Ageing working group

Country fiche on 2015 pension projections of the Slovak republic

December 2014

Contents

1. Overview of the pension system 5
1.1. Description 5
1.2. Recent reforms of the pension system 14
1.3. Description of the actual "constant policy" assumptions used in the projection 15
2. Overview of the demographic and labour force projections 17
2.1. Demographic development 17
2.2. Labour forces 18
3. Pension projection results 20
3.1. Extent of the coverage of the pension schemes in the projections 20
3.2. Overview of projection results 20
3.3. Description of main driving forces behind the projection results and their implications for main items from a pension questionnaire 23
3.4. Financing of the pension system 29
3.5. Sensitivity analysis 30
3.6. Description of the changes in comparison with the 2006. 2009 and 2012 (AR and reform) projections 31
3.7. Decomposition of the impact of recent reforms 33
4. Description of the pension projection model and its base data 35
4.1. Institutional context 35
4.2. Assumptions and methodologies applied 35
4.3. Data used to run the models 35
4.4. Reforms incorporated in the models 36
4.5. General description of the models 36
4.6. Planned future developments 36
Annex - Pension formulas 37

List of tables

Table 1 – Statutory retirement age. earliest retirement age and penalties for early retirement ……..9
Table 2 - Main demographic variables evolution……17
Table 3 - Participation rate. employment rate and share of workers for the age groups 55-64 and 65-74……..18
Table 4a - Labour market entry age. exit age and expected duration of life spent at retirement – MEN……..18
Table 4b - Labour market entry age. exit age and expected duration of life spent at retirement – WOMEN……...18
Table 5 - Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)……20
Table 6 - Projected gross and net pension spending and contributions (% of GDP) ……..20
Table 7 - Projected gross public pension spending by scheme (% of GDP)……22
Table 8a - Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) – pensions……..24
Table 8b - Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) – pensioners……...25
Table 9 - Replacement rate at retirement (RR). benefit ratio (BR) and coverage by pension scheme (in %)…….25
Table 10 - System dependency ratio and old-age dependency ratio……..…26
Table 11a - Pensioners (public scheme) to inactive population ratio by age group (%)……....26
Table 11b - Pensioners (public scheme) to total population ratio by age group (%)……...….27
Table 12a – Female pensioners (public scheme) to incative population ratio by age group (%)……...27
Table 12b – Female pensioners (public scheme) to total population ratio by age group (%)……..……..27
Table 13a - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions)……...27
Table 13b - Disaggregated new public pension expenditure (old-age and early earnings-related pensions) – MEN……...28
Table 13c - Disaggregated new public pension expenditure (old-age and early earnings-related pensions) – WOMEN……28
Table 14 - Revenue from contribution (Millions). number of contributors in the public scheme (in 1000). total employment (in 1000) and related ratios (%)……..29
Table15 - Public pension expenditure under different scenarios (p.p. deviation from the baseline)……....30
Table 16 - Overall change in public pension expenditure to GDP under the2006. 2009. 2012 and 2015 projection exercises……...32
Table 17 - Decomposition of the difference between 2009 and the new public pension projection (% of GDP)….33

List of additional tables

Add. table 1 - Overview of the Slovak pension system……..5
Add. table 2 - Number of pensioners (December 2013)……....5
Add. table 3 - Pension contributions (% of assessment base) according to participation in pension pillars……..6
Add. table 4 - Old age insurance rates – I. and II. pillar……6
Add. table 5 - Indexation mechanism from Swiss method to inflation indexation……11
Add. table 6 - Pension contributions to the system of armed forces (% of assessment base)……..11
Add. table 7 - Contributory period and replacement rates for the pension system of the armed forces (including the impact of the 2013 reform)……..11
Add. table 8 - Temporary pension of the armed forces (including the impact of the 2013 reform)……...12
Add. table 9 - Indexation mechanism for pensions of armed forces……...12

List of figures

Figure 1 - II. pillar contributions……..6
Figure 2 - Statutory retirement age in Slovakia……...8
Figure 3 - Pension point - solidarity adjustment (earning related old age pension)……9
Figure 4 - Replacement rate – 2012 pension reform impact (earning related old age pension)……..……...9

Figure 5 - Christmas bonus amount (EUR)……13
Figure 6 – Age pyramid comparison: 2013 vs. 2060……17
Figure 7 - Contributory period used in projections - convergence towards CSM working career – MEN……19
Figure 8 - Contributory period used in projections - convergence towards CSM working career – WOMEN……19
Figure 9 - Projected gross public pension expenditure (% GDP)……21
Figure 10 - Share of II. pillar pensioners on the I. pillar pensioners……21
Figure 11 - Evolution of the main driving forces behind the projection results (year 2013=1)……23
Figure 12 - Benefit ratio……26
Figure 13 - Replacement rate……26
Figure 14 - Old age pensioners (in 1000)……28
Figure 15 - Gross public expenditure. revenue and balance (% of GDP)……29
Figure 16 – Comparison of pension expenditure under sensitivity scenarios and the baseline……31
Figure 17 - Old age dependency ratio - comparison……32
Figure 18 - Real GDP growth - comparison……32
Figure 19 - Participation rate (15-64) - comparison……32
Figure 20 - Employment rate (15-64) - comparison……32
Figure 21 - Pension expenditure projections. effect of the Christmas bonus reform……33
Figure 22 - Pension expenditure projections. effects of reform decomposition – system of armed forces……34
Figure 23 - Pension system balance projection. effects of reform decomposition – system of armed forces……34

1. OVERVIEW OF THE PENSION SYSTEM

1.1. Description

The Slovak pension system consists of the:

- **Universal pension system -** covers almost all pensioners in Slovakia (regular employees. self-employed. etc.)
- **Pension system of armed forces** - covers police officers. soldiers. intelligence service. etc.
- **Voluntary fully funded "third pillar"** – no restriction on participation.

Add. table 1 - Overview of the Slovak pension system

Universal pension system	Pension system of armed forces
I. pillar – PAYG. mandatory. defined-benefit (point system – earning related). **public**	**Armed forces scheme** - PAYG. mandatory. defined-benefit. **public**
II. pillar – fully-funded. voluntary. defined-contribution. **private**	
Voluntary fully-funded "third pillar"	
III. pillar - voluntary. DC. **private**	
Social assistance	
0.pillar – universal benefit. means-tested. **public**	

The next table shows the approximate number of pensioners in the universal scheme and in the armed forces scheme. Compared to the universal system. the system of armed forces is currently about 40-times smaller.

Add. table 2 - Number of pensioners (December 2013)

universal system	old-age	992 233
	disability	258 748
	widow/widower's	335 882
	orphan's	25 385
armed forces system	retirement	30 758
	temporary	770
	disability	551
	widow/widower's	4 754
	orphan's	589
population		5 413 437

Source: IFP

1.1.1. Universal pension system

Currently. **the first pillar** is the fundamental part. providing old age. early old age. disability and survivor benefits. It is a public. mandatory. pay-as-you-go (PAYG). defined benefit and earnings related pension scheme (point system). The minimum period of participation to become entitled to pension benefits from the first pillar is 15 years.

The second pillar is a fully funded. defined contribution. private pension scheme[1] introduced by the government in January 1st. 2005. During its existence. the participation in the second pillar for newcomers to the labour market has been changed from mandatory (with no possibility to opt out) to voluntary (with the default participation only in the first pillar) then back to mandatory (but with the possibility to opt out of the system within 2 years) and as from January 2013 back to voluntary again with the possibility to decide until the age of 35.

Pension contributions

Pension contributions are levied as a percentage of the assessment base which is the gross wage up to a **maximum equal five times the average wage in the economy**. The maximum has been increased from 4 to 5 times the average wage as a result of the 2012 pension reform. The system is earnings related; however. contributions paid from earnings above the level of three times the average wage are not taken into account in the pension calculation.

Pension contributions are tax exempt as Slovakia taxes neither pension contributions nor pension benefits to/from the first and second pillar. The sum of individual's pension contributions is the same regardless of whether he/she participates in **the mixed system** (in both the first and second pillar) or **only in the first pillar**. The introduction of the second pillar in 2005 only split the employer's contribution (14%) into a part that goes to the first pillar and a part that goes to second pillar. if one participates. If not. all employers' contributions are paid into the first pillar.

Add. table 3 - Pension contributions (% of assessment base) according to participation in pension pillars

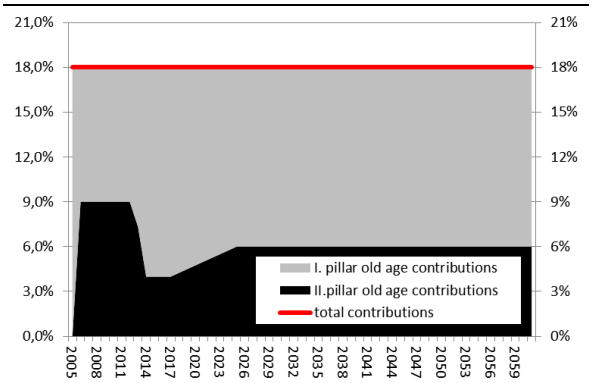
	public scheme only (first pillar)	mixed pension scheme (before 2012 reform)	mixed pension scheme (2013-2016)	mixed pension scheme (after 2024)
Paid by employer	**21.75**	**21.75**	**21.75**	**21.75**
Pension insurance	17.00	17.00	17.00	17.00
- old age insurance[1]	14.00	5.00 to first pillar 9.00 to second pillar	10.00 to first pillar 4.00 to second pillar	8.00 to first pillar 6.00 to second pillar
- disability insurance	3.00	3.00	3.00	3.00
Reserve fund of solidarity	4.75	4.75	4.75	4.75
Paid by employee	**7.00**	**7.00**	**7.00**	**7.00**
Pension insurance	7.00	7.00	7.00	7.00
- old age insurance[1]	4.00	4.00	4.00	4.00
- disability insurance	3.00	3.00	3.00	3.00
Total	**28.75**	**28.75**	**28.75**	**28.75**

[1] For those who participate in both pillars. employer was required to pay 5% to the first pillar and the remaining 9% to the second pillar before the 2012 reform. Between 2013 and 2016 contribution rate to the second pillar has been decreased to 4% due to current fiscal issues in Slovakia (part of consolidation package). As of 2017contributions to the second pillar will gradually grow by 0.25 p.p. per year until the final level of 6 percent in 2024. Until 2017. participants can contribute from their net incomes voluntarily to the second pillar with tax allowance up to 2% of the tax base (to compensate for the reduction of the rate to 4%).

Figure 1 - II. pillar contributions

Add. table 4 - Old age insurance rates – I. and II. pillar

[1] Private pension companies managing pension savings of individuals.



Source: IFP

Period	Second pillar contributions (% of assessment base)
2005-8/2012	9.00%
09/2012–2016	**4.00%**
2017	4.25%
2018	4.50%
2019	4.75%
2020	5.00%
2021	5.25%
2022	5.50%
2023	5.75%
2024-2060	**6.00%**

Source: IFP

Participants in the **second pillar** can choose to invest their contributions into at least two funds – **guaranteed** bond fund and **non-guaranteed** equity fund (mostly passively managed funds) according to their preference. These two are offered mandatorily by pension fund management companies. Decisions about creating an arbitrary number of other pension funds (including or excluding guarantees) have been left up to private pension companies. Before reaching the pension age. the savings in non-guaranteed funds will be moved automatically into a guaranteed fund such that the share in the guaranteed fund will gradually increase by 10% a year. The assessment period for providing guarantees in a bond-based guaranteed fund is 10 years and in another guaranteed fund. if any. it is 15 years at the most. The whole system is strongly regulated (more restrictions compared to. e.g.. mutual funds) and the supervision is carried out by the Central bank.

Statutory retirement age and early retirement

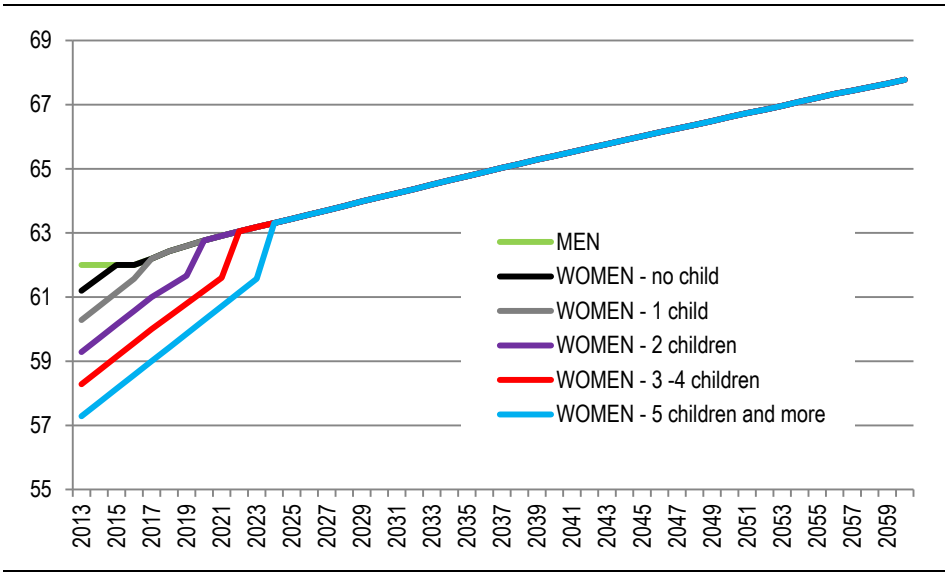
Until 2003 the retirement age was 60 years for men and 53-57 years for women (depending on the number of children raised). As from 2004. the retirement age is gradually converging to 62 for both men and women. Based on the 2012 pension reform. **as from 2017. the retirement age will be automatically annually increased by the y-o-y difference of 5-year moving average of the unisex life expectancy** according to formula

$$Retage_t = Retage_{t-1} + (ALE_{t-7.t-3} - ALE_{t-8.t-4})$$

where

$Retage_t$ is the retirement age at time t. $ALE_{t-7.\ t-3}$ is the average life expectancy (unisex) between years t-7 and t-3 at the age of rounddown($Retage_{t-1}$).

Figure 2 - Statutory retirement age in Slovakia



Source: IFP

Pensioners are allowed to retire two years before reaching the statutory retirement age. In that case. the old-age pension is reduced by approximately 6.5% per year or 12.5% per two years[2]. On the other hand. the pension is increased by 6% per year for every additional working year[3] above the retirement age.

Pension entitlement – if one participates in first pillar only

Calculation of pension benefit in the first pillar is based on a point system. i.e. earnings related principle. Three variables determine the amount of pension benefit – **contributory period**. **average pension point** and **current pension point value.**

Basically. **average pension point** is the individual's average lifetime position relatively to average wage in the economy (according to law it cannot exceed the value of 3[4]). In order to ensure solidarity. the calculated pension point is adjusted based on a solidarity formula. Pension point below value 1 is increased and pension point above 1.25 (remember that the maximum pension point is 3) is reduced. The 2012 pension reform further strengthened the solidarity principle (see graphs below). This increase in solidarity was fiscally neutral both in short and long term.

[2] More specifically, in the law the „malus" is defined as 0.5% for every started 30 day period below the retirement age (i.e. if one retires 61 days before reaching the statutory retirement age, his/her pension is lower by 1.5%)

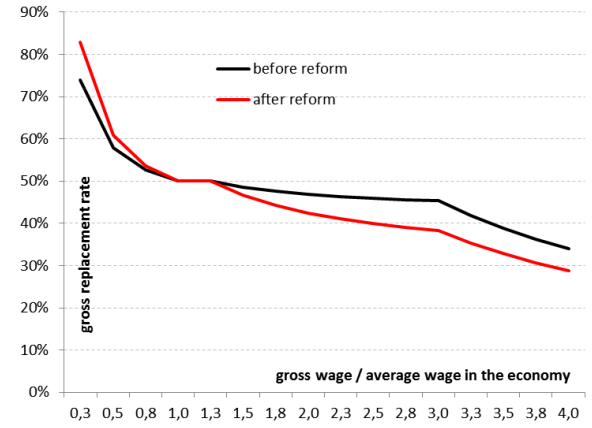
[3] More specifically, in the law the „bonus" is defined as 0.5% for every whole 30 day period above the retirement age (i.e. if one retires 59 days after reaching the statutory retirement age, his/her pension is higher by 0.5%)

[4] This originally reflected that the assessment base ceiling was 3 times the average wage. Increase of the ceiling to 4 times the average wage in 2008 and 5 times the average wage in 2013 did not lead to any change in the limit on average personal wage point.

Figure 3 - Pension point - solidarity adjustment (earning related old age pension)

Source: IFP

Figure 4 - Replacement rate – 2012 pension reform impact (earning related old age pension)



Source: IFP

Current point value was initially (at the time of first pillar reform in 2004) calculated as a residual so that a person with 40 years of service and average personal wage point equal to 1 (person earning average wage for the whole career) will receive pension with circa 50% replacement rate. In order to keep the replacement rate stable for all new pensioners. the **current point value is annually indexed to average wage increase.** More details about the pension formulas are provided in the annex.

Old age pensions are calculated as product of the contributory period. average pension point and current pension point value.

Early old age pensions are calculated as old age pensions; however the early old age pension is reduced by 0.5% for every started 30 day period below the retirement age. Moreover early old age pension must be higher than minimum subsistence level by 20%.

Disability pensions are calculated as old age pension; however the disability pension is affected by the loss of work capability. Moreover. for the calculation of the disability pensioner full career length is always assumed in the benefit calculation.

Widow and widower benefits - the entitlement arises to a widow/ widower if her/his deceased spouse was a recipient or entitled to old-age pension. early old age pension or disability pension or dies as a result of an occupational disease or accident. The entitlement lasts for 1 year thereafter. unless the recipient takes care of a dependent child. is disabled (more than 70% loss of working capacity). reaches the retirement age. raises more than 3 children or reaches 52 years and raises 2 children. The entitlement expires if widow/ widower becomes married. The benefit amounts to 60% of the old-age pension. early old-age pension or disability pension of the deceased.

Orphan's pensions - the entitlement arises to a dependent child whose parent (or custodian) has died. The entitlement arises only if the parent was an old-age pension. early old-age pension or disability pension recipient (or entitled person). Dependent child in foster care cannot receive the pension. The benefit amounts to 40% of the old-age pension. early old-age pension or disability pension of the deceased parent.

Table 1 – Statutory retirement age. earliest retirement age and penalties for early retirement

		2013	2020	2030	2040	2050	2060
Men - with 20 contribution years	statutory retirement age	62.0	62.8	64.1	65.4	66.6	67.8
	earliest retirement age	60.0	60.8	62.1	63.4	64.6	65.8
	penalty in case of earliest retirement age	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
	bonus in case of late retirement	6% per year					

Men - with 40 contribution years	statutory retirement age	62.0	62.8	64.1	65.4	66.6	67.8
	earliest retirement age	60.0	60.8	62.1	63.4	64.6	65.8
	penalty in case of earliest retirement age	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
	bonus in case of late retirement	6% per year					
Women - with 20 contribution years	statutory retirement age	58.3	62.8	64.1	65.4	66.6	67.8
	earliest retirement age	56.3	60.8	62.1	63.4	64.6	65.8
	penalty in case of earliest retirement age	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
	bonus in case of late retirement	6% per year					
Women - with 40 contribution years	statutory retirement age	58.3	62.8	64.1	65.4	66.6	67.8
	earliest retirement age	56.3	60.8	62.1	63.4	64.6	65.8
	penalty in case of earliest retirement age	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
	bonus in case of late retirement	6% per year					

Source: IFP

Minimum pension benefits - there is no minimum pension benefit legislated. However. individuals may apply for means-tested social assistance which is provided at the minimum subsistence level (less than 60% of the minimum wage). Minimum subsistence level is according to law indexed to inflation (measured on low income households' basket of goods and services).

Pension benefits in the mixed system - if one participates both in the first and second pillar

In the mixed system. **first pillar pension rights are reduced by a percentage of pension contributions paid to the private pension companies for the years of participation in the mixed system**[5]. If. for example. one participates for the whole career in both pillars and contributes 9%[6] (i.e. 50% of all old age contributions) to the second pillar. his accrued rights from the first pillar will be reduced exactly by 50% (this is the maximum). If one participates for only half of his career. the reduction will be only 25%.

The second pillar savings can be paid out in several ways. The basic way is to conclude a contract with an insurance company for a **lifetime annuity**. Receiving a **temporary annuity** (concluding a contract with an insurance company for certain number of years) or a **programmed withdrawal** (withdrawing the savings without concluding an insurance contract) requires that the pensioner's income from the two-pillar system is higher than the hypothetical income calculated as a pension benefit for 42 years of contributory period with average pension point of 1.25. At the same time. his/her income from the two-pillar system must be higher than the hypothetical income from the I. pillar if the person never participated in the II. pillar. The pension fund management company will allow programmed withdrawal also in case that no insurance company is willing to conclude a contract with a pensioner because his/her savings are not sufficient.

Pension indexation

Until 2013. first pillar pensions were indexed by the Swiss formula. i.e. 50 percent of inflation growth (measured by CPI) and 50 percent of nominal wage growth. Between 2014 and 2017. the weight of inflation indexation grows by 10 percent a year and weight of nominal wage decreases by 10 percent a year. However. during this period pensions are temporarily increased by a fixed amount. This amount is calculated as the percentage applied to the average pension. For each type of pension (old age. disabled. orphan. widow. etc.) separate fixed (nominal)

[5] Until September 2012, the ratio between pension contributions paid to the first and second pillar (9%) was 50:50. As of September 2012, just 22% of pension contributions (4%) are paid to the second pillar and the rest is paid to the first pillar. Between 2017 and 2024, the percentage of contributions paid to the second pillar will grow to 33% (6%).

[6] Describes situation before 2012 pension reform

amount will be calculated. in order to avoid redistribution among different types of pensions. **As from 2018. pensions will be indexed by pensioner's inflation**.

Add. table 5 - Indexation mechanism from Swiss method to inflation indexation

Period	Indexation mechanism	Indexation – weights		
		Nominal average wages growth	CPI	CPI pensioners*
2012	Percentage indexation	50%	50%	-
2013	**Fixed amount**	**50%**	**50%**	**-**
2014	Fixed amount	40%	60%	-
2015	Fixed amount	30%	70%	-
2016	Fixed amount	20%	80%	-
2017	Fixed amount	10%	90%	-
2018-2060	**Percentage indexation**	**-**	**-**	**100%**

** CPI measured in the households of pensioners – consumption basket of pensioners*

Source: IFP

1.1.2. Pension system of armed forces

Pension system of armed forces applies to professional soldiers. members of the Police Corps. Fire and Rescue Brigades. Mountain Rescue Service. Slovak Information Service. National Security Authority. Corps of Prison and Court Guards. Railway Police and customs officers. This system exists along with the universal mandatory scheme which covers the predominant part of the population of the Slovak Republic. It is a closed PAYG. mandatory. defined benefit pension system. There has been a major reform of the system in 2013.

Pension contributions

Pension contributions are levied as a percentage of the individual's gross wage. Compared to the first pillar of the universal system no ceiling is applied. The contribution rates are higher. increased by a recent reform.

Add. table 6 - Pension contributions to the system of armed forces (% of assessment base)

	employee	employer	TOTAL
Old-age contributions	7.0	20.0	27.0
Temporary pension contribution	1.0	1.0	2.0
Disability contributions	3.0	3.0	6.0
TOTAL	**11.0**	**24.0**	**35.0**

Source: IFP

Pension entitlement

The system is similar to the universal first pillar (although it is not a point system). A member of armed forces is entitled to a pension upon his/her termination of employment and it is not conditioned on reaching retirement age.

The minimum contributory period for a new member to acquire pension rights is 25 years. For 25 years of service. the pension is calculated as 37.5% of his/her average monthly wage in the past 10 years prior to the termination of service employment. The replacement rate increases depending on the length of career up to 65%.

Add. table 7 - Contributory period and replacement rates for the pension system of the armed forces (including the impact of the 2013 reform)

	Minimum contributory period	Replacement rate	
		Contributory period	Replacement rate

Old legislation	15 years	15	30%
		16 - 20	Raised by 2 p.p. per each year
		21 - 25	Raised by 3 p.p. per each year
		26 - 30	Raised by 1 p.p. per each year (maximum 60%)
Transition period	Increases from 15 years by one every year until reaching 25 years	15	30%
		16 - 20	Raised by 2 p.p. per each year
		21 - 25	Raised by 3 p.p. per each year
		26 - 30	Raised by 1 p.p. per each year
		> 31	Raised by 0.5 p.p. per each year (maximum 65%)
New legislation	25 years	25	37.5%
		26 - 30	Raised by 2 p.p. per each year
		31 - 35	Raised by 3 p.p. per each year
		> 36	Raised by 0.5 p.p. per each year (maximum 65%)

Source: IFP

There is a temporary pension that can be received if the contributory period is not sufficient for retirement pension entitlement. It is received for 1 – 3 years and the amount is 1% of the assessment base for each year of service.

Add. table 8 - Temporary pension of the armed forces (including the impact of the 2013 reform)

	Length of service	Period of receiving	Amount
Old legislation	5 – 9 years	1 – 3 years	2% of assessment base for each year
Transition period	Increases from 5 years by one every year until reaching 10 years	1 – 3 years	2% of assessment base for each year before 1.5.2013. then 1% of assessment base for each year (maximum 28%)
New legislation	10 – 17 years	1 year	1% of assessment base for each year (maximum 28%)
	17 – 22 years	2 years	
	22 – 25 years	3 years	

Source: IFP

Pension indexation

Based on the 2013 reform. the indexation will be unified with the general pension system as from 1.7.2018. Until then the existing pensions will be indexed by the fixed amount calculated in the same way as in the universal system adjusted by a coefficient taking into account the length of contributory period.

Add. table 9 - Indexation mechanism for pensions of armed forces

Period	Indexation mechanism	Indexation formula
2013 – 30.6.2018	Fixed amount + adjustement	(fixed amount / 30 * (1 + (contributory period above 15 years)/2))
1.7.2018 - 2060	Percentage indexation	CPI pensioners (as in the universal system)

Source: IFP

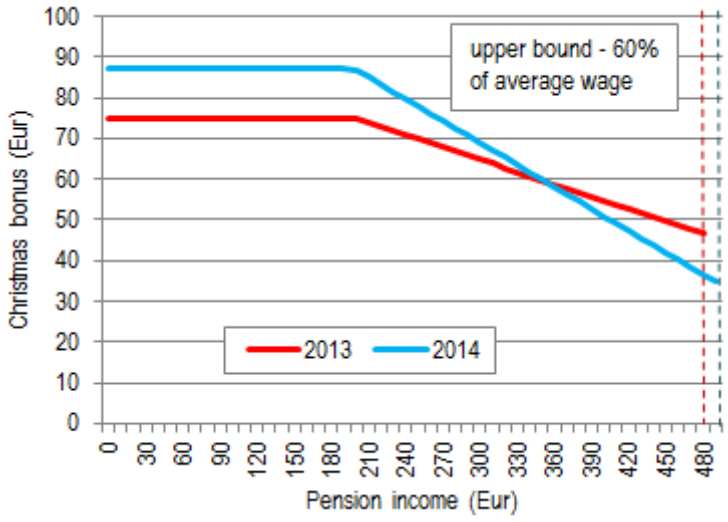
1.1.3. Voluntary fully funded "third pillar"

The third pillar was introduced in 1996 as a supplementary part of the pension system. It is a voluntary. fully funded. contribution defined. privately managed pension scheme. As of 2014 allowance for supplementary pension insurance has been reintroduced. Supplementary pension contributions are tax-deductible up to the maximum limit of 180 EUR per year.

1.1.4. Christmas bonus

The so-called Christmas bonus is a non-contributory benefit. means-tested. not being a part of the pension system. It was first introduced in year 2006 as a temporary measure to increase solidarity in the first pillar. The benefit is paid once a year in December. Only pensioners are eligible for the benefit. The benefit currently amounts to EUR 87.26 (circa 10% of the average gross monthly wage in Slovakia) and is gradually decreasing with the increase of the amount of pension income. Pensioners whose pension is above 60% of average wage in the economy are not entitled to the Christmas bonus. There is no stable indexation mechanism for the Christmas benefit (as it was originally meant to be a one-off measure) and it is raised irregularly by changing the law.

Figure 5 - Christmas bonus amount (EUR)



Source: IFP

1.1.5. Interactions between different types of pensions

Concurrent pensions

It is possible to receive pensions from **both** of the **universal** and **armed forces system** if necessary conditions for the entitlement have been fulfilled. If receiving pensions from both systems. the benefit is calculated as follows:

- the pension from the system of armed forces will be calculated only from contributory period and salaries received during the service in armed forces.
- the old age pension from the universal system is calculated as the theoretical amount of old age pension in the universal system using the full contributory period and salaries (received in both systems) minus theoretical amount of old age pension using the contributory period and salaries in the system of armed forces.

A **widow/er's** pension can be received on top of the old-age or disability pensions. However. only the higher of the two will be received in the full amount. and the pensioner will receive 50% of the amount of the lower one.

As for the **third pillar**. it is open for anyone to participate.

Social assistance is available for everyone that passes the means and property test. However. income of pensioners in the system of armed forces usually exceeds the minimum subsistence level. therefore their share in the social assistance scheme is negligible.

Reclassification of existing pensions

When reaching the statutory retirement age. disability pensioners can claim for an old-age pension. They will be entitled to the higher of the two benefits and the entitlement to the smaller pension will be cancelled. In case the two benefits are of the same amount. the pensioner has the right to choose which pension will be paid out.

1.2. Recent reforms of the pension system

The 2012 reform – changes in general pension system

There has been a major reform of the general pension system in 2012.

The first pillar

- As of 2017. the **retirement age** is going to be automatically adjusted according to changes in the life expectancy.
- **Indexation mechanism** will be gradually changing from Swiss indexation to inflation indexation (based on pensioners' consumption basket) in 2018. Between 2013 and 2017. pensions will be indexed by a fixed amount.
- The average pension point value calculation is revised in order to increase solidarity in the first pillar. This measure has a neutral fiscal impact both in short and long term.
- As of 2013. the **maximum assessment base** for pension contributions was increased to five times the average wage in economy (before it was four times the average wage).

The second pillar

- The second pillar became **voluntary for newcomers to the labour market.**
- Minimum participation period in the second pillar changed from 15 to 10 years.
- As of September 2012. contributions to the second pillar have been decreased from 9 to 4 percent of the assessment base. Starting in 2017. contributions are going to be gradually increased by 0.25 p.p. until they reach the final level of 6 percent in 2024.
- As of 2013. **the maximum assessment base for pension contributions** was increased to five times the average wage in economy (before it was four times the average wage).

Miscellaneous

- Between September 2012 and January 2013. the second pillar was "opened" again (for the 3rd time). During this period participants were given a possibility to return back to solely first pillar with full pension rights (the condition was to transfer all savings into the first pillar). Also. people who did not participate in the second pillar were given a chance to enter it. As more people exited the system than entered it. this had an immediate impact on the first pillar revenue. but in the future it will also lead to higher first pillar expenditures.

The 2013 reform – changes in pension system of armed forces

There have been major changes for the newcoming members of armed forces. A transition period has been introduced for the armed forces members that have already been in the system when the reform came into force (1.5.2013) and have not yet fulfilled requirements to retire at that time. This is in order to smoothen transition to the new system and to guarantee a fair approach to the members that entered the system when more favourable rules were in force.

Temporary pension

- Before the reform. the temporary pension could be received for up to three years if the length of service was between 5 - 9 years. Due to the reform. one year temporary pension is attributed for service length 10-17 years. 2 year for 17-22 and 3 year for 22-25 years of service. The amount of the benefit has been decreased from 2% to 1% per year of service.

- In the transition period. the minimum contributory period for entitlement of a temporary pension is increased for 5 years every year by one until it reaches 10 years.

Retirement pension

- The minimum contributory period has been increased from 15 to 25 years. The maximum replacement rate has been increased in order to motivate prolongation of service.
- In the transition period. the minimum contributory period will converge to 25 years.

Indexation mechanism

- Before the reform. no indexation rule was strictly defined. Over the past couple of years. the indexation varied among different groups. For police it was close to inflation indexation. for soldiers it was more generous and their indexation was close to wages (these two groups represent majority of the armed forces pension system).
- Due to the reform. the indexation will be unified with the general pension system as from 1.7.2018. Until then the existing pensions will be indexed by the fixed amount calculated in the same way as in the universal system adjusted by a coefficient taking into account the length of contributory period.

Assessment base

- The assessment base for calculation of retirement and temporary pension benefit has been changed from the "best year" within the period of the past 10 years prior to the termination of service to the average of last 10 years of career.

Contributions

- The retirement pension contribution has been increased from 17% to 20% for the employer (this is fiscally neutral) and from 5% to 7% for the employee.

The 2014 reforms – the second pillar annuity pay-out. changes in Christmas bonus

The second pillar

- The first pensions from the second pillar will be paid out as from 2015. There had been no legislation stating exact rules before 2014. The amendment introduces three schemes of pension benefits from the second pillar – lifetime annuity. temporary annuity and programmed withdrawal – and defines rules for entitlement and procedural side of the payout.

Christmas bonus

- The maximum amount of the Christmas bonus has been increased to 87.26 EUR. The coefficient determining the slope of decrease with pension income has been increased from 0.1 to 0.18 and thus increasing the solidarity aspect of the benefit.

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

Universal system

Full set of demographic and macroeconomic assumptions as supplied by Eurostat and the Commission is used in the projections.

The **indexation** assumed in the projections is the following:

- first pillar pensions are indexed according to law (i.e. pensioners' CPI. which is estimated as CPI+0.003 in the model).
- minimum pensions are fully indexed to wages (indexed by CPI in legislation. which is socially unsustainable).
- Christmas bonus is indexed to CPI (no indexation is legislated and the amount is raised irregularly).

The model assumes 10% **voluntary entry rate** to the **second pillar** based on empirical evidence. The model also assumes that 95% of employed persons pay **contributions** to pensions in the universal system. It is assumed that the **Christmas bonus** is a permanent part of the system and will not be cancelled throughout the projection period.

System of armed forces

In the projection. a part of the demographic and macroeconomic assumptions as supplied by Eurostat and the Commission is used that is applicable to this specific system.

Pensions are **indexed** according to law (unified with the universal system as from 2018). Average **contributory period** reflects the legislated minimum contributory period and makes assumption on how the employees will leave the system after changes in the law. Number of **contributors** (active members) of the system of armed forces are estimated as weighted average of two scenarios: status quo and constant number of active members per capita of the whole population.

2. OVERVIEW OF THE DEMOGRAPHIC AND LABOUR FORCE PROJECTIONS

2.1. Demographic development

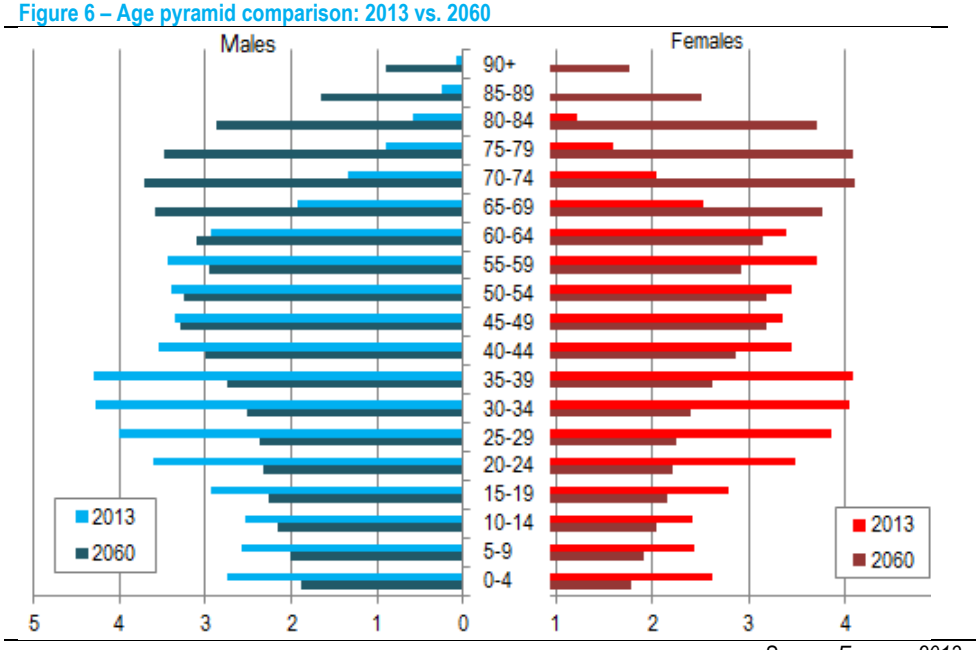
Table 2 - Main demographic variables evolution

	2013	2020	2030	2040	2050	2060	Peak year*
Population (thousand)	5413	5413	5306	5101	4857	4558	2017
Population growth rate	0.1	-0.1	-0.3	-0.4	-0.5	-0.7	2013
Old-age dependency ratio (pop65/pop15-64)	18.7	24.8	32.9	40.6	54.9	66.1	2060
Ageing of the aged (pop80+/pop65+)	22.6	19.8	23.1	31.1	30.0	37.1	2060
Men - Life expectancy at birth	72.7	74.3	76.5	78.6	80.5	82.3	2060
Men - Life expectancy at 65	14.7	15.6	17.0	18.3	19.6	20.8	2060
Women - Life expectancy at birth	79.9	81.1	82.8	84.5	86.0	87.4	2060
Women - Life expectancy at 65	18.4	19.3	20.6	21.8	23.0	24.2	2060
Men - Survivor rate at 65+	75.2	78.3	82.1	85.2	87.8	90.0	2060
Men - Survivor rate at 80+	36.9	42.3	49.7	56.6	63.0	68.6	2060
Women - Survivor rate at 65+	89.0	90.3	91.9	93.2	94.3	95.2	2060
Women - Survivor rate at 80+	61.7	65.9	71.2	75.8	79.8	83.2	2060
Net migration	2.0	3.0	2.5	4.7	4.7	2.4	2044
Net migration over population change	0.3	-1.0	-0.2	-0.2	-0.2	-0.1	2017

Table 2 shows an overview of the demographic development in Slovakia until 2060. The population size will start decreasing in 2017 and the growth will be negative until the end of projection period. The fertility rate will remain among the lowest in the EU throughout the whole period. however the life expectancy will increase substantially. Migration in Slovakia has a minor effect on the population size.

The old-age dependency ratio will increase by 47.4 p.p. between 2013 and 2060. This important demographic factor affecting the pension expenditure is projected to be the least favourable in the EU.

Figure 6 – Age pyramid comparison: 2013 vs. 2060



Source: Europop 2013

2.2. Labour forces

Table 3 - Participation rate. employment rate and share of workers for the age groups 55-64 and 65-74

	2013	2020	2030	2040	2050	2060	Peak year*
Labour force participation rate 55-64	49.6	53.8	60.5	61.2	64.5	70.4	2060
Employment rate for workers aged 55-64	44.1	48.7	55.6	58.0	61.3	67.1	2060
Share of workers aged 55-64 on the total labour force	89.0	90.5	91.9	94.8	95.0	95.2	2058
Labour force participation rate 65-74	2.6	4.1	6.6	10.6	13.5	17.6	2060
Employment rate for workers aged 65-74	2.5	3.8	6.3	10.3	13.1	17.1	2060
Share of workers aged 65-74 on the total labour force	95.2	94.9	96.0	97.1	97.0	97.0	2040
Median age of the labour force	39.0	40.0	43.0	45.0	44.0	44.0	2039

Source: IFP

Table 3 provides an overview of the projection of labour force developments. Participation of older workers will gradually increase mostly due to the increase of retirement age.

Table 4a - Labour market entry age. exit age and expected duration of life spent at retirement - MEN

	2013	2020	2030	2040	2050	2060	Peak year*
Average effective entry age (CSM) (I)	22.1	22.0	22.0	22.0	22.0	22.0	2013
Average effective exit age (CSM) (II)	61.3	61.9	62.6	63.6	64.7	66.2	2060
Average effective working career (CSM) (II)- (I)	39.2	39.9	40.7	41.6	42.8	44.2	2060
Contributory period	42.3	41.9	41.7	41.9	42.7	44.2	2060
Contributory period/Average working career	1.1	1.1	1.0	1.0	1.0	1.0	2014
Duration of retirement **	17.3	17.7	18.4	19.1	19.6	20.0	2055
Duration of retirement/average working career	44.2	44.3	45.2	45.9	45.8	45.2	2039
Percentage of adult life spent at retirement***	28.6	28.7	29.2	29.5	29.5	29.3	2039
Early/late exit****	1.1	2.2	2.1	2.1	1.6	0.9	2033

Source: IFP

Table 4b - Labour market entry age. exit age and expected duration of life spent at retirement - WOMEN

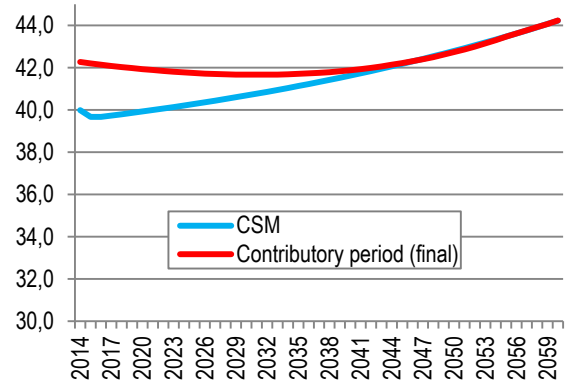
	2013	2020	2030	2040	2050	2060	Peak year*
Average effective entry age (CSM) (I)	25.5	26.2	26.2	26.2	26.2	26.2	2015
Average effective exit age (CSM) (II)	61.4	61.7	62.4	63.3	64.5	65.9	2060
Average effective working career (CSM) (II)- (I)	35.9	35.5	36.2	37.2	38.3	39.7	2060
Contributory period	41.3	40.3	39.2	38.6	38.6	39.7	2014
Contributory period/Average working career	1.1	1.1	1.1	1.0	1.0	1.0	2014
Duration of retirement **	21.7	21.9	23.2	23.6	23.9	23.3	2050
Duration of retirement/average working career	60.4	61.7	64.0	63.5	62.4	58.7	2015
Percentage of adult life spent at retirement***	33.3	33.4	34.3	34.2	34.0	32.7	2015
Early/late exit****	2.1	2.7	2.2	2.0	1.8	1.0	2026

Source: IFP

The **contributory period** in the base year was estimated from empirical data as 42.3 for men and 41.3 for women. However. it also takes into account years of unemployment before 2003. when the government paid social insurance on behalf of the unemployed. This legislation was abolished in 2003 and therefore the share of unemployment on the whole contributory period will gradually converge to zero. Since it is currently impossible to decompose the contributory period into periods of employment and unemployment. we are not able to determine the rate in which the unemployment period will fade out. The best estimate for the contributory period at the end of projection horizont is the average effective working career simulated by the Commission's labor market cohort

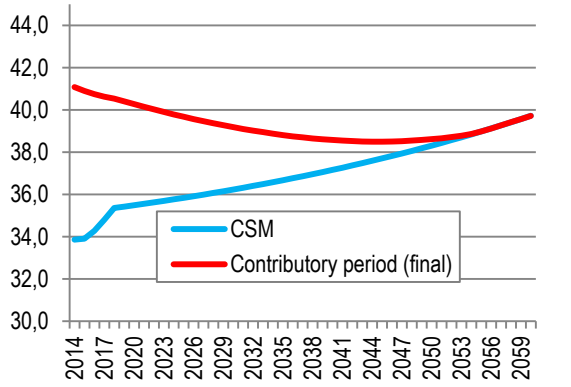
simulation model. Therefore it is assumed that the average contributory period will converge to the average effective working career simulated by the Commission on the horizon of one contributory period. The fading out of the unemployment period effect will cause a decrease in the contributory period at first. but later when the dynamics will be unified with the one of the average working career. the contributory period is projected to increase towards the end of the horizon.

Figure 7 - Contributory period used in projections - convergence towards CSM working career - MEN



Source: IFP

Figure 8 - Contributory period used in projections - convergence towards CSM working career - WOMEN



Source: IFP

Percentage of adult life spent in retirement does not increase monotonously. One reason is that the effective retirement age is not assumed to be constant with respect to the statutory retirement age (the early/late exit ratio is not constant). Another reason is that despite of the link between the statutory retirement age and life expectancy as from 2017. the formula to calculate the statutory retirement age is not straightforward and changes in life expectancy only affect the retirement age with a lag of several years.

3. PENSION PROJECTION RESULTS

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

The long-term pension projection covers the majority of pension expenditures in Slovakia. i.e. old age and early old age pensions. disability and survivor pensions from the first pillar of the universal pension system. Social assistance expenditures. that represent non-earnings related pensions in Slovakia. have been included in the current projection similarly as in the previous rounds. The second pillar pension expenditure is not fully covered due to data issues; however. some information on the private scheme has been implemented in the projection. Similarly as in the previous rounds. the third pillar is not included in the projection because of data unavailability. For a first time. also the Christmas bonus is covered.

As a new feature. the current projection explicitly quantifies pension expenditure of the armed forces. Given that the pension scheme of armed forces is a closed system beside the universal scheme. it is treated in the model such that the two schemes do not interact. This has two implications for the interpretation of the projection results.

First. the primary reference for understanding of the projection results and its underlying drivers is the pension aggregate without armed forces. which comprises earnings related pensions (old-age and early pensions. disability and survivors pensions). and non-earnings related pensions. This aggregate is compared across the baseline and the set of sensitivity scenarios. However. the headline figures (Tables 6 and 7) stand for the gross public pension expenditure including armed forces. Second. because this modelling extension appears for the first time. is not appropriate to compare the headline figures with the previous projection rounds. Again. the pension aggregate without the armed forces is used to facilitate comparison. The armed forces pension projection is analysed to a more detail in the Chapter 3.7.

Table 5 - Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)

	2006	2007	2008	2009	2010	2011	2012	2013
1 Eurostat total pension expenditure	*7.4*	*7.3*	*7.2*	*8.5*	*8.4*	*8.3*	*8.4*	*:*
2 Eurostat public pension expenditure*	*7.4*	*7.3*	*7.2*	*8.5*	*8.4*	*8.3*	*8.4*	*:*
3 Public pension expenditure (AWG)	*6.9*	*7.0*	*6.8*	*8.0*	*8.0*	*8.0*	*8.0*	*8.3*
4 Difference (2) - (3)	*0.5*	*0.3*	*0.4*	*0.5*	*0.4*	*0.3*	*0.4*	*:*
5 Expenditure categories not considered in the AWG definition. please specify:	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*:*
5.1 Pension system of armed forces	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*0.4*

** 2012 - provisional*

Source: Eurostat. Ministry of Finance of the SR

Unlike the ESSPROS data. the AWG public pension expenditure does not include pensions of armed forces. On the other hand. the AWG public pension expenditures include social assistance for old age pensioners and the Christmas bonus.

3.2. Overview of projection results

Gross public pension expenditure (including the expenditure on the armed forces) is projected to increase from 8.7 GDP in 2013 to 10.9% GDP in 2060. which makes an overall increase of 2.2 GDP p.p. over the projection horizon.

Table 6 - Projected gross and net pension spending and contributions (% of GDP) **

Expenditure	2013	2020	2030	2040	2050	2060	Peak year*
Gross public pension expenditure	8.7	8.6	8.2	8.7	9.7	10.9	2060
Private occupational pensions	:	:	:	:	:	:	:
Private individual pensions	:	:	:	:	:	:	:

Mandatory private	:	:	:	:	:	:	:
Non-mandatory private	:	:	:	:	:	:	:
Gross total pension expenditure	8.7	8.6	8.2	8.7	9.7	10.9	2060
Net public pension expenditure	8.7	8.6	8.2	8.7	9.7	10.9	2060
Net total pension expenditure	:	:	:	:	:	:	:
Contributions	**2013**	**2020**	**2030**	**2040**	**2050**	**2060**	**Peak year***
Public pension contributions	6.2%	5.9%	5.8%	6.0%	6.2%	6.3%	2060
Total pension contributions	6.7%	6.5%	6.5%	6.5%	6.5%	6.5%	2014

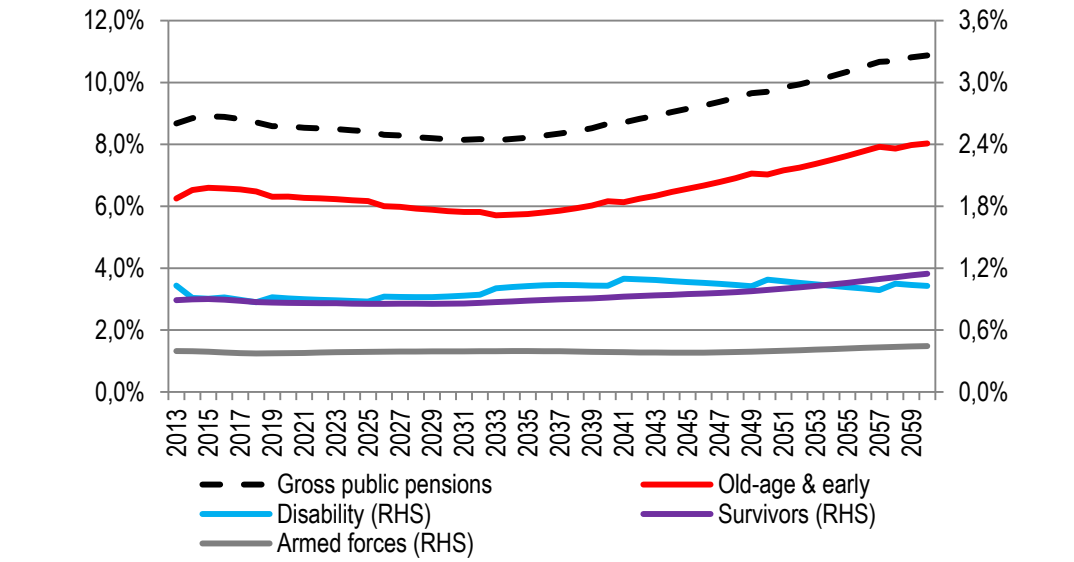
** peak year. i.e. the year in which the particular variable reaches its maximum over the projection period 2013 to 2060*
** including the pension system of armed forces

Source: IFP

Gross public pension expenditure equals net public pension expenditure. as in Slovakia pensions are not subject to taxation. The overall expenditure comprises earnings related pensions (old-age and early pension benefits. disability and survivors pensions). non-earnings related pensions. and pension benefits of the armed forces.

The evolution of the projected pension expenditure to GDP may be broken-down in three phases. The ratio is increasing over 2013 - 2016. decreasing over 2017-2033. when the pensions are expected to grow at a lesser pace than GDP. and increasing again as from 2034 to 2060.

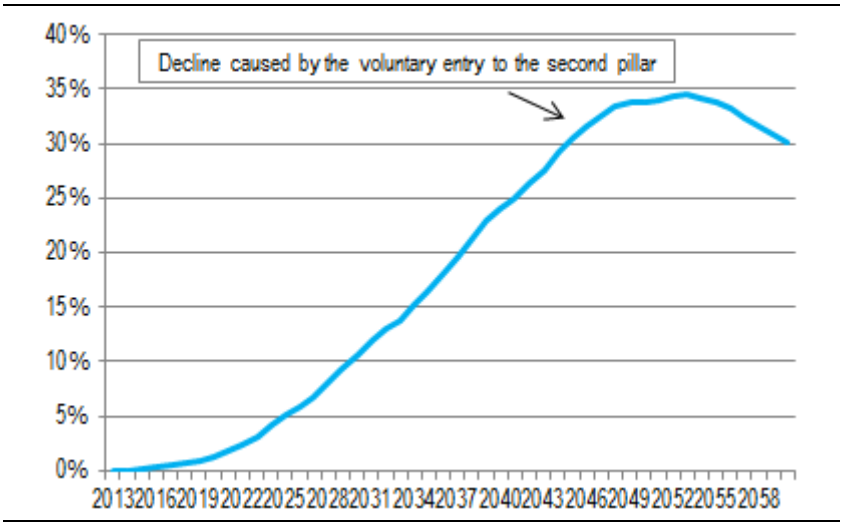
Figure 9 - Projected gross public pension expenditure (% GDP)



Source: IFP

Earnings related old-age and early pensions account for the major part of the pension expenditure. with a relatively stable share of about 72%. The projected expenditure to GDP is expected to increase from 6.3% GDP in 2013 to 8.0% in 2060. Between 2017 and 2033. the ratio is expected to decrease. owing to the upward shift of retirement age due to the 2012 reform. The number of pensioners receiving pensions only from the first pillar will increase towards the end of the projection period. This is because currently we observe a low rate of enrollment to the second pillar. given that it was set voluntary as from 2013. This will cause an increase in the public pension expenditure in the end of projection period.

Figure 10 - Share of II. pillar pensioners on the I. pillar pensioners



Source: IFP

Earnings related disability pension expenditure is projected to hover around 1% GDP. In the model. upon reaching retirement age. the disability pension benefit is transformed into old-age pension. This is reflected in the projection. since the outflow of disability pensioners is slower when the retirement age is increasing.

Earnings related survivors pension expenditure to GDP is projected to increase steadily from 0.9% GDP in 2013 to 1.1% in 2060.

Non-earnings related pension expenditure comprises minimum old-age and early pensions and the Christmas bonus. Non-earnings related old-age and early pensions are projected to increase from 0.01% GDP in 2013 to 0.16% GDP in 2060 due to the modelling assumption that the minimum pension entitlement is indexed by the wage growth. The Christmas bonus expenditure is expected to decrease from 0.10% GDP in 2013 to 0.07% GDP in 2060 (assumed is CPI indexation).

Table 7 - Projected gross public pension spending by scheme (% of GDP)

Pension scheme	2013	2020	2030	2040	2050	2060	Peak year *
Total public pensions	8.7	8.6	8.2	8.7	9.7	10.9	2060
of which earnings related:							
Old age and early pensions	6.3	6.3	5.8	6.2	7.0	8.0	2060
Disability pensions	1.0	0.9	0.9	1.0	1.1	1.0	2041
Survivors' pensions	0.9	0.9	0.9	0.9	1.0	1.1	2060
Other pensions	:	:	:	:	:	:	:
of which non-earnings related (including minimum pension and minimum income guarantee):							
Old age and early pensions	0.01	0.03	0.06	0.09	0.13	0.16	2060
Disability pensions	:	:	:	:	:	:	:
Other pensions	0.10	0.10	0.09	0.08	0.08	0.07	2014
Additional schemes (armed forces)	0.40	0.38	0.39	0.39	0.39	0.44	2060

** This column represents a peak year. i.e. the year in which the particular variable reaches its maximum over the projection period 2010 to 2060.)*

Source: IFP

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

Public pension expenditure to GDP is decomposed into four major driving forces - dependency ratio. coverage ratio. benefit ratio and a labour market indicator. as follows:

$$\frac{\text{Pension Exp}}{\text{GDP}} = \overbrace{\frac{\text{Population } 65+}{\text{Population } 20-64}}^{\text{DependencyRatio}} \times \overbrace{\frac{\text{Number of Pensioners (Pensions)}}{\text{Population } 65+}}^{\text{CoverageRatio}} \times \overbrace{\frac{\frac{\text{Average income from pensions (Average Pension)}}{\text{GDP}}}{\frac{\text{Hours Worked}}{20-74}}}^{\text{Benefit Ratio}} \times \overbrace{\frac{\text{Population } 20-64}{\text{Hours Worked } 20-74}}^{\text{Labour Market / Labour Intensity}} \quad [1]$$

The coverage ratio is further split as follows:

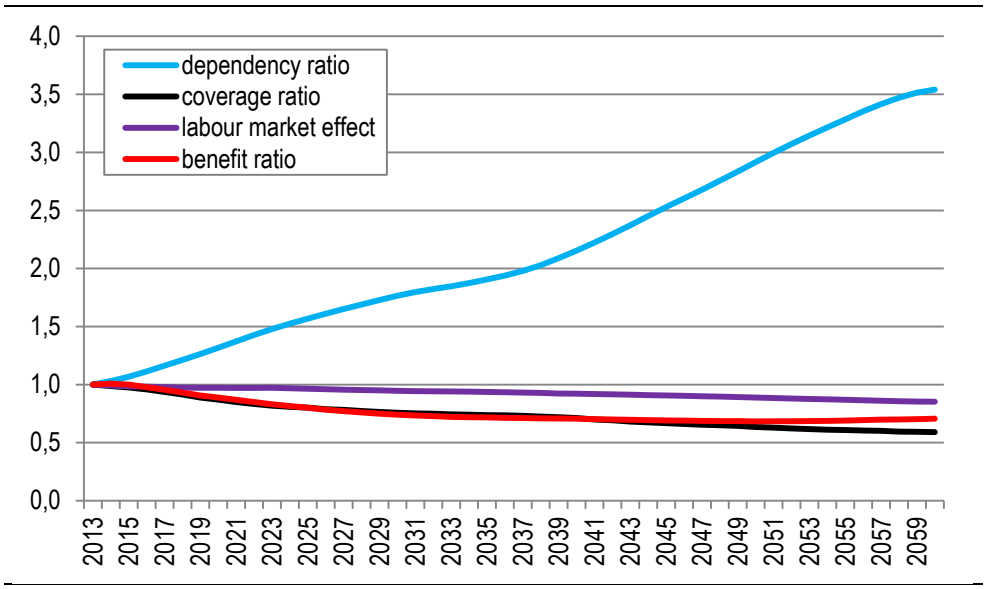
$$\overbrace{\frac{\text{Number of Pensioners}}{\text{Population } 65+}}^{\text{CoverageRatio}} = \overbrace{\frac{\text{Number of Pensioners } 65+}{\text{Population } 65+}}^{\text{CoverrageRatio Old-Age}} + \left(\overbrace{\frac{\text{Number of Pensioners} \le 65}{\text{Population } 50-64}}^{\text{CoverageRatio Early-Age}} \times \overbrace{\frac{\text{Population } 50-64}{\text{Population } 65+}}^{\text{Cohort effect}} \right) \quad [2]$$

The labour market indicator is further decomposed as follows:

$$\overbrace{\frac{\text{Population } 20-64}{\text{Hours Worked } 20-74}}^{\text{Labour Market / Labour Intensity}} = \overbrace{\frac{\text{Population } 20-64}{\text{Working People } 20-64}}^{1/\text{EmploymentRate}} \times \overbrace{\frac{\text{Working People } 20-64}{\text{Hours Worked } 20-64}}^{1/\text{Labourintensity}} \times \overbrace{\frac{\text{Hours Worked } 20-64}{\text{Hours Worked } 20-74}}^{1/\text{Careershift}} \quad [3]$$

Over the projection horizon 2013-2060. the public pension expediture are projected to increase by 2.2 GDP percentage points (Table 8b). The main driving force to the increase is the unfavourable dependency ratio. which is projected to contribute by 11.5 GDP p.p. to the overall change. The remaining three drivers are expected to have a mitigating effect. The coverage ratio will contribute by -4.3 GDP p.p.. the benefit ratio by -2.7 GDP p.p. and the labour market indicator by -1.4 GDP p.p. The public pension expenditure ratio is also affected by the GDP dynamics. especially before 2040 when the GDP is expected to grow in real terms at relatively high annual rates of 1.0 - 3.5%.

Figure 11 - Evolution of the main driving forces behind the projection results (year 2013=1)



Source: IFP

Increase in the **dependency ratio** reflects higher expected lives of the population as well as low fertility rates. The ratio of elder people 65+ to the population 20-64 is projected to increase from 20.3% in 2013 to 71.9% in 2060.

The mitigating effect of the **coverage ratio** is mainly due to higher effective retirement age of the workers. Following the reform in 2012. statutory retirement age will be linked to unisex life expectancy. At the same time. the early retirement and disability rates are projected to remain relatively low. Altogether it implies a decreasing share of pensioners in elder population 65+. which is reflected in particular in the decreasing early-age coverage ratio and in the cohort effect.

The **benefit ratio** is projected to decrease by 2060 due to the difference in the dynamics of average wage and pension indexation. The economy-wide average wage will grow by about 4.1% annually. whereas the average pension by 3.4%. In the model. existing pension benefits are indexed by the pensioners' CPI inflation rather than wages. Indexation is therefore the main factor to systematically reduce the benefit ratio.

The **labour market indicator** is projected to improve from 3.9% in 2013 to 3.3% in 2060. Employment rates of population 20-64 are expected to follow an increasing trend. from 65.2% in 2013 to 71.6% in 2060. Due to higher statutory retirement ages and incentives to stretch careers. the cohorts of 65-74 years are expected to deliver an increasing number of hours.

Table 8a - Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) - pensions

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60	Average annual change
Public pensions to GDP	-0.1	-0.4	0.5	1.0	1.1	2.2	0.217
Dependency ratio effect	2.5	2.6	1.6	2.8	2.0	11.5	0.228
Coverage ratio effect	-1.1	-0.7	-0.3	-0.9	-0.4	-3.4	-0.074
*Coverage ratio old-age**	*-0.2*	*0.4*	*0.1*	*-0.4*	*-0.2*	*-0.3*	*-0.007*
*Coverage ratio early-age**	*-0.7*	*-3.0*	*-1.7*	*-2.3*	*-1.5*	*-9.2*	*-0.208*
*Cohort effect**	*-2.1*	*-1.1*	*-0.5*	*-2.8*	*-2.3*	*-8.7*	*-0.196*
Benefit ratio effect	-1.0	-1.8	-0.6	-0.3	0.1	-3.6	-0.079
Labour Market/Labour intensity effect	-0.2	-0.2	-0.2	-0.3	-0.4	-1.4	-0.029
Employment ratio effect	*-0.2*	*-0.2*	*-0.1*	*-0.1*	*-0.2*	*-0.8*	*-0.017*
Labour intensity effect	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.000*

Career shift effect	*0.0*	*-0.1*	*-0.1*	*-0.2*	*-0.1*	*-0.5*	*-0.012*
Residual	-0.3	-0.3	-0.1	-0.2	-0.1	-1.0	0.171

** Sub components of the coverage ratio effect do not add up necessarily.*

Source: IFP

Table 8b - Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) - pensioners

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60	Average annual change
Public pensions to GDP	-0.1	-0.4	0.5	1.0	1.1	2.2	0.217
Dependency ratio effect	2.5	2.6	1.6	2.8	2.0	11.5	0.228
Coverage ratio effect	-1.1	-1.1	-0.5	-1.0	-0.7	-4.3	-0.095
*Coverage ratio old-age**	-0.1	0.0	0.0	-0.2	-0.2	-0.5	-0.012
*Coverage ratio early-age**	-0.3	-2.2	-1.2	-1.0	-0.7	-5.4	-0.119
*Cohort effect**	-2.1	-1.1	-0.5	-2.8	-2.3	-8.7	-0.196
Benefit ratio effect	-1.0	-1.4	-0.4	-0.3	0.3	-2.7	-0.059
Labour Market/Labour intensity effect	-0.2	-0.2	-0.2	-0.3	-0.4	-1.4	-0.029
Employment ratio effect	-0.2	-0.2	-0.1	-0.1	-0.2	-0.8	-0.017
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0	0.000
Career shift effect	0.0	-0.1	-0.1	-0.2	-0.1	-0.5	-0.012
Residual	-0.3	-0.3	-0.1	-0.2	-0.1	-1.0	0.172

** Sub components of the coverage ratio effect do not add up necessarily.*

Source: IFP

The decomposition using the number of pensions (Table 8a) is not quite appropriate for Slovakia as there are pensioners receiving multiple pensions at the same time. which makes the interpretation more complex.

Table 9 - Replacement rate at retirement (RR). benefit ratio (BR) and coverage by pension scheme (in %)

	2013	2020	2030	2040	2050	2060
Public scheme (BR)	45.7	41.6	34.8	33.2	32.2	33.3
Public scheme (RR)	51.7	50.3	45.3	42.4	45.8	49.4
Coverage	100.0	100.0	100.0	100.0	100.0	100.0
Public scheme old-age earnings related (BR)	46.0	40.8	33.2	31.0	29.6	30.4
Public scheme old-age earnings related (RR)	51.7	50.3	45.3	42.4	45.8	49.4
Coverage	75.1	78.3	78.7	79.7	81.9	84.4
Private occupational scheme (BR)	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:
Coverage	:	:	:	:	:	:
Private individual scheme (BR)	:	:	:	:	:	:
Private individual scheme (RR)	:	7.4	11.7	16.8	21.5	22.7
Coverage	:	1.3	10.6	24.1	33.8	30.0
Total (BR)	45.7	41.6	34.8	33.2	32.2	33.3
Total (RR)	51.7	51.2	51.4	51.9	51.8	53.1

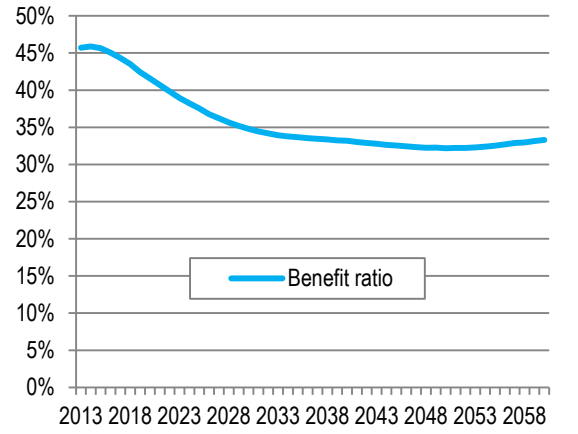
Source: IFP

The **replacement rate** will remain more or less constant since the new pensions are indexed by the wage growth through the point value channel. Between 2015 and 2040. the replacement rate of public pensions is expected to decrease gradually due to the growing amount of pensions paid out from the second pillar after 2015. After 2040.

however. only a small share of newcomers to the labour market is assumed to enter in the second pillar. hence the replacement rate will grow back to its initial level .

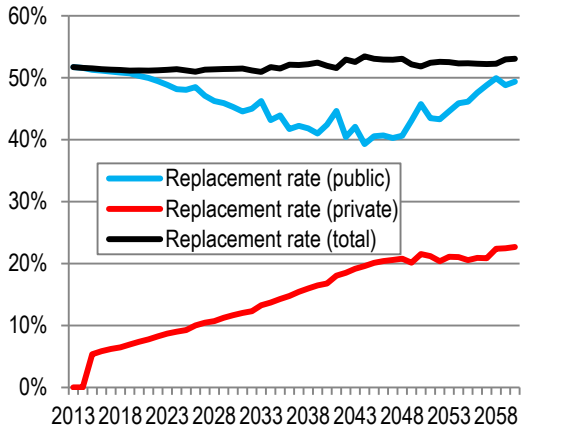
The decrease of the **benefit ratio** is caused by the change in the indexation of pensions following the 2012 reform (indexation of the existing pensions is based on pensioners' inflation instead of the Swiss formula). The benefit ratio will also be affected by pensions paid out from the II. pillar as from 2015. With more people retiring. who participated in the private scheme at the beginning of the projection horizon. the replacement rate and thus the benefit ratio in the public system will be smaller. This effect will be mitigated later by the voluntary entry to the second pillar causing that more people will remain in the public scheme.

Figure 12 - Benefit ratio



Source: IFP

Figure 13 - Replacement rate



Source: IFP

Table 10 - System dependency ratio and old-age dependency ratio

	2013	2020	2030	2040	2050	2060
Number of pensioners (thousand) (I)	1321.8	1460.7	1590.8	1698.8	1764.7	1736.5
Employment (thousand) (II)	2333.0	2310.8	2220.0	2120.9	1896.2	1720.6
Pension System Dependency Ratio (SDR) (I)/(II)	56.7	63.2	71.7	80.1	93.1	100.9
Number of people aged 65+ (thousand) (III)	721.1	915.0	1146.2	1300.4	1517.7	1604.7
Working age population 15 - 64 (thousand) (IV)	3862.6	3688.1	3478.6	3203.0	2763.4	2429.4
Old-age Dependency Ratio (ODR) (III)/(IV)	18.7	24.8	32.9	40.6	54.9	66.1
System efficiency (SDR/ODR)	3.0	2.5	2.2	2.0	1.7	1.5

Source: IFP

The **pension system dependency ratio** reaches 100% in 2060. that means there will be approximately one pensioner for each employed person. This figure. however. includes all type of pensioners. For old age pensioners. the dependency ratio is also considerably high. being the main driver of the pension expenditure.

Table 11a - Pensioners (public scheme) to inactive population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	11.9	12.8	13.7	13.3	11.0	11.2
Age group 55-59	115.7	103.1	103.9	96.0	91.7	88.7
Age group 60-64	112.1	117.7	97.4	79.5	70.8	76.2
Age group 65-69	104.8	99.8	108.5	116.5	113.9	108.6
Age group 70-74	101.1	101.3	101.9	99.7	101.9	102.9
Age group 75+	98.9	101.5	99.2	100.1	99.7	99.2

Source: IFP

Table 11b - Pensioners (public scheme) to total population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	4.7	4.9	5.2	4.8	4.0	4.1
Age group 55-59	30.5	25.4	25.0	24.7	24.1	22.2
Age group 60-64	87.1	79.7	56.6	41.2	31.1	25.8
Age group 65-69	101.3	93.7	96.7	97.3	88.0	75.0
Age group 70-74	99.4	100.2	99.9	96.7	97.8	97.8
Age group 75+	98.9	101.5	99.2	100.1	99.7	99.2

Source: IFP

Table 12a – Female pensioners (public scheme) to incative population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	9.5	10.2	11.0	10.5	8.9	9.2
Age group 55-59	113.2	99.8	101.2	84.1	78.9	75.9
Age group 60-64	112.4	120.4	101.0	78.8	69.3	63.2
Age group 65-69	104.4	98.3	105.0	113.4	111.0	111.3
Age group 70-74	101.0	101.4	102.2	96.9	99.8	100.4
Age group 75+	99.8	102.8	100.3	100.3	99.4	98.6

Source: IFP

Table 12b – Female pensioners (public scheme) to total population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	4.3	4.5	4.9	4.6	3.8	4.0
Age group 55-59	38.5	28.0	26.6	25.9	25.1	23.2
Age group 60-64	98.3	86.8	60.8	43.6	33.3	24.8
Age group 65-69	102.0	94.0	94.6	96.2	88.6	80.9
Age group 70-74	100.0	100.6	100.4	94.1	96.2	96.0
Age group 75+	99.8	102.8	100.3	100.3	99.4	98.6

Source: IFP

Due to the increase of the retirement age. the **coverage ratio** (share of pensioners on the population in particular age cohort) is decreasing. In the lowest cohort (-54) the changes are very small since there are almost no pensioners. There can be more pensioners than inactive population due to **concurrent work and pension** (i.e. person is receiving pension benefit but he/she is not registered as inactive since he/she is still employed).

Table 13a - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions)

New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure (millions EUR)		298.9	412.4	749.1	1103.7	1371.0
II. Number of new pensioners ('000)		48.5	43.7	55.8	53.6	43.8
Average pension		6.2	9.4	13.4	20.6	31.3
III. Total pension points at retirement		39.5	36.3	34.8	37.0	39.3
IV. Average pension points accumulated per year or average contributory period		41.1	40.4	40.2	40.7	42.1
V. Average accrual rate (=V/K)		1.2	1.1	1.1	1.1	1.2
Point value (V)		13.0	21.7	32.1	46.4	66.4
Point cost (K)		10.6	19.4	30.5	41.3	56.6
VI. Sustainability/adjustment factors						
VII. Average number of months paid the first year		12.0	12.0	12.0	12.0	12.0
Average pension / Economy-wide average wage		0.46	0.43	0.42	0.44	0.47

Source: IFP

Table 13b - Disaggregated new public pension expenditure (old-age and early earnings-related pensions) - MEN

New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure (millions EUR)						
II. Number of new pensioners ('000)		24.3	21.9	28.3	27.2	23.0
Average pension						
III. Total pension points at retirement		41.7	38.4	38.3	39.6	42.7
IV. Average pension points accumulated per year or average contributory period		41.9	41.7	41.9	42.7	44.2
V. Average accrual rate (=V/K)		1.2	1.1	1.0	1.1	1.2
Point value (V)		13.0	21.7	32.1	46.4	66.4
Point cost (K)		10.5	19.3	31.9	42.7	57.3
VI. Sustainability/adjustment factors						
VII. Average number of months paid the first year		12.0	12.0	12.0	12.0	12.0
Average pension / Economy-wide average wage						

Source: IFP

Table 13c - Disaggregated new public pension expenditure (old-age and early earnings-related pensions) - WOMEN

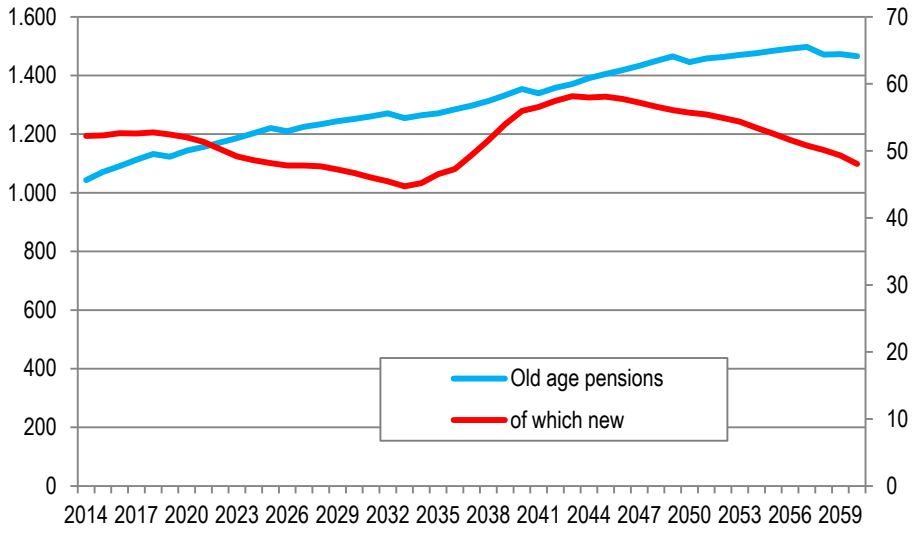
New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure (millions EUR)						
II. Number of new pensioners ('000)		24.2	21.8	27.6	26.4	20.8
Average pension						
III. Total pension points at retirement		37.3	34.1	31.2	34.2	35.5
IV. Average pension points accumulated per year or average contributory period		40.3	39.2	38.6	38.6	39.7
V. Average accrual rate (=V/K)		1.2	1.1	1.0	1.0	1.2
Point value (V)		13.0	21.7	32.1	46.4	66.4
Point cost (K)		10.5	18.9	31.2	45.3	57.3
VI. Sustainability/adjustment factors						
VII. Average number of months paid the first year		12.0	12.0	12.0	12.0	12.0
Average pension / Economy-wide average wage						

Source: IFP

The average **accrual rate** declines until 2040 because of the decrease in the contributory period and of the payout of pensions from the second pillar (lower rights accrued in the first pillar). After 2040. the average accrual rate in the first pillar will begin to increase. This dynamics is caused by the increase in the contributory period and the voluntary character of the second pillar. In the starting year (and also in the years before). according to the Social Insurance Agency. the average contributory period for men was 42.3 and women 41.3 years. In the projections we assume convergence toward the average working career as simulated by the Commission's labour market cohort simulation model. which is driven by the retirement age increase.

Number of **new old-age pensions** will decrease due to acummulation of pensioners who will not retire at the age supposed by the legislation prior to the reform. due to the steep upward-shift in the retirement age. This will. however. cause a jump in the new old-age pensions later on. when these people will retire in accordance with the amended legislation.

Figure 14 - Old age pensioners (in 1000)



Source: IFP

3.4. Financing of the pension system

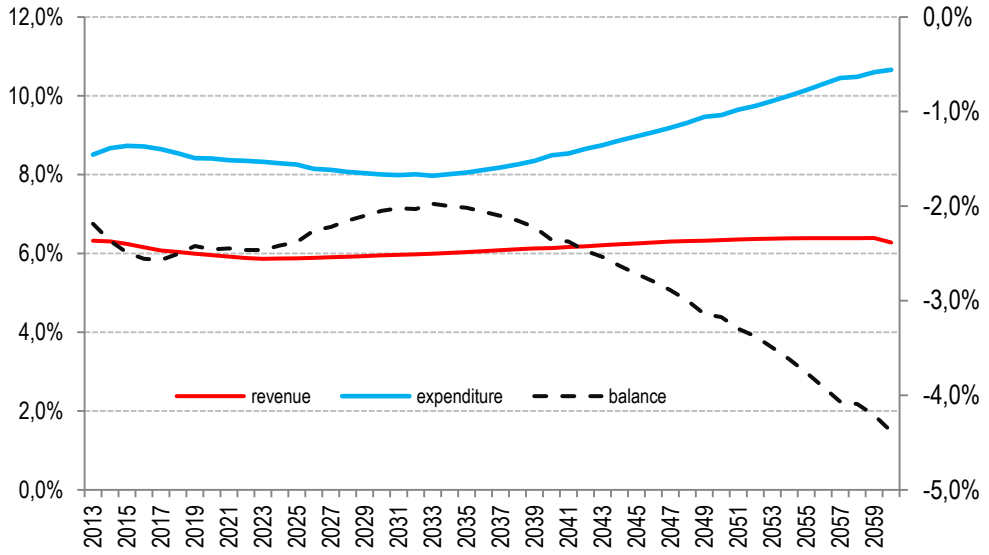
Table 14 - Revenue from contribution (Millions). number of contributors in the public scheme (in 1000). total employment (in 1000) and related ratios (%)

	2013	2020	2030	2040	2050	2060
Public contribution	*4535.2*	*5879.6*	*9294.6*	*13485.7*	*18000.6*	*23614.8*
Employer contribution	*3200.2*	*4148.8*	*6558.6*	*9516.0*	*12701.9*	*16663.5*
Employee contribution	*1335.0*	*1730.7*	*2736.0*	*3969.7*	*5298.7*	*6951.3*
State contribution	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Number of contributors (I)	2312.9	2290.9	2200.9	2102.1	1879.2	1705.0
Employment (II)	2333.0	2310.8	2220.0	2120.9	1896.2	1720.6
Ratio of (I)/(II)	1.0	1.0	1.0	1.0	1.0	1.0

Source: IFP

The pension system **revenue** (contributions received) is projected to remain stable throughout the whole projection period. It will start to decrease slightly in 2017 when the contribution rates to the second pillar will start to increase from 4% to 6%. Since the inflow of new contributors to the second pillar will be decreasing. the revenues will gradually increase again.

Figure 15 - Gross public expenditure. revenue and balance (% of GDP)



Source: IFP

3.5. Sensitivity analysis

Table15 - Public pension expenditure under different scenarios (p.p. deviation from the baseline)

Public Pension Expenditure	2013	2020	2030	2040	2050	2060
Baseline	8.3	8.2	7.8	8.3	9.3	10.4
Higher life expectancy (2 extra years)	0.0	0.0	0.0	-0.1	-0.1	0.0
Higher lab. productivity (+0.25 pp.)	0.0	0.0	-0.2	-0.3	-0.3	-0.4
Lower lab. productivity (-0.25 pp.)	0.0	0.0	0.1	0.2	0.3	0.5
Higher emp. rate (+2 pp.)	0.0	-0.1	-0.2	-0.2	-0.2	-0.2
Higher emp. of older workers (+10 pp.)	0.0	-0.2	-0.4	-0.4	-0.4	-0.3
Lower migration (-20%)	0.0	0.0	0.0	0.0	0.0	0.1
Risk scenario	0.0	0.0	0.0	0.1	0.3	0.4
Policy scenario: linking retirement age to increases in life expectancy	0.0	-0.2	-0.4	-0.7	-0.8	-0.8

Source: IFP

Sensitivity tests have been performed upon the universal pension scheme. i.e. not including the pension system of armed forces. In this section. the evolution of the following public pension expenditure aggregate is compared across the baseline and sensitivity scenarios: earnings related pensions (old-age and early pensions. disability and survivors pensions). and non-earnings related pensions.

In the **baseline scenario**. public pension expenditure is projected to increase from 8.3% GDP in 2013 to 10.4% GDP in 2060. which makes an overall increase over the projection horizon of 2.1% GDP.

In the **higher employment scenario** (overall increase of the public pension expenditure over 2013-2060 lower by 0.2 GDP p.p. compared to the baseline scenario). higher employment is contributing to higher GDP. which is the denominator in the expenditure ratio without a concurrent impact on the pension expenditure. In the **higher employment rate of older workers** scenario (-0.3 GDP p.p.). this effect on GDP is strengthened further by comparatively less people being entitled an old-age pension.

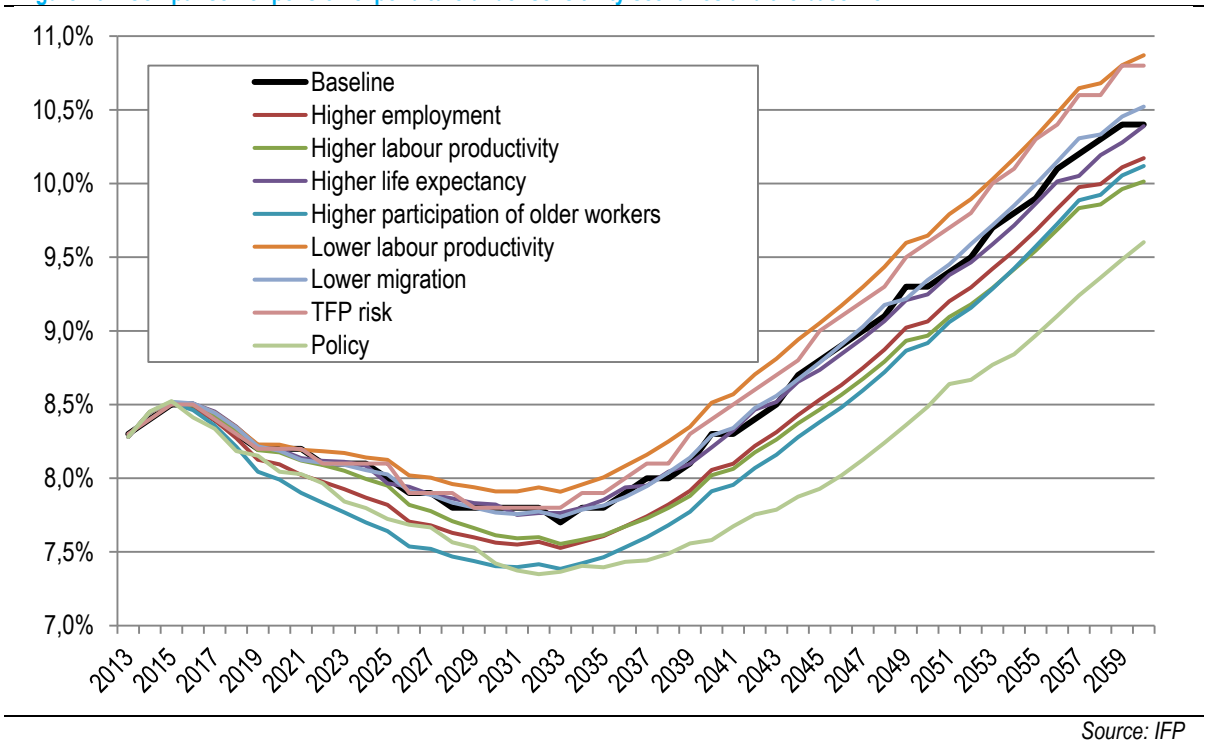
The public pension expenditure ratio is rather sensitive to the assumption about labour productivity. This regards two sensitivity scenarios. **higher labour productivity** (-0.4 GDP p.p. compared to baseline) and **lower labour productivity** (+0.5 GDP p.p. compared to baseline). On the one hand. higher labour productivity implies boost to the GDP growth. On the other hand. it increases the pension benefits through higher wages. In the model. pension benefits are indexed by the CPI inflation. Therefore. the overall impact of higher labour productivity is favourable. owing to the productivity-GDP model channel. In the lower labour productivity scenario. this mechanism works the opposite way.

Projection results are also rather sensitive to the assumption about life expectancy. It matters. however. in what way higher life expectancy is implemented in the simulation. The impact in the **higher life expectancy** scenario is negligible (+0.0 GDP p.p. compared to baseline). By contrast. in the **policy scenario with a dynamic retirement age**. the increase in the public pension expenditure over 2013-2060 would be lower by 0.8 GDP p.p. compared to baseline. The explanation lays in the fact that in the former scenario. life expectancy feeds in much more slowly. through a 5-year moving average formula for the statutory retirement age. just in the same way as in the baseline. In the policy scenario. higher life expectancy boosts the retirement ages directly.

Due to low overall rates of migration. the assumption of a **lower migration** would only result in an additional increase of +0.1 GDP p. p. over 2013-2060 compared to baseline.

Finally. performing a **risk scenario with a lower TFP growth** has been suggested. Causing lower GDP growth. the lower TFP growth will be reflected in the pension expenditure as an additional increase of 0.4 GDP p.p. in 2060 compared to baseline.

Figure 16 – Comparison of pension expenditure under sensitivity scenarios and the baseline



Source: IFP

3.6. Description of the changes in comparison with the 2006. 2009 and 2012 (AR and reform) projections

This chapter describes main drivers to changes in the projection results across the current and the previous projection rounds.

Given that the 2012 pension reform was legislated after the Ageing Report of 2012 was published. Slovakia submitted an update of the pension projection which was peer reviewed and approved by the Comission in April 2013. In the text. we refer to the reform update as to the "previous projection".

Table 16 - Overall change in public pension expenditure to GDP under the2006. 2009. 2012 and 2015 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	1.51	9.03	-2.48	-1.27	-3.13	:	-0.64
2009 **	3.43	11.70	-3.91	-0.56	-2.45	:	-1.35
2012 ***	5.21	13.50	-3.92	-0.48	-2.84	0.002	-1.04
2012 reform update ***	2.66	11.61	-4.46	-0.97	-2.03	0.004	-1.50
2015****	2.15	11.50	-4.31	-0.81	-2.68	-0.01	-1.00

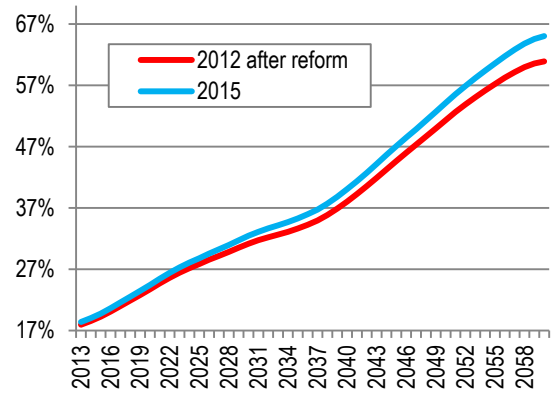
** 2004-2050; ** 2007-2060; *** 2010-2060; **** 2013-2060*
Remark: The 2015 calculation is based on the decomposition in Table 8b (using the number of pensioners)

Source: IFP

Compared to the last projection. the public pension expenditure in the current projection round will be slightly lower in 2060. and the projected slope is flatter. starting from a higher ratio in 2013. As in the previous projection round. the dependency ratio is the main driving force of the pension expenditure increase. The coverage ratio and employment again have a mitigating effect on the pension expenditure. though not as strong as in the previous round. due to less favourable demographic and macroeconomic assumptions.

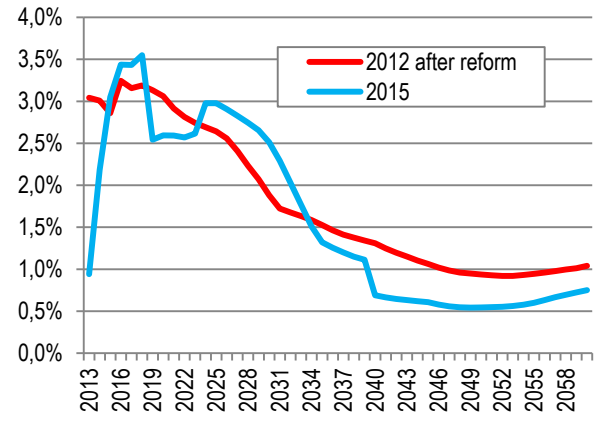
Current projection features a worsened demography profile with a higher dependency ratio over the whole projection horizon.

Figure 17 - Old age dependency ratio - comparison



Source: IFP

Figure 18 - Real GDP growth - comparison

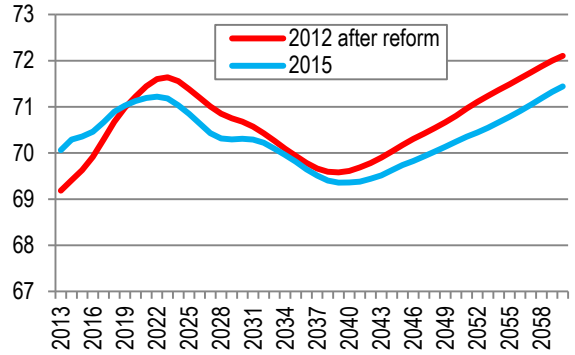


Source: IFP

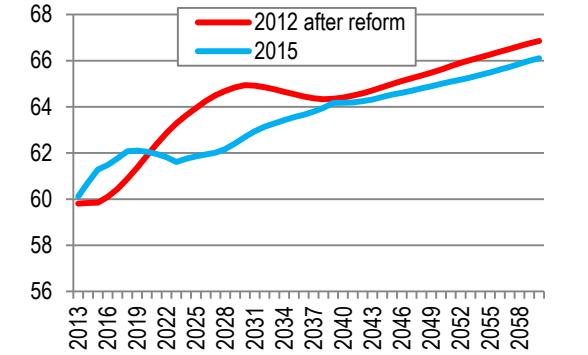
The average employment rate and participation rate of persons 20-64 is projected to be lower by 0.7 p.p. and 0.4 p.p.. respectively. and average GDP growth by 0.2 p.p. The contribution of the CPI inflation is mitigating as it is lower by 0.1 p.p.

Figure 19 - Participation rate (15-64) - comparison

Figure 20 - Employment rate (15-64) - comparison



Source: IFP



Source: IFP

Change in the modelling has had a negative (decreasing) impact on the change in the pension expenditure ratio. The projection results are very sensitive to changes in new pensioners profiles. The sample of new pensioners is rather small and since there is a transition period of moving retirement age in course. it is difficult to use more consecutive years in order to increase the sample size.

Table 17 - Decomposition of the difference between 2009 and the new public pension projection (% of GDP)

	2010	2013	2020	2030	2040	2050	2060
Ageing report 2012 (after reform)	8.0	8.0	8.0	8.1	8.5	9.5	10.6
Change in assumptions	:	0.0	0.0	-0.1	0.0	0.2	0.3
Improvement in the coverage or in the modelling	:	0.3	0.2	-0.2	-0.2	-0.4	-0.5
Change in the interpretation of constant policy	:	:	:	:	:	:	:
Policy related changes	:	:	:	:	:	:	:
New projection	:	8.3	8.2	7.8	8.3	9.3	10.4

Source: IFP

3.7. Decomposition of the impact of recent reforms

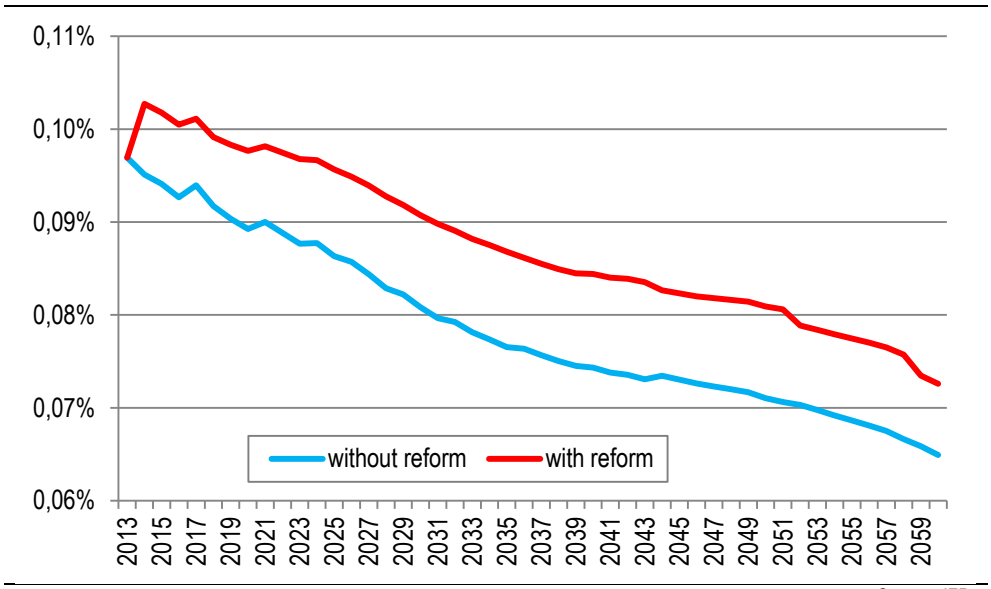
This chapter quantifies the impact of the recent reforms comparing with the no policy scenario.

2014 reform of the Christmas bonus

The 2014 reform raised the maximum amount of **Christmas bonus** that can be received. On the other hand. it also increased the coefficient that determines the decrease in the benefit with increasing pension income. The overall fiscal impact thus depends on the income profile of pensioners.

Long-term impact of the reform on the expenditure is projected to be slightly positive – the expenditure in 2060 will increase from **0.065 to 0.073% of GDP**. Compared to other expenditure in the universal system. these values are rather small.

Figure 21 - Pension expenditure projections. effect of the Christmas bonus reform



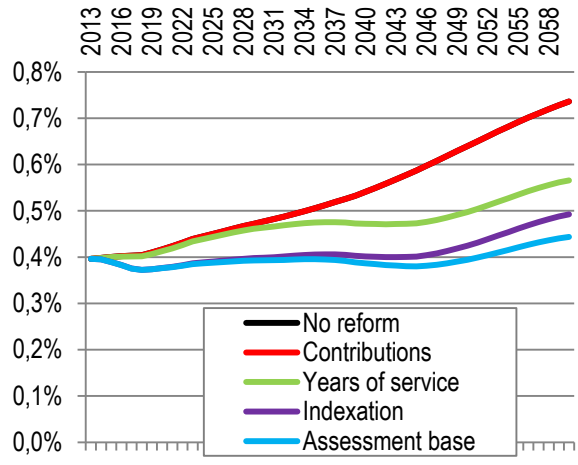
Source: IFP

2013 reform of the system of armed forces

Unlike the previous projection rounds. the current projection explicitly quantifies pensions of the **armed forces**.

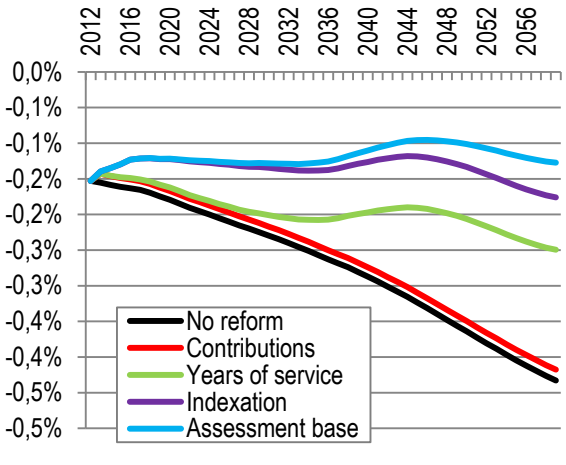
The following graphs illustrate the cumulative impact of individual measures of the 2013 pension reform on pension expenditure of the armed forces but also on the financial balance of the system (since also revenues are affected).

Figure 22 - Pension expenditure projections. effects of reform decomposition – system of armed forces



Source: IFP

Figure 23 - Pension system balance projection. effects of reform decomposition – system of armed forces



Source: IFP

- Increase of the contributory period has the strongest positive effect on the expenditure and the balance of the system. Supported with the change in the pension indexation. these two measures improve the financial sustainability of the pension system significantly.
- Changes in contribution rates have no impact on the expenditure as the gross replacement rate does not depend on these rates. Changes in assessment base have the smallest impact.
- The reform lowered the expenditure in 2060 from **0.74 to 0.44% of GDP** and improved the balance of the system from **-0.43 to -0.13% of GDP**. Compared to the universal system. these values are rather small.

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

4.1. Institutional context

The model of the Slovak pension system (**SLOPEM)** was developed by Mr. Ludovit Odor. In addition. there are two models for the system of armed forces. one for the **police** and one for the **army**. They were developed by Mr. Ludovit Odor and the Council for Budget Responsibility (an independent body for monitoring and evaluating the fiscal performance of the Slovak Republic). The projections are run by the Ministry of Finance. The models were developed in order to run long-term projections and to simulate the impact of changes in relevant parameters of the current system. The projections have not been subject to any national peer review in Slovakia.

4.2. Assumptions and methodologies applied

SLOPEM

- The model takes fully into account AWG assumptions as supplied by Eurostat and the Comission.
- Pension benefits are divided into 4 schemes by gender (old age pensions. disability pensions. widow/er pensions. and orphans' pension).
- Model does not work with age specific earnings profile – average wage is used for all age cohorts.
- The average contributory period reflects the increase in the retirement age.
- The first pillar pensions are indexed according to law (i.e. pensioners' CPI estimated as CPI+0.003). while minimum pensions (social assistance) are fully indexed to wages.
- Contributory period estimated from empirical data is assumed to converge towards the CSM output calculated by the Commission.
- Model assumes 10% voluntary entry rate to the second pillar based on the empirical evidence.

ARMED FORCES

- The models take into account those of the AWG assumptions that are applicable to the system.
- Pension benefits are divided into 5 schemes not differentiated by gender (retirement pensions. temporary pensions. disability pensions and widow/er and orphans' pension).
- Models do not work with age specific earnings profile – average wage is used for all age cohorts.
- The average contributory period reflects the legislated minimum contributory period and makes assumption on how the employees will leave the system after changes in the law.
- The number of contributors (active members) of the system of armed forces are estimated as weighted average of two scenarios: status quo and constant number of active members per capita of the whole population.

4.3. Data used to run the models

SLOPEM

The data used in the model have been provided by the Social Insurance Agency. which collects contributions and pays out all first pillar benefits. The model uses the following data:

- The number of pensions disaggregated by type of pension. age. gender and income bracket.
- The number of new pensions by type of pension. age and gender. and income bracket.
- The number of contributors by gender and income bracket.
- The number of the second pillar participants by age.
- Assumptions about the macroeconomic framework and population projection are those of the AWG.

ARMED FORCES

The data used in the models have been provided by the Ministry of Interior for the police and the Ministry of Defence for the army. The model uses the following data:

- The number of pensions disaggregated by type of pension. age and income bracket.

- The number of new pensions by type of pension. age and gender. and income bracket.
- The number of contributors by income bracket.
- Assumptions about the macroeconomic framework and population projection are those of the AWG.

4.4. Reforms incorporated in the models

The model takes into account the 2005's introduction of the second pillar together with further significant reforms of the pension system adopted later. The 2012 pension reform takes into account very significant parametric changes of the first pillar and also changes in the second pillar. The 2014 amendment determining the pay-out from the second pillar did not require any additional modifications of the model. Changes in Christmas bonus formula have been incorporated in this projection. The models of armed forces count fully with the 2013 reform.

4.5. General description of the models

Both models are cohort-based simulation models written in MATLAB. The SLOPEM model covers the first pillar of the universal pension system but calculates partly also the second pillar. At the same time it calculates also social assistance to those with pension below minimum subsistence level. and the Christmas bonus. The models for the armed forces cover majority (cca 85%) of the pension system of the armed forces.

4.6. Planned future developments

- Fully cover projections for 2nd pillar of universal pension system.
- Fully merge projections for pensions of armed forces system with those of the universal system.
- Use age-specific earnings profiles in the models.

ANNEX - PENSION FORMULAS

Old-age pension formula

$$\mathrm{OP} = \mathrm{APPV\ x\ T\ x\ CPPV}$$

OP = old age pension benefit (monthly).
APPV = Average pension point is the lifetime average of pensioner's wages (in each year of the career) relative to average wage in the economy in that year. e.g. if someone's wage was equal to average wage over the entire career. the APPV will be 1. Maximum value of the APPV is 3. APP is subject to solidarity adjustment.
T = number of years of the working career.
CPPV = current pension point value is a value in terms of money for one APP

$$\mathrm{APPV} = \frac{1}{\mathrm{t}} \sum_{1}^{\mathrm{t}} \frac{\mathrm{individual's\ wage_t}}{\mathrm{average\ age\ in\ economy_t}}$$

Deferred old age pension in the first pillar

After reaching the retirement age. the economic activity affects the amount of pension.

$$\mathrm{OP'} = (\mathrm{OP} + \mathrm{OP_1})\ \mathrm{x}\ (1 + \%)$$
$$\mathrm{OP_1} = \mathrm{PP\ x\ CPPV}$$

OP´ = total sum of the pension.
OP = the amount of pension acquired at the date of reaching the retirement age.
OP_1 = the amount of pension acquired by the economic activity at the date of reaching the retirement age.
% = 0.5% for every 30 days of the economic activity after reaching the retirement age i.e. 6% per year.

Early old age pension in the first pillar

The entitlement for early old-age pension arises to an insured person who:

- Has been old-age insured for at least 15 years
- Has less than 2 years missing until reaching statutory retirement age
- Becomes eligible for early old-age pension that is higher than 1.2 x minimum level of subsistence for one adult
- As of January 2011. it is not possible to receive early old age pension and work at the same time.

$$\mathrm{EOP} = \mathrm{OP\ x\ (1\ -\ \%)}$$

EOP – early old-age pension.
OP = the amount of pension acquired at the date of reaching the retirement age.
% = 0.5% for every 30 days of the economic activity before reaching the retirement age i.e. 6% per year.

Disability pension in the first pillar

Calculation of the disability pension for a person with a 41%-70% decline of work capability:

$$\mathrm{DP} = [\mathrm{APPV\ x\ (T + T_1)\ x\ CPPV}]\ \mathrm{x\ M}$$

Calculation of the disability pension for a person with more than 70% decline of work capability:

$$DP = APPV \times (T + T_1) \times CPPV$$

DP = disability pension.
APPV = *average pension point value.*
T = number of years of insurance as of the date of the rise of disability.
T_1 = number of years of insurance from the rise of disability until reaching the retirement age.
CPPV = current pension point value.
M = percentage rate of reduction in the capacity to carry out gainful activity.

Initial determination of the current pension point value in 2004

$$PP2004 = \frac{RR\% \times AW2003}{Years} \quad \ldots\ldots\ldots\ldots\ldots 4{,}72 = \frac{50\% \times 377{,}75}{40} \; in\ EUR$$

PP2004 – current pension point value in 2004
RR% - replacement rate (gross pension over gross average wage)- set at 50%
AW2003 - Average wage in the economy (estimated at the time of writing law)
Years – years of service
1 EUR = 38.879 SKK