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COMMISSION STAFF WORKING DOCUMENT

Eurostat study on the long-term budgetary implications of pension costs

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1. Introduction

Following the reform of the *Staff Regulations of Officials and Conditions of Employment of other Servants of the European Union* (SR reform),¹ which entered into force on 1 January 2014, the Council asked² the Commission to update the 2010 Eurostat study on the long-term budgetary implications of

¹ The SR Working Party's request focused on the impact of amendments to the SR introduced by Regulation (EU, Euratom) No 1023/2013, the temporary non-application of the salary adjustment 'method' and the 5 % reduction of staff in all institutions, bodies and agencies to be effected between 2013 and 2017 under the Inter Institutional Agreement of 2 December 2013 (between the European Parliament, the Council and the Commission) on budgetary discipline, cooperation in budgetary matters and sound financial management.

² Council SR Working Party meeting of 4 December 2014.

the pension costs of staff in all EU institutions and agencies.³ The Commission agreed to do so in due course.

This study addresses the major trends in staff pension expenditure over the 50-year period 2015-2064. A projection of such length is normal actuarial practice and many Member States have conducted studies covering similar periods.⁴ Taking such a long-term view enables us to assess the full impact of current circumstances, which will continue to unfold over that time.

The parameters and actuarial assumptions underlying this study cover the whole period of the projection. However, their interlinkages and certain short-term implications are not entirely captured, so that the study cannot be used as a basis for forecasting exact pension expenditure in the short or medium term.

Due to the 50-year projection period, the calculations are highly sensitive to the assumptions used in the model.

Eurostat has analysed the impact of the 2013 SR reform on future Pension Scheme of European Officials (PSEO hereinafter) expenditure by isolating the main parameters affected by it that have material effects on pension expenditure. In a second stage, it has compared the evolution of the PSEO expenditure developments on the basis of parameters applying:

- before the 2013 SR reform ('test version' or hypothetical scenario without the 2013 SR reform); and
- after the 2013 SR reform ('current version' or real scenario).

The difference between the two sets of results ('test version' minus 'current version') represents the estimated pension expenditure savings attributable to the 2013 SR reform parameters in question.

2. Main concepts

2.1. The PSEO has a sound legal basis in the Staff Regulations

Under Article 83 SR:

- the benefits paid under the pension scheme are to be charged to the Union budget;
- Member States are to jointly guarantee the payment of the benefits; and
- officials are to contribute one third of the cost of financing the scheme.

Article 83a and Annex XII SR set out the actuarial rules for computing the contribution rate in order to ensure that the scheme is in balance. The benefits to be paid under the scheme are laid down in Chapter 3 of Title V and Annex VIII SR.

2.2. The PSEO is a notional (virtual) fund with defined benefits, in which staff's contributions serve to finance their future pensions

The PSEO functions as a notional fund with defined benefits.⁵ Although there is no actual investment fund,⁶ the amount that would have been collected by such a fund is considered to have been invested in

³ SEC(2010) 989 final.

⁴ *The 2015 Ageing Report: Economic and budgetary projections for the EU-28 Member States (2013-2060)*, DG ECFIN European Economy series 3/2015.

⁵ A defined benefit plan is a pension plan that generally defines an amount of pension benefit that an employee will receive on retirement, usually dependent on one or more factors, such as age, years of service and remuneration.

the Member States' long-term bonds⁷ and is reflected in the pension liability (see section 2.4). Member States jointly guarantee the payment of the benefits pursuant to Article 83 SR and Article 4(3) of the Treaty on European Union.

As the PSEO is designed as a notional fund, staff contributions serve to finance the future pensions of those contributing. The contributions actually cover the cost of the pension rights acquired in a given year and are in no way linked to that year's pension expenditure. EU case-law⁸ has confirmed that the PSEO is a notional fund, despite finding that it also displays some features of a solidarity scheme.⁹

The PSEO is different from most Member State pension schemes for public officials, in which the contribution rate or benefits are adjusted so as to ensure a balance each year between contributions collected and pension expenditure. In this type of scheme, if it is not possible to achieve a balance, the difference is covered from the budget (taxes).

The notional PSEO fund is assessed annually and every five years as if a real fund existed; this represents a further guarantee of its long-term sustainability.

2.3. The PSEO is designed to be in actuarial balance by default through the rate of contribution to the scheme and pensionable age

The balance of the PSEO is ensured regularly through adjustments to contribution rates and, where relevant, pensionable age.

The PSEO follows an actuarial balance principle whereby annual staff contributions have to cover a third of the rights acquired in the year in question,¹⁰ which correspond to the future pensions that the same staff will receive after retirement, plus (under certain conditions) invalidity allowances and survivor's and orphans' pensions. In order to make this computation¹¹ possible, the contributions are evaluated at present value using an interest (discount) rate. The computation is thus an actuarial valuation.

The pension contribution rate is the mechanism that keeps the scheme in balance from year to year. It is automatically updated if the actuarial assessment of the parameters laid down in the SR shows that this is necessary in order fully to cover the pension rights acquired in a given year. Consequently, when staff members pay the updated contribution rate, they acquire pension rights for a given year protected by the principle of acquired rights.

The 2013 SR reform established pensionable age as the second variable for balancing the system. In particular, the Commission was mandated to carry out a five-yearly assessment of pensionable age, taking into account developments affecting Member States' civil servants and EU staff's life

⁶ The European Coal and Steel Community (ECSC) had a pension fund, but it was dismantled and replaced by the notional fund upon the merger of the institutions of the Communities. The notional fund for the European Economic Community was put in place with the adoption of the Staff Regulations in 1962.

⁷ On the basis of the observed average annual interest rates on the long-term public debt of the Member States, as provided for in Article 10 of Annex XII SR.

⁸ See, for example, Case F-105/05 *Wils v Parliament*, point 85 and Case T-439/09 *Purvis v Parliament*, point 45.

⁹ See Case T-135/05 *Campoli v Commission*, point 134.

¹⁰ Article 83(2) SR.

¹¹ The pension contribution rate is computed according to the 'projected unit credit' method, as prescribed by international accounting standard IPSAS 25. The sum of the actuarial values of rights acquired by active members of staff (referred to in actuarial practice as 'service cost') is compared with the annual total of their basic salaries in order to calculate the contribution rate.

expectancy.¹² The Commission is due to deliver its first report to the European Parliament and the Council in 2019.

2.4. The PSEO liability is guaranteed jointly by the Member States

2.4.1. PSEO's liability is not funded

Although staff contribute, from their salaries, a third of the expected cost¹³ of the pension benefits that they will receive on retirement, the PSEO as such is not funded. Pursuant to Article 83 SR, PSEO benefits are charged to the Union budget and the Member States guarantee their payment jointly in line with the scale laid down for financing such expenditure.

2.4.2. Calculation of liability

Every year, Eurostat calculates the liability recognised in the Union budget (the 'defined benefit obligation' – DBO), using the 'projected unit credit' method.¹⁴ The liability recognised in the balance sheet is the present value of the DBO at the balance sheet date. This is determined by discounting estimated future cash outflows using interest rates applying to government bonds that are denominated in the currency in which the benefits will be paid and have terms to maturity approximating the terms of the related pension liability.¹⁵

2.4.3. The historical accumulation of the PSEO liability

Under the notional fund approach, staff contributions have not been set aside in an actual pension fund, but have been credited to the EU budget at the time when they were collected and spent in accordance with the decisions of the budgetary authority, i.e. not assigned to any particular policy field. Under the new PSEO, it was decided that the employer's share of the contribution would not be collected; instead, the EU institutions undertook to pay future pension benefits (to be charged to the Union budget) when staff retire.

In budgetary terms, the PSEO has produced net revenue in the past, as it is not yet mature, i.e. the contributions from active staff acquiring pension rights have outweighed the benefits drawn by a limited number of retirees or invalids. PSEO revenue has consisted of staff and employer contributions; the latter were not paid into a fund, but only reflected in the pension liability. In this way, the EU budget was actually borrowing money from scheme members in return for a guarantee to pay future benefits.

The balance of amounts borrowed and amounts repaid is reflected in the pension liability.

¹² Article 77(6) and 77(7) of the SR.

¹³ The expected cost is determined according to a set of specific rules and assumptions defined in the SR.

¹⁴ The valuation is carried out in accordance with IPSAS 25, under which the employer determines its actuarial commitment on an ongoing basis, taking into account promised benefits during employees' active lifetime and foreseeable salary increases.

¹⁵ The DBO of the PSEO at 31 December 2014 was valued at around EUR 57 billion. It is calculated according to international accounting standards (IPSAS 25) and is strongly influenced by the inherent volatility of the real discount/interest rate, which corresponds to a market value at 31 December of each year. For instance, most of the increase of the liability between 2013 and 2014 (from EUR 45 billion to EUR 57 billion) is due to the decrease of the real discount rate from 1.8 % on 31 December 2013 to 0.7 % on 31 December 2014. All other parameters being equal, if the interest rate was to rise to 1.8 % on 31 December 2015, the liability would go down to its 31 December 2013 value. The interest rate used for calculating the DBO (market value on the last day of the year) is different from the one computed annually for calculating the rate of contribution to the pension scheme. In the latter the interest rate is foreseen by in Article 10 of Annex XII to the SR; it is based on a long-term moving average which decreases the volatility of the calculations.

2.4.4. The two recent reforms aimed to keep PSEO in line with the key requirements of an adequate and sustainable pension scheme

The EU pension scheme has been through two substantial reforms in less than 10 years, in 2004 and 2013, both of which have had an impact on various parameters of the scheme, e.g. by reducing pension entitlements and raising the age of retirement.

The main elements of the 2013 reform that are designed to reduce pension expenditure are:

- a higher pensionable age;
- a lower yearly pension rights accrual rate;
- a new category of staff with lower starting salaries; and
- slower career paths.

The financial impact of the 2013 reform, in terms of expenditure savings, is the subject of this study.

3. Key parameters affected by the 2013 SR reform

The Eurostat study assesses the effect of the four parameters affected by the 2013 SR reform that have the biggest impact on pension expenditure. It estimates the extra pension costs that would have been incurred by 2064 without those changes. The parameters are as follows:

- **pensionable age:** the normal pensionable age is 66 years for staff recruited after 1 January 2014, with transition measures for staff recruited before that date (Article 52 SR and Article 22 of Annex XIII SR);
- **annual accrual rate** of 1.8 % for staff recruited after 1 January 2014, 1.9 % for staff recruited between 1 May 2004 and 31 December 2013, and 2.0 % for staff recruited before 1 May 2004 (Article 77(2) SR and Article 21 of Annex XIII SR);
- **temporary non-application of the salary ‘method’** and the creation of a **new AST/SC** (clerical and secretarial) **function group** (Articles 5, 65(4) and 66 SR); and
- **new AST and AD career structure** – access to grades AD13 and AD14 is possible only via a selection procedure for officials not assigned to ‘head of unit or equivalent’ or ‘adviser or equivalent’ posts; similarly, access to grades AST10 and AST11 (senior assistant) is available for the best-performing assistants who pass a selection procedure and bear a high degree of responsibility (Article 45(1) and Annex I SR).

The interdependence of these parameters means that analysing their impact *ceteris paribus* may lead to biased results. Nevertheless, despite the potential statistical uncertainty, section 7 (synthesis of the simulations) estimates specific impacts on the basis of:

- a ‘test’ scenario (fictional situation without the 2013 SR reform); and
- a ‘current’ scenario based on population and expenditure forecasts following the 2013 reform.

4. Actuarial assumptions

Actuarial assumptions have a fundamental influence on the long-term projections. Those made in this study were developed in conjunction with DG HR, are consistent with accepted actuarial practice and were validated by independent experts.

4.1. Literature

Actuarial literature¹⁶ is unanimous in asserting that projections are highly unlikely to prove totally accurate; the reality will be different. The actual values of the parameters may differ from those assumed and there will be stochastic variations around the parameters.

Long-term projections require long-term assumptions. Unfortunately, long-term average rates are unpredictable, so this is not a prediction but an assumption; we must emphasise the **hypothetical nature of a long-term pension cost analysis**.

‘The purpose of a pension forecast is to test the future cost impact of some expected or proposed changes. The emphasis is on the future trend of the cost. Forecast results should be shown as estimates. Each individual item (e.g. liabilities, benefit payments, assets, etc.) may differ greatly from that produced by a subsequent valuation. It is not necessary, and it is often misleading, to provide detailed results for each forecast year.’¹⁷

The suitability of ‘actuarial methods’ for producing projections in relation to social security pension schemes has been outlined by Crescentini and Spandonaro (1992),¹⁸ among others. In particular, the ‘component method’ involves breaking the population down into components and simulating the evolution of each component over time. The extent of the breakdown depends on the availability of data and computing capacity; the minimum required is by:

- category (active staff, retirees, invalids, widows and orphans);
- gender; and
- age.

Further detail is justified only if it is expected to lead to a commensurate increase in the precision of the projections.

The methodology has to be tailored to the complexity of the assumptions. It can be simplified depending on the assumptions, which should be kept as simple as possible unless there are valid grounds to do otherwise.

4.2. Demographic assumptions

4.2.1. Population

The population at the beginning of the projection exercise is made up of individuals in the PSEO database¹⁹ at 31 December 2014. Active staff include officials, temporary agents, contract agents and parliamentary assistants. Pensioners include retirees, deferred pensioners, recipients of an invalidity pension, recipients of an invalidity allowance, widows and orphans.

The total PSEO population was split into 3 022 homogeneous classes (‘population aggregates for projection purposes’ – PaPs) on the basis of:

¹⁶ See, for instance, Subramaniam Iyer, *Actuarial mathematics of social security pensions*, Quantitative Methods in Social Protection Series, International Labour Office (ILO) and International Social Security Association (ISSA), 1999.

¹⁷ Sze M, ‘The process of pension forecasting’, *Journal of Actuarial Practice* vol. 1, No. 1, 1993.

¹⁸ Crescentini Laura, Spandonaro Federico, *Methodological developments in forecasting techniques*, 1992.

¹⁹ The PSEO database is maintained, updated annually and managed by the pension team in Eurostat (Unit C.3).

- administrative status;
- applicable SR depending on the date of recruitment;
- contract type;
- contract length;
- function group; and
- age.

We used the ‘open group’ approach, whereby new entrants are allowed to enter the PSEO population throughout the projection exercise.

It is widely accepted actuarial practice when carrying out such exercises to put in place some simplifications. This study (like that in 2010) disregards future EU enlargements, mainly due to their very low predictability in terms of occurrence and extent. Also, there has been only one enlargement since 2010 (when the previous study was released). Such a stable framework is realistic and allows us to isolate and gauge the impact of the current population structure on future pension expenditure.

In addition, the staff reductions provided for in the Interinstitutional Agreement for the remainder of the 2013-2017 period were factored into the calculation.

The 2013 SR reform introduced the new ‘secretaries and clerks’ (AST/SC) function group.

In the light of these factors, the growth rate of the active population has been set at -3 % for the whole projection period. The population at the beginning of the period incorporates the staff reductions already implemented under the Interinstitutional Agreement.

4.2.2. Population transitions

The first step in the projection is to estimate the number of individuals in each population sub-group at discrete time points (year 0 to 50), starting from given initial values as at 31 December 2014.

Death, invalidity, retirement and staff turnover are events that have a negative demographic impact and determine a ‘population transition’ from one population class to another. For each of the 50 years under analysis, new entrants are introduced to keep the active population stable; this is done on the basis of the following formula:

$$\text{number of newcomers at } T_n = \text{number of active members leaving between } T_{n-1} \text{ and } T_n$$

4.2.3. Active staff

This study assumes that the active population will remain constant over the 2014-2064 periods, except in 2015, 2016 and 2017, when staff reductions are implemented.

4.2.4. Life tables

We used the ‘life table’ that was used in 2014 for calculating the pension liability and contribution rate: the International Civil Servant Life Table 2013 (ICSLT 2013).²⁰ This is a prospective (dynamic) mortality

²⁰ This is the outcome of a joint project between Eurostat and the OECD’s International Service for Remunerations and Pensions (ISRP). Eurostat’s Article 83 SR Working Group adopted it at its June 2014 meeting.

table applied to the whole population; in particular, separate life tables are used for the male and female populations.

The 2013 ICSLT is brought forward three years for disabled staff, in line with common actuarial practice, which assumes that such persons die at a slightly younger age than healthy persons.

The life table has to be updated only on the occasion of the five-yearly actuarial assessment in 2018.²¹

No specific rules relating to life tables were directly affected by the 2013 SR reform, so no direct savings are expected from this item.

4.2.5. Invalidation tables

We used the EU 2013 invalidity table, which takes account of age-related probabilities of becoming disabled.

The calculations differentiate between recipients of an invalidity pension under the SR before 1 May 2004 and recipients of an invalidity allowance as created by the 2004 SR reform (with less favourable conditions, especially with respect to the calculation of financial entitlements).

No specific rules relating to the invalidity tables were directly affected by the 2013 SR reform, so no savings are expected to stem directly from this item.

4.2.6. Deferral tables

Staffs who have contributed to the PSEO for at least 10 years are entitled to a pension deferred to the point at which they reach pensionable age. Deferral tables set out the probabilities of an active member becoming entitled to a deferred pension (deferral rates).

4.2.7. Retirement tables

Retirement tables set out the probabilities of an individual retiring before a certain age. These depend on individual circumstances, in particular, the date of recruitment. Also, different applicable accrual rates affect the period of service needed to reach the 70 % ceiling for computing the retirement pension (35, 36.8 or 38.9 years).

Obviously, apart from legal provisions, individual choices will determine the actual behaviour of staff once they have reached their minimum retirement age.

The additional expenditure without the 2013 SR reform is estimated on the basis of changes as regards pensionable age.

4.2.8. Widow rates

The surviving spouse of an active staff member, retiree, deferred pensioner or invalid is entitled to a survivor's pension under certain conditions laid down in Annex VIII SR. Widow rates are the probabilities of widows entering the scheme when the member is a given age.

No specific rules relating to widow rates were directly affected by the 2013 SR reform, so no savings are expected to stem directly from this item.

²¹ See Article 9(2) of Annex XII SR.

4.2.9. Orphan rates

The death of a PSEO member may mean that an orphan's pension has to be paid to his/her surviving children. Orphan rates are the probabilities of a member dying and an orphan entering the scheme.

No specific rules relating to orphan rates were directly affected by the 2013 SR reform, so no savings are expected to stem directly from this item.

4.2.10. Recruitment policy

The active population is basically kept stable throughout the projection period, except that:

- due to the staff reductions, the population of active members falls by 1 % a year between 2015 and 2017; and
- with the introduction of the new AST/SC function group, secretaries and clerks will gradually replace assistants over the first 20 years of the exercise.

The additional expenditure without the 2013 SR reform is estimated by excluding these two factors.

4.2.11. Turnover rate

Staff turnover can be involuntary (e.g. due to expiry of a contract) or voluntary (e.g. resignation). Voluntary turnover is generally expected to be higher among younger staff. In the case of the PSEO, turnover also varies according to function group (the rate will clearly be higher among contract agents than among administrators).

No specific rules relating to turnover rates were directly affected by the 2013 SR reform, so no savings are expected to stem directly from this item.

4.2.12. Age of new entrants

No specific rules relating to age at recruitment were directly affected by the 2013 SR reform, so no savings are expected from this item.

4.3. Economic assumptions

4.3.1. General salary growth (GSG)

Salaries are updated annually in line with Article 65 SR and according to the calculation method in Annex XI SR, using a 30-year moving average of annual general salary growth (GSG).

In 2011-2014, there was a salary freeze and the updates applied differed from those calculated under the salary method.

The additional expenditure without the 2013 SR reform is estimated on the basis of the difference between:

- the 30-year moving average of calculated GSG (applying the results of the salary method or in other terms without salary freeze); and
- the 30-year moving average of applied GSG (applying the actual adjustments for the years 2011 to 2014 or in other terms with salary freeze).

4.3.2. Salary progression

Salary progression depends on step advancements and promotions. While the former generally come after a fixed period of two years (Article 44(1) SR), the latter come after a variable number of years in the same grade and are based on comparative merit (Article 45 and Annex I SR).

We used average salary progression rates by function group.

The additional expenditure without the 2013 SR reform is estimated on the basis of:

- amendments to average career rates under Table B.1 in Annex I SR (for administrators and assistants);
- specific slower average career rates under Table 2 in Annex I SR (for secretaries and clerks);
- slower average career rates proposed by DG HR to reflect actual career prospects; and
- new career limitations for AD12, AD13 and AST9 staff.²²

4.3.3. Basic salaries at recruitment

For the purposes of the projection, we used basic salaries at recruitment, as set by the legislator.²³

The additional expenditure without the 2013 SR reform is estimated by:

- incorporating the hypothetical salary adjustments described in section 4.3.1; and
- applying the basic salaries of AST members to the members of the AST/SC function group (assuming that the AST/SC group had not been introduced with the 2013 SR reform and that ASTs are recruited to perform clerical and secretarial duties).

4.3.4. Pension accrual rate

The yearly pension accrual rates are linked to the date of entry into service.

The additional expenditure without the 2013 SR reform is estimated on the basis of the impact of the fictitious application of a 1.9 % yearly rate to staff recruited after 2014.

4.3.5. Inflation rate

The forecast is made at constant prices (to improve comparability over the years) by isolating the variables that have a real influence on pension expenditure, i.e. population structure and the long-term impact of the 2013 SR reform.

5. Results

5.1. Key findings

The two recent (2004 and 2013) SR reforms amended a number of legal provisions relating to pension expenditure. Some amendments (e.g. the further reduction of the yearly pension accrual rate, from 1.9 % to 1.8 %, and the further rise in pensionable age, from 63 to 66) are specifically designed to reduce the cost of pensions.

²² Articles 30 and 31 of Annex XIII SR.

²³ See Article 66 SR.

Other changes, while not directly related to pension cost, have an impact on the overall cost of pensions by limiting the final salaries on which pension benefits are calculated. These include the creation of the AST/SC function group, lower entry-level salaries, slower or capped career paths, the suspension of the application of the salary 'method' and staff reductions under the Interinstitutional Agreement.

On the assumption that the active population will remain constant once the staff reductions have been fully implemented, the number of PSEO beneficiaries (old-age pensioners, invalids and survivors) will pass from around 21 400 in 2014²⁴ to about 49 100 in 2064 (see Table 2), an overall increase of 129 %.

The annual pension expenditure (at constant prices) will peak in 2046, when it is expected to reach EUR 2 284 million, before falling to EUR 1 873 million in 2064 (see Table 8).

The simulation also shows that, without the 2013 reform, expected additional pension expenditure would have been markedly (34.3 %) higher (see Table 9).

As mentioned above, the new measures introduced by the 2013 reform are expected to lead to increasing annual cost savings between 2015 and 2064, when they will reach EUR 642 million. Total savings over the 50 years are projected at EUR 19 230 million.

These expected savings are in addition to those from the 2004 reform, as this study has focused only on the impact of changes to the four key parameters under the 2013 reform (see section 3).

5.2. Evolution of the population

5.2.1. Projection of the active population

The active population is assumed to remain constant throughout the period, except for the 1 % staff reductions between 2015 and 2017. Active staff numbers will pass from 58 565 in 2014 to 56 808 in 2064 (end of the projection timeframe).

²⁴ In this study, population data always refer to 31 December of a given year; expenditure is for the whole year.

Table 1: Active population

Active Population		
Category	Number in 2014	Number in 2064
Officials	36 057	34 975
Temporary staff	9 460	9 176
Contract staff	11 361	11 020
Parliamentary Assistants	1 687	1 636
Total	58 565	56 808

5.2.2. Projection of non-active population

The number of non-active members (retirees, disabled staff, survivors) is expected to increase by 129 % over the 50-year period, which is equivalent to a 2.6 % linear annual increase. The highest yearly increase occurs at year 11th of the projection, while the total of retirees remains practically stable in the last decade.

Table 2: Non-active population (retirees + invalids + survivors)

Year of projection	Retirees+Invalids+Survivors	Yearly Change	Year of projection	Retirees+Invalids+Survivors	Yearly Change	Year of projection	Retirees+Invalids+Survivors	Yearly Change
2014	21 385	0.0 %	2031	33 599	2.8 %	2048	46 329	0.8 %
2015	21 599	1.0 %	2032	34 460	2.6 %	2049	46 701	0.8 %
2016	21 872	1.3 %	2033	35 377	2.7 %	2050	47 011	0.7 %
2017	22 201	1.5 %	2034	36 156	2.2 %	2051	47 315	0.6 %
2018	22 631	1.9 %	2035	36 868	2.0 %	2052	47 555	0.5 %
2019	23 229	2.6 %	2036	37 519	1.8 %	2053	47 773	0.5 %
2020	23 888	2.8 %	2037	38 181	1.8 %	2054	47 987	0.4 %
2021	24 675	3.3 %	2038	38 849	1.7 %	2055	48 193	0.4 %
2022	25 508	3.4 %	2039	39 536	1.8 %	2056	48 383	0.4 %
2023	26 303	3.1 %	2040	40 315	2.0 %	2057	48 551	0.3 %
2024	27 148	3.2 %	2041	41 202	2.2 %	2058	48 711	0.3 %
2025	28 089	3.5 %	2042	42 100	2.2 %	2059	48 837	0.3 %
2026	29 019	3.3 %	2043	42 998	2.1 %	2060	48 920	0.2 %
2027	29 941	3.2 %	2044	43 895	2.1 %	2061	48 990	0.1 %
2028	30 889	3.2 %	2045	44 800	2.1 %	2062	49 035	0.1 %
2029	31 822	3.0 %	2046	45 440	1.4 %	2063	49 065	0.1 %
2030	32 672	2.7 %	2047	45 944	1.1 %	2064	49 067	0.0 %

5.3. Pension expenditure

The estimate of pension expenditure over 50 years covers pension-related expenditure under Chapters 2, 3 and 4 of Annex VIII SR (Retirement Pension, Transfers Out and Severance Grant, Invalidation Pension/Allowance, Survivor's Pensions).

The tables below show the major expected trends in 2015-2064. Tables 3 to 8 give projected expenditure broken down as follows:

- Table 3: retirement pensions;
- Table 4: invalidity pensions and allowances;

- Table 5: survivor's pensions;
- Table 6: retirement, invalidity and survivor's pensions;
- Table 7: transfers out and severance grants; and
- Table 8: total pensions.

5.3.1. Retirement pension expenditure

Table 3: Projection of retirement pension expenditure (EUR million)

Year of projection	Retirement Pension Expenditure	Yearly Change	Year of projection	Retirement Pension Expenditure	Yearly Change	Year of projection	Retirement Pension Expenditure	Yearly Change
2014	994	0.0 %	2031	1 532	2.9 %	2048	1 787	-1.0 %
2015	993	0.0 %	2032	1 570	2.5 %	2049	1 766	-1.2 %
2016	996	0.3 %	2033	1 606	2.3 %	2050	1 742	-1.4 %
2017	1 005	0.9 %	2034	1 631	1.5 %	2051	1 715	-1.5 %
2018	1 019	1.5 %	2035	1 651	1.2 %	2052	1 688	-1.6 %
2019	1 042	2.2 %	2036	1 667	1.0 %	2053	1 660	-1.7 %
2020	1 071	2.7 %	2037	1 681	0.8 %	2054	1 632	-1.7 %
2021	1 106	3.3 %	2038	1 693	0.7 %	2055	1 604	-1.7 %
2022	1 145	3.5 %	2039	1 703	0.6 %	2056	1 576	-1.7 %
2023	1 184	3.4 %	2040	1 718	0.9 %	2057	1 549	-1.7 %
2024	1 224	3.4 %	2041	1 738	1.2 %	2058	1 522	-1.7 %
2025	1 271	3.8 %	2042	1 758	1.1 %	2059	1 496	-1.7 %
2026	1 315	3.5 %	2043	1 777	1.1 %	2060	1 470	-1.7 %
2027	1 357	3.2 %	2044	1 796	1.0 %	2061	1 445	-1.7 %
2028	1 401	3.2 %	2045	1 813	1.0 %	2062	1 420	-1.7 %
2029	1 450	3.5 %	2046	1 815	0.1 %	2063	1 396	-1.7 %
2030	1 489	2.7 %	2047	1 806	-0.5 %	2064	1 373	-1.7 %

5.3.2. Invalidity pension/allowance expenditure

Table 4: Projection of invalidity pension and allowance expenditure (EUR million)

Year of projection	Invalidity Pension / Allowance Expenditure	Yearly Change	Year of projection	Invalidity Pension / Allowance Expenditure	Yearly Change	Year of projection	Invalidity Pension/ Allowance Expenditure	Yearly Change
2014	189	0.0 %	2031	149	-3.8 %	2048	63	-2.7 %
2015	190	0.6 %	2032	142	-4.3 %	2049	61	-2.3 %
2016	190	0.3 %	2033	137	-4.0 %	2050	60	-1.9 %
2017	191	0.2 %	2034	131	-4.3 %	2051	59	-1.4 %
2018	191	0.2 %	2035	125	-4.6 %	2052	59	-1.1 %
2019	192	0.2 %	2036	119	-4.8 %	2053	58	-0.9 %
2020	192	-0.1 %	2037	112	-5.3 %	2054	58	-0.9 %
2021	191	-0.5 %	2038	106	-5.4 %	2055	57	-0.6 %
2022	190	-0.6 %	2039	101	-5.1 %	2056	57	-0.5 %
2023	188	-1.1 %	2040	95	-5.6 %	2057	57	-0.5 %
2024	185	-1.4 %	2041	90	-5.8 %	2058	57	-0.4 %
2025	180	-2.4 %	2042	84	-6.0 %	2059	56	-0.4 %
2026	176	-2.6 %	2043	80	-5.7 %	2060	56	-0.3 %
2027	170	-3.2 %	2044	75	-6.1 %	2061	56	-0.2 %
2028	166	-2.7 %	2045	70	-5.9 %	2062	56	-0.2 %
2029	160	-3.3 %	2046	67	-4.6 %	2063	56	-0.2 %
2030	154	-3.5 %	2047	65	-3.8 %	2064	56	0.0 %

5.3.3. Survivor's pension expenditure

Table 5: Projection of survivor's pension expenditure (widows + orphans) (EUR million)

Year of projection	Survivor's Pension Expenditure	Yearly Change	Year of projection	Survivor's Pension Expenditure	Yearly Change	Year of projection	Survivor's Pension Expenditure	Yearly Change
2014	141	0.0 %	2031	244	2.6 %	2048	339	1.2 %
2015	148	4.6 %	2032	251	2.6 %	2049	343	1.1 %
2016	154	4.2 %	2033	257	2.6 %	2050	347	1.1 %
2017	160	3.8 %	2034	264	2.5 %	2051	350	1.0 %
2018	166	3.7 %	2035	270	2.4 %	2052	353	0.9 %
2019	172	3.7 %	2036	276	2.3 %	2053	356	0.8 %
2020	178	3.5 %	2037	282	2.2 %	2054	359	0.7 %
2021	184	3.3 %	2038	289	2.2 %	2055	361	0.7 %
2022	190	3.3 %	2039	295	2.1 %	2056	363	0.6 %
2023	195	3.0 %	2040	301	2.0 %	2057	365	0.5 %
2024	201	3.0 %	2041	306	1.9 %	2058	367	0.4 %
2025	207	3.0 %	2042	312	1.8 %	2059	368	0.4 %
2026	213	2.9 %	2043	317	1.7 %	2060	369	0.3 %
2027	219	2.9 %	2044	322	1.6 %	2061	371	0.3 %
2028	226	2.8 %	2045	327	1.4 %	2062	371	0.2 %
2029	232	2.7 %	2046	331	1.4 %	2063	372	0.2 %
2030	238	2.7 %	2047	335	1.3 %	2064	372	0.1 %

5.3.4. Retirement, invalidity and survivor's pension expenditure

Table 6: Projection of retirement, invalidity and survivor's pension expenditure (EUR million)

Year of projection	Ret_Inv_Surv Pension Expenditure	Yearly Change	Year of projection	Ret_Inv_Surv Pension Expenditure	Yearly Change	Year of projection	Ret_Inv_Surv Pension Expenditure	Yearly Change
2014	1324	0.0 %	2031	1 925	2.3 %	2048	2 189	-0.7 %
2015	1331	0.6 %	2032	1 963	2.0 %	2049	2 171	-0.8 %
2016	1341	0.7 %	2033	1 999	1.9 %	2050	2 149	-1.0 %
2017	1355	1.1 %	2034	2 025	1.3 %	2051	2 125	-1.1 %
2018	1377	1.6 %	2035	2 045	1.0 %	2052	2 100	-1.2 %
2019	1406	2.1 %	2036	2 062	0.8 %	2053	2 074	-1.2 %
2020	1440	2.4 %	2037	2 076	0.7 %	2054	2 049	-1.2 %
2021	1480	2.8 %	2038	2 088	0.5 %	2055	2 023	-1.3 %
2022	1524	2.9 %	2039	2 099	0.5 %	2056	1 997	-1.3 %
2023	1567	2.8 %	2040	2 114	0.7 %	2057	1 971	-1.3 %
2024	1610	2.8 %	2041	2 134	1.0 %	2058	1 946	-1.3 %
2025	1659	3.0 %	2042	2 154	0.9 %	2059	1 920	-1.3 %
2026	1704	2.8 %	2043	2 174	0.9 %	2060	1 896	-1.3 %
2027	1747	2.5 %	2044	2 192	0.9 %	2061	1 871	-1.3 %
2028	1792	2.6 %	2045	2 210	0.8 %	2062	1 848	-1.3 %
2029	1842	2.7 %	2046	2 213	0.1 %	2063	1 824	-1.3 %
2030	1882	2.2 %	2047	2 205	-0.3 %	2064	1 801	-1.2 %

5.3.5. Transfers out and severance grant expenditure²⁵

Table 7: Projection of transfers out and severance grants (EUR million)

Year of projection	TrOut+SevGr Expenditure	Yearly Change	Year of projection	TrOut+SevGr Expenditure	Yearly Change	Year of projection	TrOut+SevGr Expenditure	Yearly Change
2014	113	0.0 %	2031	82	-1.5 %	2048	71	-0.1 %
2015	108	-4.0 %	2032	81	-1.3 %	2049	71	-0.1 %
2016	104	-3.5 %	2033	80	-1.6 %	2050	71	0.2 %
2017	102	-2.4 %	2034	79	-1.7 %	2051	72	0.1 %
2018	101	-1.0 %	2035	78	-0.8 %	2052	71	0.0 %
2019	100	-1.0 %	2036	77	-1.1 %	2053	72	0.2 %
2020	99	-0.8 %	2037	77	-0.5 %	2054	72	0.0 %
2021	98	-1.3 %	2038	76	-0.7 %	2055	72	0.3 %
2022	95	-3.4 %	2039	76	-0.7 %	2056	72	-0.2 %
2023	93	-1.1 %	2040	75	-0.9 %	2057	72	0.3 %
2024	92	-1.3 %	2041	74	-1.3 %	2058	72	-0.2 %
2025	91	-1.4 %	2042	74	-0.6 %	2059	72	0.2 %
2026	90	-1.5 %	2043	73	-0.8 %	2060	72	-0.2 %
2027	88	-1.6 %	2044	72	-1.0 %	2061	72	0.2 %
2028	86	-2.7 %	2045	72	-0.3 %	2062	72	-0.2 %
2029	85	-1.5 %	2046	71	-0.7 %	2063	72	0.2 %
2030	84	-1.3 %	2047	71	-0.1 %	2064	72	-0.4 %

²⁵ As regards transfers-out, the present study relies on recent past observations. Therefore it does not aim at predicting the future behaviour of staff leaving the institutions

5.3.6. Total pension expenditure

Table 8: Projection of total pension expenditure (retirement, invalidity, survivors, transfers out) (EUR million)

Year of projection	Ret_Inv_Surv Pension Expenditure & Tr Out	Yearly Change	Year of projection	Ret_Inv_Surv Pension Expenditure & Tr Out	Yearly Change	Year of projection	Ret_Inv_Surv Pension Expenditure & Tr Out	Yearly Change
2014	1 436	0.0 %	2031	2 007	2.1 %	2048	2 261	-0.7 %
2015	1 439	0.2 %	2032	2 044	1.8 %	2049	2 242	-0.8 %
2016	1 445	0.4 %	2033	2 079	1.7 %	2050	2 220	-1.0 %
2017	1 457	0.8 %	2034	2 104	1.2 %	2051	2 196	-1.1 %
2018	1 478	1.4 %	2035	2 123	0.9 %	2052	2 172	-1.1 %
2019	1 506	1.9 %	2036	2 139	0.8 %	2053	2 146	-1.2 %
2020	1 539	2.2 %	2037	2 153	0.6 %	2054	2 120	-1.2 %
2021	1 578	2.5 %	2038	2 164	0.5 %	2055	2 095	-1.2 %
2022	1 618	2.6 %	2039	2 175	0.5 %	2056	2 069	-1.3 %
2023	1 660	2.6 %	2040	2 189	0.7 %	2057	2 043	-1.2 %
2024	1 703	2.6 %	2041	2 208	0.9 %	2058	2 017	-1.3 %
2025	1 750	2.8 %	2042	2 228	0.9 %	2059	1 992	-1.2 %
2026	1 794	2.5 %	2043	2 247	0.8 %	2060	1 967	-1.2 %
2027	1 835	2.3 %	2044	2 265	0.8 %	2061	1 943	-1.2 %
2028	1 878	2.3 %	2045	2 282	0.8 %	2062	1 919	-1.2 %
2029	1 926	2.6 %	2046	2 284	0.1 %	2063	1 896	-1.2 %
2030	1 965	2.0 %	2047	2 277	-0.3 %	2064	1 873	-1.2 %

5.4. Impact of the 2013 reform – synthesis of the simulations

Sensitivity analysis is highly recommended²⁶ to assess the impact of each parameter intervening in the related calculations.

Table 9 shows the extra pension costs that would be incurred by 2064 in the hypothetical scenario without the 2013 SR reform. The model estimates that the total pension expenditure in 2064 without the 2013 reform, would have been 642 million Euros higher (34.3%). This amount is split into several components each linked to a particular parameter.

Table 9: Impact analysis of the 2013 SR reform

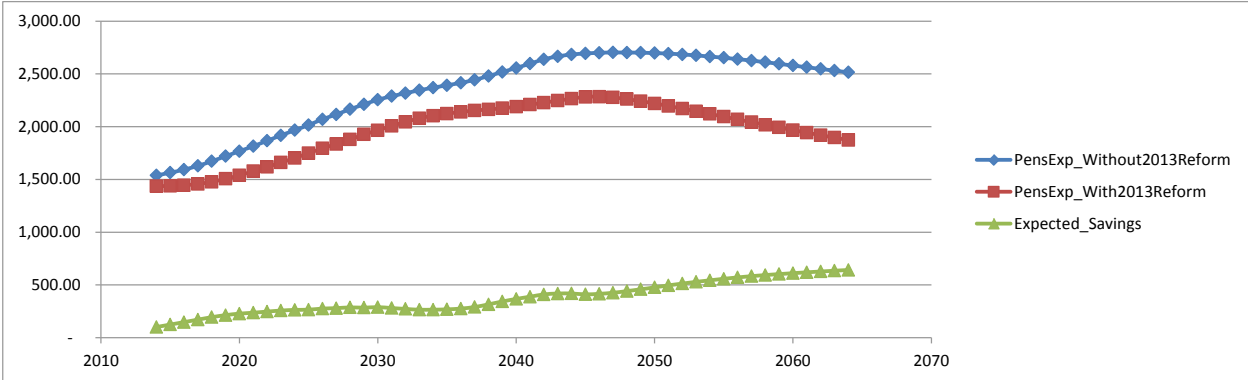
Sensitivity Analysis		
Parameter	Impact (€ m)	Impact (%)
Entry Salary	157	8.4 %
Recruitment Policy	111	5.9 %
General Salary Growth	107	5.7 %
Retirement Rates	105	5.6 %
Salary Progression	96	5.1 %
Accrual Rate	34	1.8 %
Staff cut (2013&2014)	33	1.8 %
Total Impact	642	34.3 %

5.5. Impact of the 2013 SR reform: yearly savings

Graph 1 shows anticipated savings from the 2013 SR reform, which are expected to grow over time and reach their maximum of EUR 642 million in 2064 (the last year of the projection exercise). It shows that pension expenditure should decrease in the second half of the period. This is due to the generational effect of replacing members benefiting from old SR provisions with members covered by the less favourable arrangements introduced with the reform.

Overall, the hypothetical additional costs over 50 years, without the 2013 SR reform, are estimated in the order of EUR 19 billion (EUR 19 230 million).

Graph 1: Projected pension expenditure with and without the 2013 SR reform and annual cost savings at 2014 prices (EUR million)



26 McGillivray (1996) and Picard (1996)

6. Comparative analysis of the 2010 and 2016 studies

The studies carried out after the 2004 and 2013 SR reforms have sought to analyse the effects of key provisions on long-term pension expenditure.

While these studies display clear similarities, the following elements should be emphasised:

- In 2010, the elapsed time between the entry into force of the amended Staff Regulations in 2004 and the completion of the 2010 study itself enabled Eurostat to benefit from substantial insights on the practical impact of the new legal provisions. Besides, as the 2004 reform coincided with the ‘big bang’ EU enlargement and its catalysing impact on recruitment, a substantial part of the reference population was already subject to the amended rules by the time of the 2010 study;
- Conversely, the present study relies on more limited experience of the actual impact of the 2013 SR reform. This is due on the one hand to the shorter time lag between the reform itself and the reference date of the study, and on the other hand to the more restrictive recruitment policy under the 2013 Inter Institutional Agreement.

The above contextual differences are reflected in the assumptions made in the two studies, which makes it difficult to compare them objectively. However, due account should be taken of the combined findings of the studies as regards projected pension expenditure in the long term. Indeed it should be pointed out that in the recent years the PSEO was joined by the assistants in the European Parliament and a number of agencies. The effect of applying the SR as amended in 2004 to this additional population was not fully reflected in the 2010 study as the active population was assumed to be kept constant. Therefore the present study reveals additional savings resulting from the 2004 reform that could not be assessed under the assumptions of the 2010 Eurostat study.

7. Review of Eurostat calculations

As was the case with the 2010 study on pension expenditure savings from the 2004 SR reform, the methodology, assumptions and computations in this study have been reviewed and validated by external actuarial experts.