and the Ministry of Labour and Pension System

New public pension expenditure can be disaggregated in the number of new pensions and the average pension, which in turn can be disaggregated, within the Croatian pension point system, in the number of pension points at retirement and the point value. The Croatian system has no sustainability or adjustment factors (i.e. they are equal to 1). The results are shown in Table 14a for all new old-age and early earnings-related pensions, whereas results for men and women are presented in Table 14b and in Table 14c, respectively. Tables 14a to 14c refer to the first pillar public pension scheme, while the comparable results for the second pillar private individual scheme are given in Table 14d.

There is decreasing number of new public pensions in the period up to 2030. Namely, up to 2027, and ever further up to 2033, the rising statutory retirement age dominates over ageing and leads to a lower number of new pensions. Once this transitional period is over, in 2034, inflows into retirement are projected to increase, before falling again because of a declining population. This pattern is somewhat more pronounced for women than for men.

Accumulation of total pension points is projected to increase in the period up to 2020 driven by longer contributory periods. However, as more and more new pensions will be combined pensions of the first and the second pillar, their first pillar pensions will be determined on the basis of pension points that are calculated using the basic pension factor of 0.75 that will cause a gradual decline in total pension points at retirement.

The *average contributory period* is projected to increase by 4.9 years for women and 2.9 years for men (3.7 years in total) between 2016 and 2070 as a reflection of rising statutory retirement age. The rising contributory period is related to the projected increase in the effective retirement age, which is, aside from the rising statutory age, assumed to be driven

also by rather low replacement rates meaning that workers have strong income incentive to stay longer in employment.[18]

Due to valorisation rules that increase the point value at a lower rate than wage growth, the *average new pension* will increase slower than the average wage, and the replacement rate will decline accordingly. In the period up to 2020, when the majority of new pensions will be only from the first pillar, the decline in the replacement rate will be mild due to an increase in pension points related to longer contributory period that partially compensate for the impact of valorisation rules. In the following period, from 2020 to 2040, both valorisation rules (via point value) and rising importance of the two-pillar regime (via total pension points) will result in a fall in the replacement rate of new public pensions.

After 2040, the transition to the two-pillar regime is complete and it is projected that total pension points and average contributory period will remain relatively stable in line with the projected evolution of the average effective retirement age that follows the projected increase in the average effective exit age.[19]

Table 14a - Projected and disaggregated new public pension expenditure (old-age and early earnings-related first-pillar pensions)

New pension	2016	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	71.4	86.4	85.2	125.3	177.4	230.4	298.8
II Number of new pensions (in 1000)	37.6	36.2	30.5	36.3	36.6	33.8	31.8
III Total pension points at retirement	38.5	42.4	37.4	34.4	34.3	34.5	34.7
IV Average contributory period	31.1	32.0	33.8	34.7	34.8	34.8	34.8
V Point value (V)	8.2	9.4	12.5	16.8	23.6	32.9	45.1
VI Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Monthly Average pension (III)*(V)*(VI)	316.7	397.7	466.5	576.2	808.5	1135.4	1565.3
VII Average number of months paid the first year	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Monthly average pensionable earnings / Monthly economy-wide average wage	1.00	1.00	0.99	1.00	1.00	1.00	1.00

Source: Commission Services and the Ministry of Labour and Pension System

Table 14b - Projected and disaggregated new public pension expenditure (old-age and early earnings-related first-pillar pensions) - MEN

New pension	2016	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	43.2	53.2	46.4	69.4	102.2	133.8	170.1
II Number of new pensions (in 1000)	21.8	21.6	15.9	19.3	20.2	18.8	17.3
III Total pension points at retirement	40.2	43.8	38.9	35.8	35.8	36.0	36.3
IV Average contributory period	31.9	32.2	33.4	34.6	34.7	34.7	34.7
V Point value (V)	8.2	9.4	12.5	16.8	23.6	32.9	45.1
VI Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0	1.0

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[18] The strong link between increases in the effective retirement age and increases in statutory retirement age in the presence of relatively low replacement rates was observed in the period 1999-2008 when the statutory retirement age increased by 5 years for both men and women.

[19] Average effective retirement age is higher then the average effective exit age, for both genders over the forecasting period, because the projected effective retirement age refers to old-age and early earnings-related pensioners, while the projected effective exit age is based on the projected change in the labour force participation rates that takes into account individuals expected to become inactive for other reasons as well (for example, social assistance beneficiaries, disability and survivor's pensioners).

Monthly Average pension (III)*(V)*(VI)	330.9	410.9	484.8	601.1	843.2	1184.6	1634.5
VII Average number of months paid the first year	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Monthly average pensionable earnings / Monthly economy-wide average wage	1.04	1.04	1.04	1.04	1.04	1.04	1.04

Table 14c - Projected and disaggregated new public pension expenditure (old-age and early earnings-related first-pillar pensions) - WOMEN

New pension	2016	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	28.2	33.2	38.8	55.9	75.2	96.6	128.8
II Number of new pensions (in 1000)	15.8	14.6	14.5	17.0	16.4	15.0	14.5
III Total pension points at retirement	36.1	40.3	35.7	32.7	32.5	32.6	32.9
IV Average contributory period	29.9	31.7	34.2	34.9	34.9	34.9	34.9
V Point value (V)	8.2	9.4	12.5	16.8	23.6	32.9	45.1
VI Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Monthly Average pension (III)*(V)*(VI)	297.6	378.4	445.7	547.8	765.5	1073.3	1482.2
VII Average number of months paid the first year	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Monthly average pensionable earnings / Monthly economy-wide average wage	0.94	0.94	0.94	0.94	0.94	0.94	0.94

Source: Commission Services and the Ministry of Labour and Pension System

In addition to new pension expenditure from the public scheme, there will be a rising importance of expenditure on new pensions from the mandatory private individual scheme. Table 14d shows the disaggregation of expenditures on new pensions in that scheme. The number of new pensions shows that this scheme will become fully functional at around 2030 with around 13,700 new pensioners. Thereafter, the number of new pensioners will depend on rising statutory retirement age (until 2033) and demographic developments. In 2070, new pension expenditure in the private scheme is projected at 78.2 million euro. The average accrual rate is relatively stable in the first three decades of the projection period. After 2040 it decreases slightly as a consequence of increasing life expectancy, whereas the effective retirement age stays unchanged in line with assumptions on evolution of exit ages.

Table 14d - Projected and disaggregated new mandatory private individual pension expenditure – individual private second pillar scheme

New pension	2016	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	0.0	0.8	10.9	33.4	46.3	59.2	78.2
II Number of new pensions (in 1000)	0.1	2.3	13.7	25.1	25.4	23.5	22.1
Monthly Average pension (III)*(IV)*(V)*(VI)	29.3	62.1	132.8	222.1	303.8	419.4	589.7
III Average contributory period	13.1	16.8	27.7	34.3	34.4	34.4	34.4
IV Average accrual rate	0.22	0.28	0.29	0.28	0.25	0.24	0.23
V Monthly average pensionable earnings	1027.5	1301.5	1669.5	2323.2	3483.9	5126.8	7356.7
VI Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0	1.0
VII Average number of months paid the first year	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Monthly average pensionable earnings / Monthly economy-wide average wage	1.00	1.11	1.03	1.01	1.02	1.01	1.01

Source: Commission Services and the Ministry of Labour and Pension System

3.5. Financing of the pension system

The Croatian public pension system is primarily financed by contributions of 20% paid by employees out of their gross earnings. Table 15 shows the main characteristics of the financing of the system. Contributions should be paid on earnings up to a maximum of 6 times the average wage. For those insured in both mandatory pension pillars, contributions of 15% of gross wage go to the first pillar and 5% goes to the second pillar. Additional contributions should be paid for pension insurance of employees in arduous and hazardous occupations listed in special legislation. These contributions are paid by employers at rates from 4.86% to 17.58% of the gross wage. If a person is insured in both pillars, these contributions are also divided between two pillars: ¾ goes to the first pillar, ¼ to the second pillar.

The Government does not pay specific contributions to the public pension scheme. However, it transfers resources to cover some specific expenditure such are pension expenditures ensuing from special regulations, costs of the pension supplement (4%-27%) expenditures and other extraordinary pension increases, as well as expenditures due to the transitional cost of the pension reform after introduction of the second pillar pension scheme. The Government is obliged to cover any remaining financing gap. The Croatian Pension Insurance Institute is integrated into the Government Budget and it operates within the State Treasury.

Table 15 – Financing of the system			
	Public employees	Private employees	Self-employed
Contribution base	Gross wage	Gross wage	Gross wage or contribution base that depends on the type of activity
Contribution rate/contribution			
Employer	4.86% to 17.58% for employees in arduous and hazardous occupations	4.86% to 17.58% for employees in arduous and hazardous occupations	-
Employee	20% (public PAYG scheme participants only); 15% (participants in both public PAYG scheme and mandatory fully-funded DC scheme)	20% (public PAYG scheme participants only); 15% (participants in both public PAYG scheme and mandatory fully-funded DC scheme)	20% (public PAYG scheme participants only); 15% (participants in both public PAYG scheme and mandatory fully-funded DC scheme)
State	-	-	-
Other revenues	Government committed to cover deficits.	Government committed to cover deficits.	Government committed to cover deficits.
Maximum contribution	6 times the average wage	6 times the average wage	6 times the average wage
Minimum contribution	0.38 times the average wage	0.38 times the average wage	0.38 to 1.1 times the average wage

Source: Commission Services and the Ministry of Labour and Pension System

	2016	2020	2030	2040	2050	2060	2070
Public contribution	2624.5	2991.2	3856.6	5386.5	7733.2	10698.5	14514.4
Employer contribution	*68.4*	*55.1*	*64.4*	*89.7*	*128.5*	*177.3*	*239.9*
Employee contribution	*2555.7*	*2935.6*	*3791.7*	*5296.1*	*7603.8*	*10520.2*	*14273.1*
State contribution	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Other revenues	*0.4*	*0.5*	*0.5*	*0.7*	*0.9*	*1.1*	*1.4*
Number of contributors (I)	1453.0	1469.0	1409.7	1395.6	1339.5	1258.0	1188.7
Employment (II)	1591.5	1590.7	1525.7	1510.2	1449.5	1361.5	1286.6
Ratio of (I)/(II)	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Source: Commission Services and the Ministry of Labour and Pension System

Table 16 shows the projected revenues from contributions (without government transfers[20] and funds transferred from the second pillar for new mono-pillar pensioners) and the number of contributors. The number of contributors increases up to 2018 and then declines in line with employment trend. It should be noted that the number of contributors is lower than total employment. The main reason are the existing differences in the methodology and definition of employed persons and active contributors. The pension projection model counts the *average* number of persons that actually pay contributions in a given year based on administrative data on persons who were actively insured in the public pension insurance system, while the number of employed persons is based on the methodology and data used in the EU Labour Force Survey.[21] By assumption, the number of contributors rises at the same rate as total employment, so the contributors-to-employment ratio is equal to 0.913 in 2016, after which it grows slightly to 0.924 in 2030 due to assumed improvements in the fight against the hidden economy. After 2030, it remains constant over the rest of the projection horizon.

3.6. Sensitivity analysis

The baseline projections of pension expenditures presented so far have been challenged by a number of sensitivity tests in which particular parts of the baseline assumptions are changed. The results in terms of deviation of the expenditure-to-GDP ratio from the baseline projection are presented in Table 17a.

Table 17a - Public and total pension expenditures under different scenarios (deviation from the baseline)

	2016	2020	2030	2040	2050	2060	2070
Public Pension Expenditure							
Baseline	10.6	10.8	10.5	9.3	8.5	8.3	8.1
Higher life expectancy (2 extra years)	0.0	0.0	0.1	0.3	0.4	0.5	0.6
Higher Total Factor Productivity Growth (+0.4 pp.)	0.0	0.0	0.0	-0.1	-0.3	-0.4	-0.5
Lower Total Factor Productivity Growth (-0.4 pp.)	0.0	0.0	0.0	0.1	0.3	0.5	0.6
Higher emp. rate (+2 pp.)	0.0	-0.1	-0.4	-0.3	-0.3	-0.2	-0.2

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[20] In 2016, transfers from the State Budget were EUR 2244.5 million (46.0% of total pension system revenue).
[21] According to the EU Labour Force Survey methodology, persons in employment are those who were engaged in any work for payment in cash or kind during the reference week and persons who were not at work during the reference week but had a job or business from which they were temporarily absent. Therefore, the Survey covers all persons who worked for at least one hour in the reference period, irrespective of their formal status or means of payment.

Lower emp. rate (-2 pp.)	0.0	0.1	0.4	0.3	0.3	0.3	0.3
Higher emp. of older workers (+10 pp.)	0.0	-0.1	-0.8	-0.7	-0.7	-0.7	-0.7
Higher migration (+33%)	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.3
Lower migration (-33%)	0.0	0.0	0.0	0.1	0.2	0.3	0.3
Lower fertility	0.0	0.0	0.0	0.2	0.5	0.9	1.4
Risk scenario	0.0	0.0	0.0	0.1	0.1	0.2	0.3
Policy scenario: linking retirement age to increases in life expectancy	0.0	0.0	-0.1	-0.3	-0.6	-0.9	-1.0
Total Pension Expenditure							
Baseline	10.6	10.8	10.7	9.9	9.5	9.4	9.4
Higher life expectancy (2 extra years)	0.0	0.0	0.1	0.3	0.4	0.5	0.6
Higher Total Factor Productivity Growth (+0.4 pp.)	0.0	0.0	0.0	-0.1	-0.3	-0.5	-0.7
Lower Total Factor Productivity Growth (-0.4 pp.)	0.0	0.0	0.0	0.2	0.4	0.6	0.8
Higher emp. rate (+2 pp.)	0.0	-0.1	-0.4	-0.3	-0.3	-0.3	-0.3
Lower emp. rate (-2 pp.)	0.0	0.1	0.4	0.4	0.4	0.4	0.4
Higher emp. of older workers (+10 pp.)	0.0	-0.1	-0.8	-0.8	-0.8	-0.8	-0.8
Higher migration (+33%)	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.3
Lower migration (-33%)	0.0	0.0	0.0	0.1	0.2	0.3	0.3
Lower fertility	0.0	0.0	0.0	0.2	0.6	1.1	1.7
Risk scenario	0.0	0.0	0.0	0.1	0.1	0.2	0.3
Policy scenario: linking retirement age to increases in life expectancy	0.0	0.0	-0.1	-0.3	-0.7	-1.0	-1.3

Higher life expectancy: A scenario with an increase of life expectancy at birth of about two years by 2070 compared with the baseline projection.

Higher life expectancy by two years compared to the baseline is likely to gradually increase pension spending. In 2050, the difference is projected to reach 0.4 percentage points of GDP, rising to 0.6 percentage points of GDP in 2070. Higher spending will be entirely borne by the public pension scheme, as the private individual scheme will adjust its pension payment to higher life expectancy. In the public scheme there is no automatic adjustment mechanism so that longer duration of retirement increases pension spending.

Lower/higher total factor productivity (TFP) growth: A scenario where TFP growth is assumed to converge by 2045 to a growth rate which is 0.4 p.p. lower/higher than in the baseline scenario (0.6% and 1.4% respectively in the two alternative scenarios). The increase is introduced linearly during the period 2026-2045.

In the *higher/lower labour productivity scenarios*, the pension expenditures-to-GDP ratio is projected to fall/increase a bit compared to the baseline scenario, but only after 2040. In the case of higher productivity growth, a higher wage growth is expected. Then, the current valorisation and indexation rules would lead to a somewhat lower benefit ratio and hence lower overall pension expenditures (and vice versa in the case of lower productivity growth). The effect is again concentrated in the public pension scheme.

Lower/higher employment rate: A scenario with the employment rate being 2 p.p. lower/higher compared with the baseline projection for the age-group 20-64. The decrease/increase is introduced linearly over the period 2018-2030 and remains 2 p.p. higher thereafter. The higher employment rate is assumed to be achieved by lowering the rate of structural unemployment (the NAWRU).

Higher employment rate of older workers: A scenario with the employment rate of older workers (55-74) being 10 p.p. higher compared with the baseline projection. The increase is introduced linearly over the period 2018-2030 and remains 10 p.p. higher thereafter. The higher employment rate of this group of workers is assumed to be achieved through a reduction of the inactive population.

Higher employment rates (overall and of older workers) is estimated to have beneficial effects on public spending on pensions, foremost through a higher GDP, although benefits are slightly higher due to a longer average contribution period. This is in part a matter of distribution of benefits and costs over time; higher employment in present period would be beneficial for sustainability of the public PAYG system.

Lower/higher migration: A scenario with 33% less/more migration compared with the baseline projection.

Due to relatively low migration flows in Croatia, *lower migration scenario* would have only a limited effect on future pension expenditure, which may be higher by 0.3 percentage points of GDP in 2070 compared to the baseline scenario. The lower net migration tends to reduce employment and GDP, while pension expenditures will remain unchanged in the first years, leading to a somewhat higher pension expenditure-to-GDP ratio later on.

Lower fertility: A scenario with 20% lower fertility gradually by 2070 compared with the baseline projection.

The *lower fertility scenario* projects a substantial increase in future expenditure on pensions relative to the baseline. In this scenario, public pension expenditure is projected to be lifted by 1.4 percentage points of GDP compared to the baseline scenario. Overall pension expenditure is foreseen to increase by 1.7 percentage points of GDP compared to the baseline. Among the sensitivity scenarios, the lower fertility scenario exerts the highest upward pressure on future expenditure.

TFP risk scenario: A scenario where TFP growth is assumed to converge to 0.8% (the target rate) in 2045.

Worse-than-expected total factor productivity in the *risk scenario* is expected to lead to 0.3 percentage points of GDP higher expenditure on public pensions in 2070 in comparison with the baseline scenario.

Policy-change scenario: This scenario considers the adoption of an automatic mechanism. Retirement ages are shifted year-over-year in line with changes in life expectancy at current retirement ages.

The *policy scenario* of linking retirement age to increases in life expectancy has the largest potential downward impact pension expenditures relative to GDP. The projection results show a decline by 1.0 and 1.3 percentage points for public and total pension expenditures in 2070 compared to the baseline scenario. The dynamic retirement age will extend the contribution period, slowdown inflows into retirement and reduce the duration of retirement as compared to the baseline, resulting in a lower expenditure-to-GDP ratio. The private scheme with actuarial calculations of pension benefits is expected to partially compensate for these effects. However, the sustainability of the public PAYG scheme will clearly improve in such scenario.

Full wage valorisation/indexation scenario: Considering that the baseline scenario shows continuing deterioration in the adequacy of future pension benefits, an alternative scenario was developed in order to investigate the impact of full wage valorisation/indexation on the benefit ratio and pension expenditure. The results are presented in Table 17b.

Table 17b - Public and total pension expenditures under full wage valorisation/indexation scenario (deviation from the baseline)							
	2016	2020	2030	2040	2050	2060	2070
Public Pension Expenditure							
Baseline	10.6	10.8	10.5	9.3	8.5	8.3	8.1
Wage indexation scenario	0.0	0.0	0.5	1.1	1.7	2.2	2.7
Total Pension Expenditure							
Baseline	10.6	10.8	10.7	9.9	9.5	9.4	9.4
Wage indexation scenario	0.0	0.0	0.4	0.8	1.3	1.8	2.3
Public scheme revenue							
Baseline	5.8	5.9	6.1	6.2	6.2	6.2	6.2
Wage indexation scenario	0.0	0.0	0.2	0.5	0.5	0.5	0.5
Public benefit ratio							
Baseline	31.6	32.2	30.5	27.6	24.6	22.6	21.2
Wage indexation scenario	0.0	0.1	1.4	3.2	4.9	6.1	7.1
Total benefit ratio							
Baseline	31.6	32.2	31.0	29.3	27.4	25.7	24.6
Wage indexation scenario	0.0	0.1	1.3	2.5	3.8	5.0	5.9

Note: Public scheme revenue includes both social security contributions and transfers from individual saving accounts to the State Budget
Source: The Ministry of Labour and Pension System

Valorisation/indexation of pensions in line with wage growth would slow down the decline in the public benefit ratio and would thus have positive impact on pension adequacy. In 2070, the public benefit ratio would increase to 28.3 percent (7.1 percentage points higher than in the baseline scenario) and the total benefit ratio would increase to 30.5 percent (5.9 p.p. higher than in the baseline scenario and slightly lower than the 2016 level). At the same time, public pension expenditure would increase to 10.9% of GDP (2.7 p.p. higher than in the baseline scenario). Significant increase in public pension expenditure is because of the increase in average public pension compared to the baseline but also because of the fact that in case of full wage indexation a higher share of new pensioners would opt for mono-pillar pensions.

3.7.   Description of the changes in comparison to the 2015, 2018 and 2019 projections

Croatia first participated in the AWG projections in the 2015 projection round. The results of the 2018 projection round were highly similar to those from the previous round (Table 18). The main reason for that was the absence of major changes in the pension system. The only change with noticeable fiscal impact on the 2018 round of projections was the change of indexation of the pensions that are determined by special regulations, from separate to general indexation rule. Other differences were the result of the change in assumptions (population projections, labour market projections and productivity), modelling approach and the data revisions. For example, the official data on the average national gross wage that is used in the calculation of the pension benefit in the first pillar was revised downwards in 2016.

The new 2019 projections were prepared in line with the legislated pension reform that came into force in 2019. Most noticeable changes in comparison to the 2018 projections are related to a smaller decline in public pensions to GDP in the period 2016-2070 (-3.78 in 2018 vs. -2.44 in 2019 projections) and a smaller decline in benefit ratio in the same period (-4.86 in 2018 vs. -3.66 in 2019). The change in the long-term trend is a result of introduced legislative changes that increased future pension benefits and improved adequacy of the pension system.

Table 18 - Overall change in public pension expenditure to GDP under the 2015, 2018 and 2019 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2015*	-3.92	6.39	-3.27	-1.36	-4.96	0.00	-0.72
2018**	-3.78	6.32	-3.32	-1.22	-4.86	0.02	-0.71
2018** (new projection 2019)	-2.44	6.73	-3.48	-1.29	-3.66	0.02	-0.76

Notes: *2013 – 2060. **2016 - 2070.
Source: Commission Services and the Ministry of Labour and Pension System

Decomposition of the difference between the 2018 round and the new 2019 pension projections reveals indeed that the difference is due to policy-related changes (Table 19). As it was explained in the previous chapters of the document, the main focus of legislative changes was improving pension adequacy. The introduced measures resulted in the gradual increase in the projected average pension benefit over time, which is the main driver behind the projected increase in pension expenditure compared to the previous round of projections.

Table 19 - Decomposition of the difference between 2018 and the new public pension projection (% of GDP)

	2016	2020	2030	2040	2050	2060
Ageing report 2018	10.6	10.4	10.0	8.3	7.4	7.0
Change in assumptions	0.0	0.0	0.0	0.0	0.0	0.0
Improvement in the coverage or in the modelling	0.0	0.0	0.0	0.0	0.0	0.0
Change in the interpretation of constant policy	:	:	:	:	:	:
Policy-related changes	0.0	0.4	0.5	1.0	1.1	1.3
New projection	10.6	10.8	10.5	9.3	8.5	8.3

Source: Ministry of Labour and Pension System

4. DESCRIPTION OF THE PENSION PROJECTION MODEL AND ITS BASE DATA

4.1. Institutional context in which those projections are made

The pension projection model has been developed within the Croatian Pension Insurance Institute by a joint working group consisting of experts from the Croatian Pension Insurance Institute and the Institute of Economics, Zagreb. The model is designed specifically to run long-term pension projections for AWG purposes. It is expected to give useful insights into outcomes and driving forces of the Croatian pension system as a whole and of its components in the projection period up to 2070. The projections have been reviewed by the Ministry of labour and pension system.

4.2. Assumptions and methodologies applied

The model and structure of the data are developed in a way to comply with the AWG methodologies and assumptions.

All the commonly agreed AWG assumptions for this projection round are used in the modelling as supplied by the Eurostat and the Commission.

4.3. Data used to run the model

The model uses the data from the base year (2016). Most of them are provided by the Croatian Pension Insurance Institute, which is in charge of disbursing all public pension benefits, and Croatian Registry of Insured People, which administrates second pillar individual accounts. The model requires the following data disaggregated by type of pension, gender and age:

- the number of pensions,
- the number of new pensions,
- number of pensioners,
- the number of outflow pensioners,
- the number of new pensioners,
- average pension benefit,
- average newly granted pension benefit from the first and second pillar.

Projections of the labour market and macroeconomic parameters are from the AWG assumptions.

4.4. Reforms incorporated in the model

The state of the pension system as of September 2019, including pension reforms that came into force in 2019 as described in section 1.2 one of this fiche, is incorporated in the pension projections.

4.5.   General description of the model

The model is a macro simulation model, i.e. aggregated data are used in the calculations. The pension model is based on a cohort approach. The model covers the public PAYG scheme (first pillar) and the mandatory private funded scheme (second pillar).

4.6.   Additional features of the projection model

Main equations used in the modelling of the new pension benefits are given in part one of this fiche.

The number of pensions in projection year t for a specific cohort (pension type, gender, and age) results from the number of pensions in year t-1 minus outflow of pensions plus new pensions in year t.

Outflow of pensions in each projection year is equal to the number of pensions in year *t-1* multiplied by the mortality rates given the AWG population scenario, plus the outflows due to other reasons like switching from one type of pension to another, outflow of orphan pension due to finishing the school, etc.

New old-age and new disability pensions are calculated with probabilities of pension entry, estimated on the basis of past trends, taking into account the legislated increase of the statutory retirement age. Number of new orphan benefits and number of new survivors' pensions for spouses are calculated on the basis of past trends.

The public pension benefits of new entrants are calculated by the point formula on a basis of their wages relative to average country wage and the average contribution years for different cohorts, taking into account penalties/bonuses in case of early/deferred retirement and the effect of minimum/maximum pension on pension amount.

Pension formula and benefit amount differ in case of new pensioners who acquire pension only in the first public pillar and of those who acquire pension both in the first and second fully funded pillar (described in the section 1.1.6.). Average new public pension is calculated as a weighted average of public pensions from these pension regimes.

New second pillar (fully funded, DC) pension benefits are calculated on the basis of individual account (the value of account depends on contribution years, wage amount, contribution rate, contribution collection efficiency, and rate of return), retirement age (unisex life expectancies are used) and type of pension (single, joint for spouses, both types can be with or without guaranteed period), and legislated regime of indexation. Administrative charges in both contribution-accumulation and pension-payment phases are also taken into account in the calculation of the second pillar benefits.

The number of public pensions is the same to the number of pensioners reflecting the fact that a person can receive only one pension from the public pension system. As the second pillar is mandatory for younger cohorts, growing number of pensioners in the public system will be entitled also to second pillar pension in the next decades as well, while their first pillar pension will be accordingly smaller than the pension of the older cohorts who acquired only the first pillar pension. In line with that, the total number of pensioners will be the same as the number of public pensions, while the total number of pensions will be the sum of pensions from both mandatory pillars.

Economy-wide average wage at retirement

Over almost the entire projection horizon economy-wide average wage at retirement is somewhat lower than the economy-wide average wage (Table A1). The reason is that calculation of economy-wide average wage at retirement includes also the contribution base for self-employed and farmers, that are on average lower than economy-wide average wage.

Table A1 – Economy wide average wage at retirement evolution (in thousands euro)							
	2016	2020	2030	2040	2050	2060	2070
Economy-wide average wage	12.4	14.1	19.5	27.5	41.2	60.7	87.2
Economy-wide average wage at retirement	12.3	14.1	19.3	27.3	41.0	60.4	86.7

Source: Commission Services and the Ministry of Labour and Pension System

Pensioners vs Pensions

The number of public pensions is the same to the number of pensioners reflecting the fact that a person can receive only one pension from the public pension system. As the second pillar is mandatory for younger cohorts, growing number of pensioners in the public system will be entitled also to second pillar pension in the next decades as well. In line with that, the total number of pensioners will be the same as the number of public pensions, while the total number of pensions will be the sum of pensions from both mandatory pillars.

Pension taxation

In Croatia, pensions are taxed according to general income tax rules, but the calculated income tax is reduced by 50%. Also, there is a personal tax deduction on pensions with the result that majority of the pension benefits are untaxed. Pensioners with benefits higher than the economy-wide average net wage pay health insurance contribution of 3% of gross pensions. However, the average gross and the average net pensions are similar (the difference is around 1%) and this holds for the entire projection period.

Disability pension

Disability pensions in Croatia are paid from the first pillar on condition that insurance period is equal to one third of working life.[22] Disability pension beneficiaries are projected to remain at relatively lower levels than it was the case several years ago mainly as a result of the new system for achieving disability pensions which has been established alongside with the introduction of compulsory medical assessment during first 3 years for disability pensioners, improved occupational rehabilitation system and also considering the fact that the number of disability pensioners-war veterans reached its peak and will gradually decline in the future. New disability pensions are calculated with probabilities of pension entry, estimated on the basis of past trends and taking into account the legislated increase of the statutory retirement

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[22] See section 1.1.5 for more details.

age. Conversion of disability pensions to old-age pensions when pensioner reaches statutory retirement age is practiced in Croatia as of 2015.

Table A2 presents incidences of *new* disability pensioners relative to population in the same age group, i.e. disability rates. As we move towards the end of the projection horizon, disability rates increase for older age groups as a consequence of increase of statutory retirement age, while for the population older than 70 they remain zero over the entire observed period.

Table A2 – Disability rates by age groups (%)							
	2016	2020	2030	2040	2050	2060	2070
Age group -54	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Age group 55-59	0.3	0.3	0.5	0.5	0.6	0.6	0.6
Age group 60-64	0.2	0.3	0.5	0.7	0.7	0.7	0.7
Age group 65-69	0.0	0.0	0.0	0.1	0.1	0.2	0.2
Age group 70-74	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age group 75+	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Ministry of Labour and Pension System

Survivor pensions

Survivors' pensions in Croatia are paid to the family members when conditions stipulated by law are met, i.e. the deceased must have been a pension beneficiary, a beneficiary of occupational rehabilitation or an insured person who had completed five-year insurance period or ten-year qualifying period.[23] Survivor pensions are declining in Croatia over the projection period, mainly due to the projected increase in female employment rates. Number of new survivors' pensions for spouses is calculated on the basis of past trends and corrected by the probability that they will acquire their own old age pension.

Non-earnings related minimum pension

Minimum pension in Croatia crucially depends on contribution years and therefore it is not flat rate. Namely, the calculation formula for minimum pension in Croatia is roughly the same as that for earning-related pensions. Also, the eligibility for minimum pension is not means-tested. Valorisation and indexation of the minimum pension is subject to the same rules as for all other public pensions. Hence, minimum pension is an integral part of the insurance in the public PAYG scheme and financed by its regular revenues.

Contributions

Majority of pension contributions in Croatia are paid by employees on the basis of gross wage. There is minimum and maximum contribution base. Employers pay pension contributions for employees in arduous and hazardous occupations. The State has no obligation to pay pension contributions, except for lump-sum transfers for specified purposes.

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[23] See section 1.1.5 for more details.

ANNEX 1: DECOMPOSITION OF MAIN DRIVING FORCES BEHIND THE PROJECTION RESULTS

To assess the relevance of the driving forces behind pension projection results, the following formulas, which decompose the evolution pension expenditure to GDP ratio into the effects of the following four factors: *dependency ratio, coverage ratio, employment rate and benefit ratio*, have been agreed in the AWG.

$$\frac{\text{Pension Exp}}{\text{GDP}} = \overbrace{\frac{\text{Population } 65+}{\text{Population } 20-64}}^{\text{Dependency Ratio}} \times \overbrace{\frac{\text{Number of Pensioners (Pensions)}}{\text{Population } 65+}}^{\text{Coverage Ratio}}$$

$$\times \overbrace{\frac{\dfrac{\text{Average income from pensions (Average Pension)}}{\text{GDP}}}{\text{Hours Worked } 20-74}}^{\text{Benefit Ratio}} \times \overbrace{\frac{\text{Population } 20-64}{\text{Hours Worked } 20-74}}^{\text{Labour Market / Labour Intensity}} \qquad [1]$$

For the projection round 2015, two further sub-decompositions have been agreed. The coverage ratio is further split with the scope of investigating the take-up ratios for old-age pensions and early pensions:

$$\overbrace{\frac{\text{Number of Pensioners}}{\text{Population } 65+}}^{\text{Coverage Ratio}} =$$

$$= \overbrace{\frac{\text{Number of Pensioners } 65+}{\text{Population } 65+}}^{\text{Coverrage Ratio Old-Age}} + \left(\overbrace{\frac{\text{Number of Pensioners} \leq 65}{\text{Population } 50-64}}^{\text{Coverage Ratio Early-Age}} \times \overbrace{\frac{\text{Population } 50-64}{\text{Population } 65+}}^{\text{Cohort effect}} \right) \qquad [2]$$

The labour market indicator is further decomposed according to the following:

$$\overbrace{\frac{\text{Population } 20-64}{\text{Hours Worked } 20-74}}^{\text{Labour Market / Labour Intensity}} =$$

$$\overbrace{\frac{\text{Population } 20-64}{\text{Working People } 20-64}}^{1/\text{Employment Rate}} \times \overbrace{\frac{\text{Working People } 20-64}{\text{Hours Worked } 20-64}}^{1/\text{Labour intensity}} \times \overbrace{\frac{\text{Hours Worked } 20-64}{\text{Hours Worked } 20-74}}^{1/\text{Career shift}} \qquad [3]$$