



**MINISTRY OF FINANCE  
OF THE CZECH REPUBLIC**

**INFORMATION PAPER**

**CZECH PENSION PROJECTIONS – A 2012  
UPDATE**

**JINDŘICH MARVAL, ZBYNĚK ŠTORK**

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## ABSTRACT

Ministry of Finance of the Czech Republic takes part in the preparation of the long-term projections, which serve as a base for assessing of long-term sustainability of the public finance. Long-term expenditures concern five spheres – pensions, health care, long-term care, education and unemployment benefits. Pension projections are calculated by each Member State and results are peer reviewed within Ageing Working Group (EPC/AWG). Projections are updated every three years. This paper presents the last update published in the 2012 Ageing Report.

**Keywords:** Pension projections, Public pensions expenditures, Replacement rate, 2012 Ageing Report.

## ABSTRAKT

Ministerstvo financí participuje na přípravě dlouhodobých projekcí, které slouží následně pro hodnocení udržitelnosti veřejných financí. Výdaje se sledují v pěti oblastech – penze, zdravotnictví, dlouhodobé péče, vzdělávání a dávky v nezaměstnanosti. Penzijní projekce si zpracovává každý členský stát sám a výsledky jsou předmětem oponentního řízení v rámci pracovní skupiny pro stárnutí populace (EPC/AWG). Projekce jsou aktualizovány každé tři roky. Tato informační studie přináší poslední aktualizaci, která je publikována ve Zprávě o stárnutí populace z roku 2012.

**Klíčová slova:** Penzijní projekce, Veřejné výdaje na důchody, Náhradový poměr, Zpráva o stárnutí populace 2012.

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# 1 Introduction

The first long-term pension projections were done by the Ministry of Finance of the Czech Republic in 2005 (see Krejdl and Štork, 2005). It was the first round of projections done after the Czech Republic had entered the EU on the 1st of May 2004. The main features determining the principal framework of the Czech pension system resulted mainly from the public finance reform in 2003. The results of long-term pension projections presented here are the second update. The first update was prepared in 2008 and published in 2009 Ageing report (see European Commission, 2009A).

In the meantime there have been quite a lot of changes approved and implemented to the pension scheme. The most relevant for the updated calculations we present here in a brief overview.

The reduction brackets and reduction coefficients determine the rate of progressiveness or the rate of solidarity in the pension system between the high-income and low-income people. The government introduced several changes of these parameters to reflect more previous income and life standard. The former three brackets are now reduced to two from 2015 onwards. The part of income above the second threshold is not taken into account, as this part does not enter to calculation base for the social security contributions. Thus income up to 44% of gross average wage will enter into calculation base to the full extent, those above 44% up to 400% of gross average wage only by 26% and above 400% of gross average wage will not be taken into account at all. However, situation just described is the ultimate one and will be reached gradually as is shown in table 1.

**Table 1: Reduction brackets (RB) and relevant income for pension calculations (i.e. reduction coefficients)**

	2011a	2011b	2012	2013	2014	2015
<b>Relevant income up to 1<sup>st</sup> RB</b>	100%	100%	100%	100%	100%	100%
<b>Relevant income between 1<sup>st</sup> and 2<sup>nd</sup> RB</b>	30%	29%	28%	27%	26%	26%
<b>Relevant income between 2<sup>nd</sup> and 3<sup>rd</sup> RB</b>	10%	13%	16%	19%	22%	0%
<b>Relevant income up to 3<sup>rd</sup> RB</b>	10%	10%	8%	6%	3%	0%
<b>1<sup>st</sup> RB as % of average gross wage</b>	44%	44%	44%	44%	44%	44%
<b>2<sup>nd</sup> RB as % of average gross wage</b>	116%	116%	116%	116%	116%	400%
<b>3<sup>rd</sup> RB as % of average gross wage</b>	400%	400%	400%	400%	400%	

*Source:* Pension insurance law n. 155/1995

Furthermore, the retirement age has been postponed. In the first projections the retirement age was considered to rise up to 63 for men and childless women. However, in 2008 it was approved to postpone the retirement age further to 65 for men and women with none or one child. In 2011 another change in this respect was introduced and the Czech Republic (similarly like Greece, Italy and Denmark) decided to postpone the retirement age forever. Another important change is unification of the retirement age for men and women no matter how many children women raised. Table 2 presents concrete data. The unification will be reached in 2041 for people born in 1975 whose retirement age will be 66 years and 8 months and for every next vintage the retirement age will be 2 months higher.

In accordance with the extension of the retirement age, the age limit for entitlement to a “permanent” widow/widower’s pension is also increased accordingly.

Law now strictly determines the pension indexation and does not leave a room for government to make any other decision to raise the rate of increase in pensions.

**Table 2: Retirement age by the year of birth (y=year, m= month)**

Retirement age						
Year of birth	Men	Women according to number of raised children				
		0	1	2	3 and 4	5 and more
1936	60y2m	57y	56y	55y	54y	53y
1937	60y4m	57y	56y	55y	54y	53y
1938	60y6m	57y	56y	55y	54y	53y
1939	60y8m	57y4m	56y	55y	54y	53y
1940	60y10m	57y8m	56y4m	55y	54y	53y
1941	61y	58y	56y8m	55y4m	54y	53y
1942	61y2m	58y4m	57y	55y8m	54y4m	53y
1943	61y4m	58y8m	57y4m	56y	54y8m	53y4m
1944	61y6m	59y	57y8m	56y4m	55y	53y8m
1945	61y8m	59y4m	58y	56y8m	55y4m	54y
1946	61y10m	59y8m	58y4m	57y	55y8m	54y4m
1947	62y	60y	58y8m	57y4m	56y	54y8m
1948	62y2m	60y4m	59y	57y8m	56y4m	55y
1949	62y4m	60y8m	59y4m	58y	56y8m	55y4m
1950	62y6m	61y	59y8m	58y4m	57y	55y8m
1951	62y8m	61y4m	60y	58y8m	57y4m	56y
1952	62y10m	61y8m	60y4m	59y	57y8m	56y4m
1953	63y	62y	60y8m	59y4m	58y	56y8m
1954	63y2m	62y4m	61y	59y8m	58y4m	57y
1955	63y4m	62y8m	61y4m	60y	58y8m	57y4m
1956	63y6m	63y2m	61y8m	60y4m	59y	57y8m
1957	63y8m	63y8m	62y2m	60y8m	59y4m	58y
1958	63y10m	63y10m	62y8m	61y2m	59y8m	58y4m
1959	64y	64y	63y2m	61y8m	60y2m	58y8m
1960	64y2m	64y2m	63y8m	62y2m	60y8m	59y2m
1961	64y4m	64y4m	64y2m	62y8m	61y2m	59y8m
1962	64y6m	64y6m	64y6m	63y2m	61y8m	60y2m
1963	64y8m	64y8m	64y8m	63y8m	62y2m	60y8m
1964	64y10m	64y10m	64y10m	64y2m	62y8m	61y2m
1965	65y	65y	65y	64y8m	63y2m	61y8m
1966	65y2m	65y2m	65y2m	65y2m	63y8m	62y2m
1967	65y4m	65y4m	65y4m	65y4m	64y2m	62y8m
1968	65y6m	65y6m	65y6m	65y6m	64y8m	63y2m
1969	65y8m	65y8m	65y8m	65y8m	65y2m	63y8m
1970	65y10m	65y10m	65y10m	65y10m	65y8m	64y2m
1971	66y	66y	66y	66y	66y	64y8m
1972	66y2m	66y2m	66y2m	66y2m	66y2m	65y2m
1973	66y4m	66y4m	66y4m	66y4m	66y4m	65y8m
1974	66y6m	66y6m	66y6m	66y6m	66y6m	66y2m
1975	66y8m	66y8m	66y8m	66y8m	66y8m	66y8m
1976	66y10m	66y10m	66y10m	66y10m	66y10m	66y10m
1977	67y	67y	67y	67y	67y	67y

Source: Pension insurance law n. 155/1995

The required insurance period for pension entitlement has been prolonged from 25 to 35 years (including non-contributory periods), respectively 30 years (only the period during which the

insurance was paid – i.e. without non-contributory periods). Those who do not reach the required insurance period have the retirement age higher by 5 additional years comparing to the statutory age.

Non-contributory periods have been restricted and will be assessed at 80% of the pension entitlements. The compensatory insurance period for the duration of studies has been cancelled.

In disability pensions, new a three-tiered disability structure depending on the percentage reduction in working capacity of the policyholder was introduced in 2008. In the former system the full disability pension is now the third degree and belongs to the people whose working capacity diminished by at least 70% and the accrual rate is the same like for old-age pensions, i.e. 1.5%. The former partial disability pension is now equivalent to the second degree and belongs to those whose working capacity diminished by 50-69% and the accrual rate is one half of the one in the third degree, i.e. 0.75%. The first degree is new and belongs to those whose working capacity diminished by 35-49% and the accrual rate is here one third of the one in the third degree, i.e. 0.5%. Disabled persons aged 65 or older (i.e. if their statutory retirement age is higher than 65 years) that belong to the third degree will be automatically administratively reclassified as old age pensioners.

The restriction of pensioners' working activity<sup>1</sup> has been abolished. There is no condition on the working activity while receiving pension after the statutory retirement age.

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<sup>1</sup> Formerly a retired person could have a working contract for one year at the most. After that the contract could be renewed, but again for one year only.

## 2 Projection results<sup>2</sup>

### 2.1 Extent of the pension schemes' coverage

Projection results illustrate pension expenditure development focusing mainly on social security pensions as the most important scheme. Projection exercise fully covers all pensions – i.e. old age, disability and survivors' with respect to legislation valid up to October 2011.

Some results of non-mandatory private pension scheme have been included to the extent that availability of relevant data allowed. There are data about the number of clients (contributors) of pension funds and assets saved (clients' means) available. From the point of view of the pension system, the 3rd pillar<sup>3</sup> exists for few years only. And also since benefits have a form of lump sum in most cases, it was not possible to analyze the expenditure side in the way as in the case of social security scheme. This pillar has only a limited impact on pension sustainability and adequacy, so this lack of data does not bias presented results.

### 2.2 Overview of projection results

The pension system has undergone crucial and far reaching parametric changes focused mainly on postponement of retirement age. This tool should help to reduce negative longevity effects on social security expenditures, mainly on old-age pensions.

**Table 3: Statutory retirement age, earliest retirement age and penalties for early retirement<sup>4</sup>**

		2010	2020	2030	2040	2050	2060
<b>Men - with 20 contribution years</b>	statutory retirement age	67y+2m	68y+8m	70y	71y+6m	72y+10m	74y+4m
	earliest retirement age	67y+2m	68y+8m	70y	71y+6m	72y+10m	74y+4m
	penalty in case of earliest retirement age	:	:	:	:	:	:
<b>Men - with 40 contribution years</b>	statutory retirement age	62y+2m	63y+8m	65y	66y+6m	67y+10m	69y+4m
	earliest retirement age	59y+2m	60y	60y	61y+6m	62y+10m	64y+4m
	penalty in case of earliest retirement age	15.90%	18.90%	27.90%	27.90%	27.90%	27.90%
<b>Women - with 20 contribution years</b>	statutory retirement age	67y+2m	68y+8m	70y	71y+6m	72y+10m	74y+4m
	earliest retirement age	67y+2m	68y+8m	70y	71y+6m	72y+10m	74y+4m
	penalty in case of earliest retirement age	:	:	:	:	:	:
<b>Women - with 40 contribution years</b>	statutory retirement age	58y+8m	61y+8m	64y+8m	66y+6m	67y+10m	69y+4m
	earliest retirement age	55y+8m	58y+8m	60y	61y+6m	62y+10m	64y+4m
	penalty in case of earliest retirement age	15.90%	15.90%	24.90%	27.90%	27.90%	27.90%

*Source:* Pension insurance law n. 155/1995, own calculations

*Note:* Penalties marked as ":" means that these people are not allowed to retire earlier because they must reach higher than statutory retirement due to the lack of contributory years.

Currently the statutory retirement age is increasing without any limits for both men and women by certain months for each generation. So the specific age of retirement is attributed to each

<sup>2</sup> For underlying assumptions and projection methodologies see European Commission (2011)

<sup>3</sup> The voluntary system providing the possibility to accumulate additional resources for pension. It is in fact just another form of savings product which can be modified or even canceled.

<sup>4</sup> Women are taken those with two children.

generation, not to a calendar year. The values in the Table 3 are illustrative recalculations for calendar years in which majority of mentioned pensioners will retire.<sup>5</sup>

People are allowed to retire 3 years before statutory age and this period is extended with retirement age increase up to 5 years for those, whose retirement age will be 65 or more. Their pension is subject to penalization as their income-related part of pension is curtailed. For those retired earlier, the full penalization is illustrated as if a person retires on the first day he/she is allowed to.<sup>6</sup>

**Table 4: Eurostat (ESSPROS) vs. Ageing Working Group (AWG) definition of pension expenditure (% GDP)**

	2003	2004	2005	2006	2007	2008	2009	2010
<b>1 Eurostat total pension expenditure</b>	8.7	8.3	8.4	8.3	8.2	8.5	:	:
<b>2 Eurostat public pension expenditure</b>	8.7	8.3	8.4	8.3	8.2	8.5	:	:
<b>3 Public pension expenditure (AWG)</b>	8.3	7.9	8.0	8.0	7.9	8.3	9.6	9.1
<b>4 Difference (2) - (3)</b>	0.4	0.3	0.3	0.3	0.3	0.2	:	:

Source: European Commission, own calculations

The comparison of the past showing the differences in pensions as a share of GDP in fact does not mean that different data are used for the projection. The difference stems from exclusion of armed forces in AWG projections due to lack of data and due to the fact that these marginal schemes are not financed from social security system but rather from budgets of respective ministries (i.e. ministries of interior, justice and defence).

**Table 5: Projected gross and net pension spending and contributions (% of GDP)**

Expenditure	2005	2010	2020	2030	2040	2050	2060	Peak year*
<b>Gross public pension expenditures</b>	8.0	9.1	8.7	8.9	9.7	11.0	11.8	2060
<b>Occupational pensions</b>	:	:	:	:	:	:	:	:
<b>Private pensions</b>	:	:	:	:	:	:	:	:
<b>Mandatory private</b>	:	:	:	:	:	:	:	:
<b>Non-mandatory private</b>	:	:	:	:	:	:	:	:
<b>Net public pension expenditure</b>	8.0	9.1	8.7	8.9	9.7	11.0	11.8	2060
<b>Net total pension expenditure</b>	8.0	9.1	8.7	8.9	9.7	11.0	11.8	2060
Contributions	2000	2010	2020	2030	2040	2050	2060	Peak year*
<b>Public pension contributions</b>	8.4	8.4	8.6	8.6	8.6	8.6	8.6	2013
<b>Total pension contributions</b>	8.9	9.1	9.2	9.3	9.3	9.3	9.3	2060

Source: Own calculations

Social security scheme is the major source of benefits for elderly generation based on pay-as-you-go system.<sup>7</sup> With the population ageing the expenditure pressures will rise to some extent with the old-age pension as the most demanding type of pension.<sup>8</sup> The increase is fully in line with the rise in the number of old age pensions. Due to the difficulties discussed above, private non-mandatory pensions have not been included.

<sup>5</sup> For detailed explanation of retirement age postponement please see the description of the pension system.

<sup>6</sup> E.g. males in 2030 and after will be able to retire 5 years before statutory retirement age, which will decrease their pension by 27,9% of his/her assessment base (0,9%, 1,2% and 1,5% of assessment base for every started period of 90 days, see Section 1). So by retiring 5 years earlier he/she will have  $4*0,9\% + 4*1,2\% + 1,5\%*(365*5-721)/90 = 27,9\%$  of assessment base.

<sup>7</sup> Since the 1st of January 2012 there is 7,2% of state budget's VAT revenue transferred to social security scheme.

<sup>8</sup> It is worth noting that according to simulations (carried out by Ministry of Labour and Social Affairs) over the horizon of 2060 the pension system should recover from the retiring of these boom generations and number of pensions and also expenditure will decrease and stabilize the system.

Pensions in the Czech Republic are not taxed in fact. This is due to relatively high threshold, up to which pensions are tax-exempt. Only the amount exceeding 288,000 CZK<sup>9</sup> (approx. 11,391 EUR) per year is subject to personal income tax. Such pension benefit is reached by only marginal number of pensioners, since the average pension is only about 121,116 CZK (approx. 4,790 EUR) per year. Another case when the pension income is taxed relates to those pensioners whose income other than pension exceeds 840,000 CZK (approx. 33,224 EUR) per year. Only a negligible number of pensioners (hardly 1% of them) pays taxes. Moreover such negligible personal income tax revenue is a source of the state budget and not of the social security system. For these reasons we do not calculate projections of taxes with respect to pensions.

Public pension contributions are those of working population paid from their wages. In the projection they are developing with compensation of employees and as such are keeping constant over projection horizon. Total pension contribution than includes also those of non-mandatory private pensions (3<sup>rd</sup> pillar).

**Table 6: Projected gross public pension spending by scheme (% of GDP)**

Pension scheme	2005	2010	2020	2030	2040	2050	2060	Peak year *
<b>Total public pensions</b>	8.0	9.1	8.7	8.9	9.7	11.0	11.8	2060
<i>of which</i>								
<b>Old age and early pensions</b>	5.9	7.2	6.9	6.9	7.5	8.8	9.5	2060
<b>Disability pensions</b>	1.5	1.2	1.1	1.3	1.3	1.4	1.4	2057
<b>Others (survivors)</b>	0.7	0.7	0.7	0.8	0.9	0.9	0.9	2060

Source: Own calculations

The greatest part of social security expenditures is taken by old-age pensions being mostly affected by changes in population structure. However the increase is somewhat lower, due to the postponement in retirement. There are two opposite effects driving future development of disability pensions. First, positive effect is related to legislative changes that introduced three degrees of disability (instead of previous two). This leads to savings since a number of pensioners have been moved to lower degrees with lower benefits. Second, negative effect stems from the fact that postponement of retirement age brings more disabled persons in preretirement ages due to their higher disability rates.

**Table 7: Factors behind the change in public pension expenditures between 2010 and 2060 (in percentage points of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60	Average annual change
<b>Public pensions to GDP</b>	-0.4	0.2	0.8	1.4	0.8	2.7	0.044
<b>Dependency ratio effect</b>	3.2	1.2	1.5	2.3	1.1	9.3	0.177
<b>Coverage ratio effect</b>	-2.2	-0.6	-0.7	-0.8	-0.3	-4.6	-0.097
<b>Employment ratio effect</b>	-0.3	0.0	0.1	-0.2	-0.1	-0.6	-0.011
<b>Benefit ratio effect</b>	-0.6	-0.3	0.2	0.3	0.1	-0.2	-0.014
<b>Labour intensity effect</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.000
<b>Residual</b>	-0.5	-0.1	-0.3	-0.2	0.0	-1.1	-0.011

Source: Own calculations

Table 7 shows results of the public pension decomposition, which reflects the following logic:

<sup>9</sup> This value is subject to ad hoc indexation by Ministry of Labour and Social Affairs.

$$\begin{aligned}
\frac{\text{Pension Exp.}}{\text{GDP}} &= \overbrace{\frac{\text{Population 65+}}{\text{Population 20-64}}}^{\text{Dependency Ratio}} \times \overbrace{\frac{\text{Number of Pensioners}}{\text{Population 65+}}}^{\text{Coverage Ratio}} \\
&\times \overbrace{\frac{\text{Population 20-64}}{\text{Working People 20-64}}}^{1/\text{Employment Rate}} \times \overbrace{\frac{\text{Average Pension}}{\text{GDP}}}^{\text{Benefit Ratio}} \times \\
&\times \overbrace{\frac{\text{Working People 20-64}}{\text{Hours Worked 20-64}}}^{1/\text{labour intensity}} \times \overbrace{\frac{\text{Hours Worked 20-64}}{\text{Hours Worked 20-74}}}^{\text{Residual}}
\end{aligned}$$

It is apparent that the main contribution to the increase of pension expenditure has the ageing population that will change the ratio between the elderly and active population. Opposing to that, coverage ratio will decrease over time. The main reason should be seen in continuous postponement of the retirement age that takes place during the projection horizon. This will reduce the number of pensioners and together with the increase of population aged 65+ will influence the ratio.

Only a limited impact on expenditure per GDP will have two remaining factors. Employment rate is projected to be relatively stable over the projection horizon and has only a small dampening effect. Benefit ratio will decline in first several decades thanks to the assumed indexation. Indexation of pensions is represented by an inflation growth (measured by the aggregate consumer price index) plus at least a third of the growth in real average wage, which is formula exactly stated by law effective from 2012 onwards. The indexation must firstly guarantee that the flat rate will be 9% of gross average wage and the earnings-related component will be adjusted to fulfil the condition of indexation formula. Since the previous effective indexations were higher<sup>10</sup> than this indexation used for projections, the ratio is falling. This gap leads to the fall in the benefit ratio.

**Table 8: Replacement rate at retirement (RR) and coverage by pension scheme (in %)**

	2005	2010	2020	2030	2040	2050	2060
<b>Public scheme (RR)</b>	24.8	28.5	26.3	26.1	27.8	25.4	27.1
<b>Coverage</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Source:* Own calculations

In fact, all pensioners in the Czech Republic are covered in the social security pension scheme. The replacement rate provided by this scheme illustrated in Table 8 declines in first 20 years, which is due to the retirement age postponement. Nowadays, there are people that delay their retirement over the statutory age. That gains them an extra bonus and it raises their pension benefit. It is expected that with the age postponement the additional benefits will diminish.

Public scheme replacement rate represents all pension types here. The highest replacement rates are in case of old-age pensions (around 35%) and 3<sup>rd</sup> type of disability pensions (also above 30%). On the other hand, there are lower rates for survivors' pensions (around 10% in case of widows'/widowers' and 18% in case of orphans' respectively).

<sup>10</sup> Previous legislation set only minimum level of indexation equal to inflation plus a third of the growth in real average wage. But government could decide for higher indexation, which usually happened.

**Table 9: Replacement Number of pensioners and contributors in the Public scheme (in 1000), population over 65 and total employment (in 1000) and related ratios (%)**

	2005	2010	2020	2030	2040	2050	2060
<b>Number of pensioners (I)</b>	2654.4	2834.6	2877.5	2998.7	3112.4	3275.4	3309.8
<b>Number of people aged 65+ (II)</b>	1465.8	1616.9	2144.8	2395.2	2695.4	3074.2	3200.6
<b>Ratio of (I) and (II)</b>	1.8	1.8	1.3	1.3	1.2	1.1	1.0
<b>Number of contributors (III)</b>	4786.4	5003.7	4890.7	4805.2	4685.7	4462.2	4259.8
<b>Employment(IV)</b>	4757.3	4888.1	4884.8	4799.4	4680.0	4456.8	4254.6
<b>Ratio of (III) and (IV)</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Support ratio (Ratio of (III) and (I))</b>	1.8	1.8	1.7	1.6	1.5	1.4	1.3

*Source:* Own calculations

Table 9 shows that the number of pensioners and persons aged 65 and older both increase. Since during the projection horizon the retirement age will be even higher than 65, the ratio of these two numbers decreases. Contributors to the social security scheme are solely those from working population. That is why the ratio of contributors and those employed is stable over time. Finally, the decline in the support ratio<sup>11</sup> is a result of changes in the structure of the population and related increase in the dependency ratio.

**Table 10: Replacement Number of pensioners and contributors in the Public scheme (in 1000), population over 65 and total employment (in 1000) and related ratios (%)**

	2005	2010	2020	2030	2040	2050	2060
<b>Age group -54</b>	10.1	9.6	10.3	10.5	10.8	10.4	10.4
<b>Age group 55-59</b>	125.8	124.4	80.4	84.1	86.3	86.5	86.6
<b>Age group 60-64</b>	114.4	117.0	92.7	69.8	75.0	83.6	87.1
<b>Age group 65-69</b>	106.9	109.9	100.0	100.6	90.3	80.7	68.3
<b>Age group 70-74</b>	96.8	104.5	99.1	98.7	98.4	97.8	96.5
<b>Age group 75+</b>	100.8	100.8	99.3	98.4	97.9	97.6	97.5

*Source:* Own calculations

**Table 11: Female pensioners to inactive population ratio by age group (%)**

	2005	2010	2020	2030	2040	2050	2060
<b>Age group -54</b>	9.5	8.9	9.7	10.0	9.9	9.6	9.8
<b>Age group 55-59</b>	121.8	118.8	77.9	83.4	87.9	89.5	89.3
<b>Age group 60-64</b>	113.5	116.7	93.4	64.9	68.0	77.1	82.3
<b>Age group 65-69</b>	103.1	108.3	100.0	100.0	85.2	76.8	60.4
<b>Age group 70-74</b>	96.2	104.1	98.9	98.4	97.9	97.3	95.8
<b>Age group 75+</b>	102.3	103.0	99.5	98.3	97.7	97.3	97.1

*Source:* Own calculations

Shares of pensioners to inactive population include two effects. Due to the continuous increase in retirement age, a share of old-age pensioners decreases in relevant cohorts since they are no longer allowed to retire. Together with this, of course, there is an increase in disability pensions due to higher disability rate in these higher ages. However, the disability rates (probability of becoming disabled) do not fully offset the old age pensions. Moreover, also participation rates are very low in these ages. These factors drives the share of pensioners over inactive people down for certain period of projection. It is worth noting that results are also influenced by macroeconomic assumptions to some extent. Pension projections must respect assumptions about labour force and inactive people and cover major share of these "residual" people with a pension.

<sup>11</sup> The *support ratio* is defined as a number of contributors relative to the number of pensioners in public pension schemes.

**Table 12: Projected and disaggregated new public pension expenditure (% GDP)**

New pension	2010	2020	2030	2040	2050	2060
<b>I Projected new pension expenditure (millions EUR)</b>	574.3	672.9	1048.5	2624.6	2624.2	5697.7
<b>II. Average contributory period</b>	43.2	43.2	43.2	43.2	43.2	43.2
<b>III. Monthly average pensionable earnings</b>	1216.3	1840.0	2709.4	3959.3	5738.8	8203.1
<b>IV. Average accrual rates</b>	1.7	1.7	1.7	1.6	1.5	1.6
<b>V. Sustainability/Adjustment factor</b>	:	:	:	:	:	:
<b>VI. Number of new pensioners ('000)</b>	107.6	84.3	89.8	159.0	115.0	171.4
<b>VII Average number of months paid the first year</b>	6.0	6.0	6.0	6.0	6.0	6.0
<b>VIII. Product of II, III, IV, V, VI, VII</b>	574.3	672.9	1048.5	2624.6	2624.2	5697.7
<b>I-VIII</b>	0.0	0.0	0.0	0.0	0.0	0.0

Source: Own calculations

New pension expenditures (for old-age pension mentioned in the first line of Table 12) are driven by pension formula, parameters of the pay-as-you-go system and wage development that is considered as a pensionable earning. Accrual rate is constant over time as legislated. There is no sustainability factor in the pension system.

Besides the baseline scenario discussed in all other parts of this document, several sensitivity analysis have been carried out.<sup>12</sup> These scenarios with the results are depicted in the table 13.

**Table 13: Public and total pension expenditures under different scenarios (deviation from the baseline)**

Public/Total Pension Expenditure	2010	2020	2030	2040	2050	2060
<b>Baseline</b>	9.1	8.7	8.9	9.7	11.0	11.8
<b>Higher life expectancy</b>	0.0	0.0	0.1	0.2	0.2	0.4
<b>Higher lab. productivity (+0.1pp.)</b>	0.0	0.0	0.0	-0.1	-0.1	-0.1
<b>Lower lab. productivity (-0.1pp.)</b>	0.0	0.0	0.0	0.1	0.1	0.1
<b>Higher interest rate (+0.5 pp.)</b>	0.0	0.0	0.0	0.0	0.0	0.0
<b>Lower interest rate (-0.5 pp.)</b>	0.0	0.0	0.0	0.0	0.0	0.0
<b>Higher emp. rate (+1 p.p.)</b>	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
<b>Higher emp. of older workers (+5 pp.)</b>	0.0	-0.1	-0.2	-0.3	-0.3	-0.2
<b>Lower migration (-10%)</b>	0.0	0.0	0.0	0.1	0.1	0.1

Source: Own calculations

**Higher life expectancy** shows higher expenditures simply due to the longer lives of retired people and thus higher total number of pensioners that receive pension benefits. There is no compensation in the pension formulae that would reduce this effect.

**Higher labour productivity** is slightly more demanding from the level of total expenditure point of view. But the opposite is true looking at the GDP ratios. This scenario creates higher GDP (higher denominator for per GDP spending) and somewhat higher wages. However newly granted pensions will be higher, the indexation rule will translate only 1/3 of this positive effect into the growth of the pension benefit.

<sup>12</sup> In the system with one pillar the effects on public pensions and total pensions are the same.

**Higher and lower interest rate** does not have any impact on expenditures. Only accumulated assets in our system would be affected by this assumption.

**Higher employment rate** is in terms of expenditure marginally lower comparing to the baseline. Also as in case of higher productivity, the GDP as the denominator is somewhat higher. The effect on pension expenditure itself is very limited.

**Higher employment of older workers** slightly lowers pension expenditure by contributing to higher GDP and results in very similar outcomes comparing to higher employment rate scenario.

Under the assumption of **lower migration** the increase in pension expenditure is somewhat higher. The reason is solely in lower employment and lower GDP that raises the ratio.<sup>13</sup>

**Table 14: Overall change in public pension expenditure to GDP under the 2006, 2009 and 2012 projection exercises**

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
<b>2006 *</b>	5.58	10.46	-3.46	-0.28	-0.56	:	-0.58
<b>2009 **</b>	3.27	9.55	-3.51	-0.47	-1.21	:	-1.08
<b>2012 ***</b>	2.73	9.25	-4.64	-0.58	-0.21	0.010	-1.10

Source: Own calculations

Note: \* 2004-2050; \*\* 2007-2060; \*\*\* 2010-2060

Comparing to previous projection round, current results are affected by several main factors. First, the adoption of parametric reform helps to limit the expected increase in the number of old-age pensioners and also damps the expenditure pressures mainly in last two decades of projection. Second, from the beginning of 2010 changes in disability pensions became effective, so we were able to get first real data about the new setting of the system. It shows that the new system reduces expenditures comparing to the previous one.

**Table 15: Overall change in public pension expenditure to GDP under the 2001, 2006, 2009 and 2012 projection exercises**

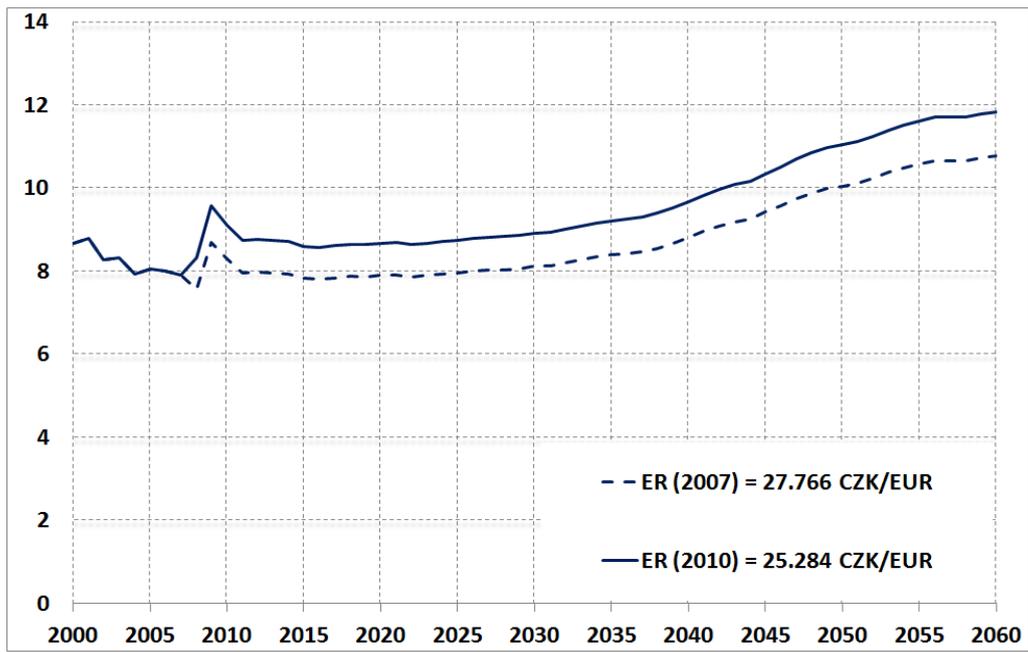
	2005	2010	2020	2030	2040	2050	2060
<b>Ageing report 2009</b>	8.0	7.1	6.9	7.1	8.4	10.2	11.0
<b>Change in assumptions</b>	0.0	1.3	1.2	1.1	1.0	1.0	1.1
<b>Improvement in the coverage or in the modelling</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Change in the interpretation of constant policy</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Policy related changes</b>	0.0	0.7	0.6	0.7	0.2	-0.1	-0.3
<b>New projection</b>	8.0	9.1	8.7	8.9	9.7	11.0	11.8

Source: Own calculations

Third, an important factor is the change of exchange rate, which has substantial impact on presented values of expenditures as shares on GDP. Our projections are originally carried out in Czech Korunas (CZK), but GDP comes from AWG macroeconomic assumptions in Euros. For the last projection round it was assumed the exchange rate amounting to 27.766 CZK/EUR, while these results are calculated using the rate 25.284 CZK/EUR. This represents an appreciation almost 9%. As clearly visible from following graph this overestimates total expenditures by 1p.p.

<sup>13</sup> The level of total expenditure is lower in this scenario comparing to the baseline.

**Graph 1: Impact of exchange rate on public pensions expenditure (% GDP)**



Source: Own calculations

## Conclusion

Public pension expenditures will rise by 2,7% percentage points from 9,1% of GDP in 2010 to 11,8% of GDP in 2060. The main contribution to the increase has the ageing population that will change the ratio between the elderly and active population. Opposing to that, coverage ratio will decrease over time. The main reason should be seen in continuous postponement of the retirement age that takes place during the projection horizon. Employment and benefit ratio will have a minor effect.

Replacement rate will slightly decline from 28,5 to 27,1. However, it is necessary to add that public scheme replacement rate here represents all pension types. The highest replacement rates are in case of old-age pensions (around 35%) and the 3<sup>rd</sup> degree disability pensions (also above 30%). On the other hand, there are lower rates for survivors' pensions (around 10% in case of widows'/widowers' and 18% in case of orphans' respectively). Nevertheless these numbers concern average pension income to average gross wage. But due to the fact that only negligible part of the aggregate pension income is taxed, better picture would be obtained when the net wage would be used for the calculation.

Comparing to previous projection round, current results are affected by several main factors. First, the adoption of parametric reform helps to limit the expected increase in the number of old-age pensioners and also damps the expenditure pressures mainly in the last two decades of the projection. Second, from the beginning of 2010 changes in disability pensions became effective, so we were able to get first real data about the new setting of the system. It shows that the new system reduces expenditures comparing to the previous one. Third, another important factor is the change of exchange rate, which has substantial impact on presented values of expenditures as shares on GDP. Our projections are originally carried out in Czech Korunas (CZK), but GDP comes from AWG macroeconomic assumptions in Euros. For the last projection round it was assumed the exchange rate amounting to 27.766 CZK/EUR, while these results are calculated using the rate 25.284 CZK/EUR. This represents an appreciation almost 9%. This factor overestimates total expenditures by 1p.p.

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