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Contact:

Kevin Everard

tel: ++352 247-76322
fax: ++352 247-86225
email: kevin.everard@igss.etat.lu

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1. OVERVIEW OF THE PENSION SYSTEM

Numerous instruments have been created in Luxembourg to ensure that elder people continue to receive an income. These instruments may be categorized as follows:

- the general pension scheme for the private sector,
- special pension schemes for the public sector,
- supplementary pension schemes for the private sector,
- private pension plans, and
- social assistance

1.1. Description

1.1.1. The general pension scheme of the private sector

The general pension scheme in Luxembourg is based on a system of compulsory insurance. Apart from civil servants and other employees of the government, local authorities, public institutions and the Luxembourg national railways, which have their own statutory schemes, all those who are covered by pension insurance in Luxembourg belong to the general pension scheme.

Those people who belong to a pension scheme by virtue of working for an international body are not subject to a national scheme.

The general pension scheme in Luxembourg comprises disability, early old age, old age and surviving dependants' pensions. It guarantees a minimum personal pension (90% of social minimum income SMI) to members that have belonged to the scheme for at least 40 years. For each missing year, this quantity is reduced by one fortieth of the amount of the personal pension, down to an eligibility threshold of 20 years.

The 2012 pension reform revised the applicable pension formula. From 2013 onwards, the yearly pension (P=P1+P2+P3+P4) depends on four annual pension formula parameters (*p1, p2_1, p2_2, p3*) and comprises the following main elements:

- (P1) the pro rata enhancement: corresponding to a given percentage (p*1*) of the total contributory income (I);
- (P2) the incremental enhancement: for each full year that the sum of the recipient's age plus the total of contributory years (CY) exceeds the given annual parameter (*p2_1*), the pro rata enhancement is increased by a fixed percentage (*p2_2*) up to a ceiling of 2.05%;
- (P3) the flat rate (percentage *p3* of SMI): calculated on the basis of the number of qualifying years (QY) including compulsory contribution years (CY) and credited non-contributory years (NY) such as years of study or years taken off to bring up children, the number of qualifying years being capped at 40;
- (P4) the end-of-year allowance bonus (2.5% of SMI): this bonus is due as long as the global contribution rate has not to be increased. The periods taken into account are the same as for the flat rate.

Box1: The pension formula

$$P=P1+P2+P3+P4$$

$$P1 = p1 * I$$

$$P2 = (age + CY - p2\_1) * p2\_2 * I, \text{ if } age + CY > p2\_1$$

$$P3 = \min\{40, QY\} / 40 * p3 * SMI$$

$$P4 = \min\{40, QY\} / 40 * 0.025 * SMI$$

I: total income over the career; SMI: social minimum income; CY: contributory years; NY: non-contributory years; QY: qualifying years (CY+NY).

The evolution of the annual pension formula parameters (*p1, p2_1, p2_2, p3*) is given in the table below.

Table 1: Evolution of the annual pension formula parameters

year	*p3* (%)	*p1* (%)	*p2_1*	*p2_2* (%)	year	*p3* (%)	*p1* (%)	*p2_1*	*p2_2* (%)
before 2013	23.500	1.850	93	0.010	2033	25.863	1.719	96	0.018
2013	23.613	1.844	93	0.011	2034	25.975	1.713	96	0.019
2014	23.725	1.838	93	0.011	2035	26.088	1.707	97	0.019
2015	23.838	1.832	93	0.012	2036	26.200	1.700	97	0.019
2016	23.950	1.825	93	0.012	2037	26.313	1.694	97	0.020
2017	24.063	1.819	93	0.012	2038	26.425	1.688	97	0.020
2018	24.175	1.813	94	0.013	2039	26.538	1.682	97	0.021
2019	24.288	1.807	94	0.013	2040	26.650	1.675	97	0.021
2020	24.400	1.800	94	0.013	2041	26.763	1.669	98	0.021
2021	24.513	1.794	94	0.014	2042	26.875	1.663	98	0.022
2022	24.625	1.788	94	0.014	2043	26.988	1.657	98	0.022
2023	24.738	1.782	94	0.015	2044	27.100	1.650	98	0.022
2024	24.850	1.775	95	0.015	2045	27.213	1.644	98	0.023
2025	24.963	1.769	95	0.015	2046	27.325	1.638	98	0.023
2026	25.075	1.763	95	0.016	2047	27.438	1.632	99	0.024
2027	25.188	1.757	95	0.016	2048	27.550	1.625	99	0.024
2028	25.300	1.750	95	0.016	2049	27.663	1.619	99	0.024
2029	25.413	1.744	95	0.017	2050	27.775	1.613	99	0.025
2030	25.525	1.738	96	0.017	2051	27.888	1.607	99	0.025
2031	25.638	1.732	96	0.018	2052	28.000	1.600	100	0.025
2032	25.750	1.725	96	0.018	after 2052	28.000	1.600	100	0.025

Any insured person who has reached his or her 65th birthday is entitled to an old age pension (viei), subject to proof of at least 120 months' contributory periods. Any insured person who has reached his or her 60th birthday is entitled to an early old age pension (an60), subject to proof of 480 months' contributory and non-contributory periods, provided that contributory periods account for at least 120 months. Any insured person who has reached his or her 57th birthday is entitled to an early old age pension (an57), subject to proof of 480 months' contributory periods.

Disability pensions are calculated in the same way as old age pensions. Yet, in order to ensure that recipients of disability pensions receive an adequate income, the period taken into account for the pro rata and flat rate enhancements are extended to the age of 55 and 65, respectively (special pro rata and flat rate enhancements). The amount of the pro rata enhancement is derived from a notional salary corresponding to the average of the monthly salaries on which actual contributions have been paid.

The surviving spouse’s pension comprises three quarters of the pro rata enhancement, including any incremental or special enhancement, the entire flat rate and the entire end-of-year allowance. Abatement provisions apply if the surviving spouse’s total income exceeds a fixed ceiling. The surviving child’s pension comprises one quarter of the pro rata enhancement, one third of the flat rate and one third of the end-of-year allowance.

Table 2: Statutory retirement age, earliest retirement age and penalties for early retirement; see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060
with 20 contributory years*						
statutory retirement age	65	65	65	65	65	65
earliest retirement age	65	65	65	65	65	65
penalty for earliest retirement age	none	none	none	none	none	none
with 40 contributory years*						
statutory retirement age	65	65	65	65	65	65
earliest retirement age	57	57	57	57	57	57
penalty for earliest retirement age	none	none	none	none	none	none

*identical for men and women

1.1.2. Special pension schemes for the public sector

The public sector comprises the civil service proper, Luxembourg national railways, local authorities as well as public institutions whose staff is subject to a special pension scheme that differs from the general scheme.

One has to distinguish between two distinct pension schemes for the public sector: the original scheme, now known as the transitional special pension scheme, and the new special pension scheme, which, apart from a few specific procedural and funding features, essentially corresponds to the general pension scheme.

In the transitional scheme for civil servants and persons treated as such who were in post on 31 December 1998 or had been appointed by that date, the pension is calculated based on the final salary earned by the public servant at a reference replacement rate of 83.33%. For years of service after 1 January 1999, the latter is lowered in stages from 83.33% to 72%. Pensions awarded prior to the entry into force of the new law were not affected by the 1999 reform.

Applying to civil servants who entered the public service after 31 December 1998, the new scheme retains the status of a special scheme, but it is based on the same principles as the general scheme for the private sector with the exception of the absence of an income ceiling for the assessment of contributions.

1.1.3. Supplementary pension schemes

The law provides for a statutory framework designed to protect the rights of employees and to put the various supplementary pension schemes on the same fiscal footing. These schemes are either internally funded by companies through provisions in the balance sheet or externally funded in the form of a pension fund or group policy.

The legislative act in question applies to all supplementary pension schemes established after its entry into force and to existing schemes which give rise to payouts of a capital sum or annuity after its entry into force.

The law applies to supplementary schemes established by a company for all of its employees or for certain categories of its employees but not to promises made to individual members of staff.

Every company is free to establish one or more supplementary pension schemes and to determine their organizational structure, the conditions of membership, the funding arrangements, the level of benefits, the ways in which benefits are assigned and the rules governing the amendment and termination of the scheme.

1.1.4. Individual pension plans

A pension plan is a contract between an insurer and an individual. From a fiscal point of view, the cost of premiums paid into a pension plan is tax-deductible under the heading of special expenses.

As for membership, the scheme is accessible to all taxpayers residing in the Grand Duchy of Luxembourg as well as to non-residents who opt to be treated in the same way as residents for tax purposes, on condition that at least 90% of their total earned income from domestic and foreign sources is taxable in the Grand Duchy of Luxembourg.

1.1.5. Social assistance

Unlike the general pension scheme, which is an instrument of social security based on solidarity between people in different income brackets and between generations, the minimum guaranteed income (currently 70% of SMI) is defined as a measure of social assistance provided by the public authorities to individuals with insufficient financial resources.

1.1.6. Pension system financing

The funding of the general pension scheme is based on a system of division into ten-year coverage periods with mandatory formation of a reserve fund exceeding one and a half times the total amount of annual expenditure. The contribution rate is set at the beginning of each ten-year period at a level that shall guarantee the funding of the scheme throughout the period. After 5 years, the projections are verified and the global rate may be increased for a new period of 10 years if necessary.

The rate, half of which is payable by the employer and half by the employee, amounts to 16% of the gross contributory income. The central government also makes a contribution, amounting to a further 8% of the gross contributory income.

Pensions awarded under the transitional and new special schemes are paid by the central government. Members of these schemes contribute at the rate of 8% of the gross contributory income.

Social assistance benefits are at the charge of central government.

1.1.7. The pension fund of the general pension scheme of the private sector

The key task of the pension fund of the general pension scheme of the private sector is to optimize the way in which the scheme's recoupment reserve is managed and to achieve investment security while minimizing the risk inherent in the financial markets.

Income from contributions is currently running well ahead of expenditure on benefits, and the level of contribution-based income, fixed at 24% of the contributions base, is around 3% in excess of that required by a straightforward burden-sharing system. This surplus is assigned to the pension fund reserve and, as long as population trends sustain the current favorable ratio of workers to pensioners, the level of that reserve should keep rising.

1.1.8. Indexation and revaluation

The indexation of pensions and social assistance has been taken back in the 2012 pension reform.

Pensions, as well as social assistance, are indexed to price evolution in a non-periodic way each time prices increase by more than 2.5% (with reference to the price level at the moment of the previous adjustment). The reform maintained this principle.

In addition, under the former legislation, pensions could be adjusted every two years to the real wage evolution. The decision on adjusting pensions to wage evolution was under the responsibility of the government and conditioned by the financial resources of the scheme.

Up to 2006 the government regularly applied the adjustment mechanism. The law of 21 December 2004 adjusted pensions to the real wage evolution with effect from 1 January 2005. End of 2006 it was considered whether a further adjustment can be operated from 1 January 2007. In the conclusions of the Tripartite coordination committee of 28 April 2006, it was decided by the social partners to reduce the adjustment mechanism by 50% in order to consolidate public finances. Whereas the evolution of the average level of wages showed an effective increase of 1.9%, pensions were only increased by 1% on 1 July 2007 and by 0.9% on 1 July 2008 (law of 22 December 2006). In late 2008 it was decided by the government to return to a full adjustment for the next two years (law of 19 December 2008). End of 2010 it was once again considered whether a further adjustment could be operated from 1 January 2011. After several bipartite consultations with the social partners, the government decided to modulate the adjustment mechanism. As a consequence, the law of 17 December 2010 did not raise directly the adjustment factor from 1.379 to 1.405 from 1 January 2011, but only by 50% from 1.379 to 1.392 from 1 January 2011 and by further 50% from 1.392 to 1.405 from 1 January 2012.

As a consequence of the pension reform, the adjustment of current pensions (stock) is maintained at the 2012 level until 1 January 2016. Afterwards, a full adjustment of pensions (stock), at an annual pace, is only possible if contributions receipts exceed benefit expenditure (general pension scheme). If not, the adjustment mechanism of pensions is to be reduced between 50% and 100%. In the "constant policy" scenario a reduction of 50% is applied. Thus for the period from 2016 up to the year a first deficit of the general pension scheme is observed the pension stock is fully adjusted to real wage evolution.

Moreover, the pension reforms ensured that, for the initial calculation, new pensions will be adjusted to real wage evolution up to the fourth year preceding the year of retirement.

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

The pension legislation, in particular the pension formula for the general scheme of the private sector, has been subject to modifications. Until 2013, the yearly pension (P=P1+P2+P3+P4) comprised the following main elements:

- (P1) the pro rata enhancement: corresponding to 1.85% of the total contributory income (I);
- (P2) the incremental enhancement: for each full year of the recipient's life after his or her 55th birthday and for each year of contribution in excess of 38 years, the pro rata enhancement is increased by 0.01% up to a ceiling of 2.05%;
- (P3) the flat rate (23.5% of SMI): calculated on the basis of the number of qualifying years (QY) including compulsory contribution years (CY) and credited non-contributory years (NY) such as years of study or years taken off to bring up children, the number of qualifying years being capped at 40;
- (P4) the end-of-year allowance bonus (2.5% of SMI): the periods taken into account are the same as for the flat rate.

Box 2: The pre-reform pension formula

$$P=P1+P2+P3+P4$$

$$P1 = 0.0185 * I$$

$$P2 = (age - 55 + CY - 38) * 0.0001 * I, \text{ if } age > 55 \text{ and } CY > 38$$

$$P3 = \min\{40,QY\} / 40 * 0.235 * SMI$$

$$P4 = \min\{40,QY\} / 40 * 0.025 * SMI$$

I: total income over the career; SMI: social minimum income; CY: contributory years; NY: non-contributory years; QY: qualifying years (CY+NY).

The 2012 pension reform established a new pension formula (Section 1.1.1) for the general scheme of the private sector in order to align the pension benefit to the evolution in life expectancy over a 40-year period. Although the pension reform did not alter the four components (P=P1+P2+P3+P4) of the pension formula, different factors appearing in three of the four contributing summands have changed. Indeed, formerly constant pension parameters have been replaced by annually varying parameters (Table 1) whose initial values coincide with the pre-reform rates. In this way, the pro rata enhancement factor now ranges between 1,850% before 2013 and 1.600% from 2052 on, the increment factor of the pro rata enhancement varies between 0.010% and 0.025%, while the flat rate starts at 23.5% of SMI in 2012 and ends at 28% of SMI in 2052.

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

No specific constant policy assumptions have been implemented. For implemented reforms, see Section 1.1.1 and Section 1.1.8.

2. PENSION PROJECTION RESULTS

2.1. Extent of the coverage of the pension schemes in the projection

The coverage of the pension projection model is close to 100%.

The model includes public pension expenditure from the general pension scheme of the private sector (ESSPROS schemes 3) and the special pension schemes of the public sector (ESSPROS schemes 17, 18 and 20). In the present projection exercise, all special public schemes are merged into a unique scheme.

Expenditure items include early old age, old age, disability and survivor pension benefits. In addition, projections do include a minimum pension provision guaranteed in the context of the pension schemes.

Table 3: European system of integrated social protection statistics (ESSPROS) / core module public pension expenditure versus AWG public pension expenditure; see Appendix for common agreed reporting table

	2005	2006	2007	2008	2009	2010	2011	2012
ESSPROS	9,6	8,6	8,2	8,8	9,9	9,4	9,5	9,8
AWG*	9,4	8,9	8,4	8,5	9,5	9,2	9,2	9,5

* general scheme and special scheme; 2012 country fiche data

Occupational pension schemes are voluntary for employees and have developed mainly in foreign or very large industrial and commercial companies, as well as in the banking sector. Occupational pension schemes are not covered by the projections. In 2002, a new legislation on individual old-age savings was introduced, favoring their development through tax incentives.

The high level of pension provision from public pensions leaves only a limited need for supplementary schemes. In addition, until now, no detailed information is available neither on occupational pension schemes, nor on individual private pensions. For both reasons, supplementary pension expenditures are excluded from the projections.

Social assistance expenditure to people in the retirement age (less than 0.1% of GDP), other than minimum pension provision, is not included in the projections.

2.2. Overview of projection results

The expected development of public pension expenditure slightly increases between 2013 and 2060. By 2060 pension expenditure will be around 13.4% of GDP (Table 4).

Table 4: Projected gross and net pension spending and contributions (% of GDP); see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060	Peak year*
public pension expenditure							
gross	9,3	10,5	11,9	12,6	12,4	13,4	2060
*net***	8,3	9,3	10,6	11,2	11,0	11,9	2060
public pension contributions***	10,1	10,1	10,0	10,0	10,1	10,1	2015

* this column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the interval from
** average itemized tax rates are computed by IGSS through a tax-benefit micro simulation model
*** contributions include central government contributions

It is clear that the essential driving force for expenditure comes from old age and early pensions (Table 5). Indeed, because of the formidable economic growth of the country over the last 30 years, the private sector showed a huge increase of scheme members from 1980 onwards. These former active contributors get pension beneficiaries once they become eligible for retirement by 2020. Yet, the resulting considerable increase in public expenditure is counterbalanced by the significance of the assumed population growth, which, being favorable to employment growth, enhances the growth of GDP.

Table 5: Projected gross public pension spending by scheme (% of GDP); see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060	Peak year
total public pensions	9,3	10,5	11,9	12,6	12,4	13,4	2060
of which earnings related:							
old age and early pensions	6,7	8,0	9,5	10,3	10,2	11,0	2060
disability pensions	0,8	0,8	0,7	0,5	0,4	0,6	2014
survivors' pensions	1,9	1,7	1,7	1,8	1,8	1,8	2013

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

In Luxembourg, the pressure on public pension spending comes from changes in the dependency ratio of the pension system. Over the projection period, the support ratio (Table 8), i.e. the number of contributors per pensioner, is decreasing so that less and less contributors have to support more and more pensioners.

Since the average compulsory contribution period is supposed to increase due to more complete careers of migrants and cross-border workers and increasing participation rates of resident females, one could estimate that the benefit ratio should increase in the long run. Contrasting these expectations, the impact of the 2012 pension reform, particularly in relation with the legislated annual reduction of the accrual rate, causes the benefit rate to decrease by slightly more than 0.5 points per cent of GDP.

The standard decomposition of the ratio of public pension expenditure to GDP into the dependency ratio, the coverage ratio, the benefit ratio and the employment rate is not significant in the case of Luxembourg public pension projections. As the share of cross-border workers in employment is supposed to stay above 35% over the whole projection period, pure demographic components as well as labor force considerations, essentially focused on resident population, do only partially capture the expected impacts. In order to make this kind of analysis meaningful for Luxembourg, the decomposition is therefore limited to two components: the dependency ratio and the benefit ratio.

Table 6: Factors behind public pension expenditures between 2013 and 2060 (% of GDP); see Appendix for common agreed reporting table

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60
public pension expenditure	1,2	1,4	0,7	-0,2	1,0	4,0
dependency ratio*	0,1	1,3	1,0	0,4	1,1	3,6
benefit ratio**	1,7	-0,4	-1,0	-1,0	-0,3	-0,6
residual	-0,6	0,5	0,7	0,4	0,1	1,1

* ratio between pensioners and contributors
** ratio between pension expenditure divided by pensioners and GDP divided by contributors

The 'reduced-form' decomposition clearly shows that the pressure on the pension scheme mainly comes from the increasing number of pensioners in comparison to the contributors (Table 6). The reported decrease of the benefit ratio over the projection period does compensate this effect and hence also impacts expenditure development in the future.

Over the projection period, the average replacement rate (ratio between new old age pensions and average economic wage) will decrease continuously (Table 7).

Table 7: Replacement rate* (% of average economic wage) and coverage by pension scheme; see Appendix for common agreed reporting table

	2014	2020	2030	2040	2050	2060
public scheme	77,7	74,6	64,8	68,2	63,9	64,6
coverage**	100,0	100,0	100,0	100,0	100,0	100,0

* new old age pensions (an57, an60, viei – see Section 1.1.1)
** all pensioners belong to the pension scheme

The dynamics of the projection are such that the number of pensioners will increase sharply over the period 2020-2040, and this mainly due to fact that present cross-border workers get eligible to pension entitlements over this period (Table 8). The support ratio evolution from 2040 onwards is mainly linked to ageing phenomena.

Table 8: Number of pensioners and contributors in the public pension scheme (in 1000) and related support ratio (%); see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060
number of pensioners	172,0	205,0	277,3	348,7	396,1	455,8
number of contributors	445,2	527,7	639,2	740,6	814,3	853,3
support ratio	2,6	2,6	2,3	2,1	2,1	1,9

The proportion of pensioners by age class does not change significantly over the projection period, which is consistent with the constant participation rate profile over the projection period (Tables 9 and 10). Over the period 1980-1995 the average entry age to the pension scheme increased substantially from around 17 to 21. Thus it has to be expected that in the long run less people are eligible for early age retirement at age 57 (40 contributory years, see Section 1.1.1). Current new retirees, due the fact that they present over 40 contributory years since they started their professional career on average at age 17, are eligible for early retirement at age 57. Future retirees will on average only present 36 contributory years at that age so that they are not eligible for early retirement at age 57. Hence the relative amount of pensioners aged 55-59 is reported to decrease.

Table 9: Pensioners (all schemes) to inactive population* ratio by age group; see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060
0-54	3%	3%	2%	2%	2%	2%
55-59	27%	13%	10%	10%	10%	13%
60-64	74%	81%	73%	75%	80%	85%
65+	99%	100%	100%	100%	100%	100%

* inactive population is replaced by the sum of contributors and pensioners

Table 10: Female pensioners (all schemes) to inactive population* ratio by age group; see Appendix for common agreed reporting table

	2013	2020	2030	2040	2050	2060
0-54	4%	4%	4%	3%	3%	3%
55-59	29%	26%	22%	19%	16%	15%
60-64	74%	78%	81%	84%	85%	86%
65+	99%	100%	100%	100%	100%	100%

* inactive population is replaced by the sum of contributors and pensioners

The mixed impact of the increased contributory periods of resident female and cross-border contributors on the total contributory period (from on average 30 years presently to almost 37 years in 2060) and the amplified number of pension beneficiaries (from about 7300 presently to about 11000 in 2040) are the main driving forces of new public pension expenditure over the projection period (Table 11).

Table 11: Projected and disaggregated new public pension expenditure; see Appendix for common agreed reporting table

New pension	2014	2020	2030	2040	2050	2060
projected new pension expenditure (millions EUR)	278,5	328,2	531,0	773,0	862,6	2450,6*
average contributory period	30,5	30,8	32,4	34,7	35,4	36,6
monthly average pensionable earnings	5628,1	6128,1	6972,3	10021,6	13566,1	19043,4
average accrual rates (%)	1,8	1,8	1,7	1,7	1,6	1,6
sustainability/adjustment factor	1,0	1,0	1,0	1,0	1,0	1,0
number of new pensioners ('000)	7,3	8,0	11,2	11,0	9,2	18,3
average number of months paid the first year	12,0	12,0	12,0	12,0	12,0	12,0
monthly average pensionable earnings / monthly economy-wide average wage	1,4	1,3	1,1	1,2	1,1	1,1

* in line with number of new pensioners based on AWG demographic assumptions (cf. questionnaire, line 93)

2.4. Assets

The increase of the assets of the general pension scheme's reserve fund up to 2020 is generated by two factors (Table 12). On the one hand, present contribution income is higher than pension expenditure over that period (Section 1.1.7). On the other hand, supplementary receipts are generated by the reserve fund itself.

By 2020 the balance of the general scheme turns negative as former cross-border contributors become pension beneficiaries. Assets will be exhausted shortly after 2050.

Table 12: Assets of pension funds and reserves (% of GDP)

	2013	2020	2030	2040	2050	2060
% of GDP	30,2	39,6	38,4	24,0	5,7	0,0

2.5. Sensitivity analysis

The higher life expectancy scenario increases expenditure pressure on the pension schemes as no demographic calibration mechanism is included in the pension formula's design (Table 13). The higher/lower productivity scenario mainly acts on the denominator and an increased/decreased level of GDP leading to a lower/higher ratio of pension expenditure to GDP in the long run. The higher employment rate scenario has an impact in the medium term: as labor input increases, whereas pension expenditure remains unchanged, the ratio of expenditures to GDP decreases slightly in the medium term. A higher employment rate of older workers leads to a constant decrease of the expenditure to GDP ratio in the medium term due to a constant increase of retirement age and a continuous increase of employment over the same period. The impact of the lower migration and risk scenarios are similar to that of the lower productivity scenario. Finally, a significant reduction of public pension expenditure is observed in the policy scenario, where the linking of the retirement age to increases in life expectancy induces a large reduction of expenditures.

Table 13: Public pension expenditures under different scenarios (% of GDP); see Appendix for common agreed reporting table.

	2013	2020	2030	2040	2050	2060
baseline	9,3	10,5	11,9	12,6	12,4	13,4
higher life expectancy	0,0	0,0	0,1	0,1	0,2	0,4
higher lab. productivity	0,0	0,0	-0,1	-0,2	-0,3	-0,3
lower lab. productivity	0,0	0,0	0,1	0,2	0,2	0,3
higher emp. rate	0,0	-0,1	-0,3	-0,3	-0,3	-0,1
higher emp. of older workers	0,0	-0,2	-0,5	-0,5	-0,5	-0,2
lower migration	0,0	0,2	0,7	1,1	1,2	0,8
risk scenario	0,0	-0,2	0,0	0,4	0,7	1,1
policy scenario: linking retirement age to increases in life expectancy	0,0	-0,1	-0,5	-0,8	-1,0	-1,9

2.6. Description of the changes in comparison with previous projections

Comparing previous and current projection exercises, the decomposition of the increase of public pension expenditure over the projection period in the dependency and benefit ratios (Table 14) clearly shows that the main driving force behind expenditure increase comes from the dependency ratio, this strong upturn mainly being based on the eligibility of present cross-border workers for pension benefits in the future.

Two major changes are to be reported between the different projection exercises. The marked difference in the evolution of the dependency ratio between 2006 and 2009 is the outcome of a severe reduction of the economic growth rate over the period 2010-2050 from about 3.1% in the 2006 exercise to about 2.7% in the 2009 exercise, and at equivalent productivity growth, to similar reductions of employment growth.

Table 14: Decomposition of the changes in comparison with previous projection exercises; see Appendix for common agreed reporting table

	% change*	dependency ratio	benefit ratio	residual
EXP/GDP – 2006**	7,7	5,6	1,8	0,2
EXP/GDP – 2009**	13,5	11,1	1,9	0,5
EXP/GDP – 2012**	8,8	9,7	-0,8	-0,1
EXP/GDP – 2015**	4,0	3,6	-0,6	1,1

* between 2010 and 2050 for 2006, 2009 and 2012 projections; between 2013 and 2060 for 2015 projections
** EXP: public pension expenditure

In the 2006 and 2009 projection exercises, a slight increase of the benefit ratio is reported, because people eligible for pension benefits have more complete contributory careers in the future (line 2 in Table 11). In the 2012 and 2015 projection exercises, this effect is counterbalanced by the partial adjustment of pensions to real wage evolution and the annually decreasing accrual rate introduced in the 2012 pension reform, respectively.

Finally, the considerable decreases concerning the ratio of public pension expenditure to GDP and of the dependency ratio between the 2012 and 2015 projections are mainly due to changes in the demographic assumptions. Especially the assumptions on population growth, leading to an increase in the growth of the number of contributors, have a major impact on the dependency ratio, while the resulting growth increase of the labor input is favorable to GDP growth.

Table 15: Decomposition of the difference between 2012 and the new public pension projection (% of GDP)

	2010	2013	2020	2030	2040	2050	2060
Ageing report 2012	9,2%	9,7%	10,8%	14,0%	16,5%	18,1%	18,6%
Change in assumptions		-0,1%	-0,3%	-1,6%	-3,2%	-4,1%	-4,3%
Improvement in coverage/ modelling		-0,3%	-0,2%	-0,4%	-0,5%	-1,5%	-0,8%
Policy related changes		+0,0%	+0,1%	-0,1%	-0,2%	-0,2%	-0,1%
New projection		9,3%	10,5%	11,9%	12,6%	12,4%	13,4%

Decomposing the difference between the last and current projection exercises (Table 15), one observes that in the long term, the change in the demographic assumptions has a major impact on pension expenditure. In fact, from 2030 onwards, more than half of its decrease is due to optimistic population growth projections provided by Eurostat. Residual improvements mainly emerge from a change in the projection model.

Although the 2012 pension reform primarily concerns modifications to old age and early old age pensions, a visible difference in the survivor pension expenditure to GDP ratio between the 2012 and 2015 projection exercises is reported. Essentially, this is a direct consequence of the new indexation to wages rule applied to old age pensions. Indeed, since any survivor's pension is in a direct relation to the last old age pension that has been paid to the deceased beneficiary, the downward revision of real wage indexation from 2022 onwards has a visible impact on survivor pension benefits.

Table 16: Difference between 2012 and the new survivor pension projection (% of GDP)

	2013	2020	2030	2040	2050	2060
SurvEXP/GDP 2012	1,9%	2,1%	2,4%	2,6%	2,8%	2,9%
SurvEXP/GDP 2015	1,9%	1,9%	1,8%	1,7%	1,6%	1,5%
Difference	-0,1%	-0,2%	-0,6%	-0,9%	-1,2%	-1,4%
SurvEXP Effect	-0,2%	-0,4%	-0,6%	-0,8%	-0,9%	-1,0%
GDP Effect	0,2%	0,2%	0,0%	-0,2%	-0,3%	-0,4%

* SurvEXP: survivor pension expenditure

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

3.1. Institutional context

The Inspection générale de la sécurité sociale (IGSS) uses a customized version of the International Labor Organization (ILO) generic pension modelling tool to perform the financial projections of the pension schemes. In order to take account of the particularities of the Luxembourg labor market (high proportion of cross-border workers), the ILO modelling tool was adapted to include dimensions such as country of origin or employment status (beyond the general breakdown by age, sex and benefit type). The model thus makes a difference between total labor force and 'national' labor force. The tool is used for long-term planning, the assessment of pension reform options and in political debates.

With a view to regular evaluation of the financial situation of the general pension scheme, the tool is used by the IGSS to draw up a report at the end of each seven-year period of coverage in accordance with article 238, paragraph 6, of the Code of social security which states that “For each subsequent period of coverage, the overall contribution shall be continued, or reset by special law on the basis of a technical review of the preceding period and actuarial forecasts for the new period of coverage to be drawn up by the supervisory authority”.

3.2. Assumptions and methodologies applied

The modified ILO pension model includes the following two components: a demographic component projects the number of contributors and pensioners and a financial component to evaluate receipts and expenditures of the systems. All model components are calibrated in order to fully comply with AWG assumptions.

Fertility rate, life expectancy and migration are in line with EUROPOP2013 scenario.

AWG employment growth assumptions are used for the projections based on national account labor series.

The total number of civil servants is supposed to increase in line with general employment. Since civil servants schemes apply the same pension formula as the general pension scheme from 1999 onwards, the relative share of civil servants within the employed does not have a major impact on pension expenditure in the medium and long run.

Age specific earning profiles are used to compute total economic wage levels. Earning profiles are kept constant over the projection period. AWG labor productivity assumptions are applied to model real wage growth.

3.3. Data used to run the model

Projections are based on individual register data available in the data warehouse at the IGSS. Based on the compulsory membership of people to the national social protection system, individual administrative data is available in common operational files of the Social security institutions in Luxembourg. Main administrative data relates to protected people monthly income declarations, which are at the basis of the computation of the contributions. Other important administrative data is related to monthly benefits paid out by the institutions. Both sources are essential to gather information on disposable income of protected people.

3.4. Reforms incorporated in the model

The 2012 pension reform has been fully incorporated in the model.

3.5. General description of the model

The national pension model used for providing actuarial estimates of future expenditure and contributions base of the general and special pension schemes in Luxemburg, in line with the economic and demographic framework used in the AWG projections exercise, is a standard deterministic cohort-based pension projection model. It is a fully customized version of the ILO generic pension modelling tool and it closely complies with local social insurance legislation in Luxembourg and captures national pension peculiarities.

It is based on macro simulation techniques, i.e., the projections rely on grouped data. Under the model, each status of an insured person (active person, inactive person and pensioner) is explicitly modelled, distinguishing new persons from initial stock, and associated values (average salary, average pension, etc.) are projected year by year.

The national pension model satisfies the following key methodological features:

- The model is based on standard actuarial mathematics for social security schemes and on actuarially assumed transition probabilities (mortality rates, retirement rates, etc.) which are used to map the transition of an insured person (active person[1], inactive person[2] and pensioner) in a given year onto the next year's status.
- The development of the active insured population is linked to the evolution of total employed population and earnings assumptions, which, in turn, are explicitly linked to the assumptions on macroeconomic growth and the wage share of GDP.
- The active insured population is disaggregated into the following population groupings, the subdivision being based on gender (males/females), employment category (public/private), residency (residents/non-residents), and income group (by earnings band).

Chart 1 gives an overview of the structure of the national pension model, which consists of (i) Input files, (ii) the Projection file, (iii) Result files and (iv) the long-term Account file.

[1] Active insured person refers to an individual who has made at least one contribution to the social security scheme during a given year.
[2] Inactive insured person refers to an individual who has made no contribution during last year because was unemployed, or out of the labor force, or emigrant, but is registered in the social security scheme, i.e., made contributions during previous years.

Chart 1: Model structure

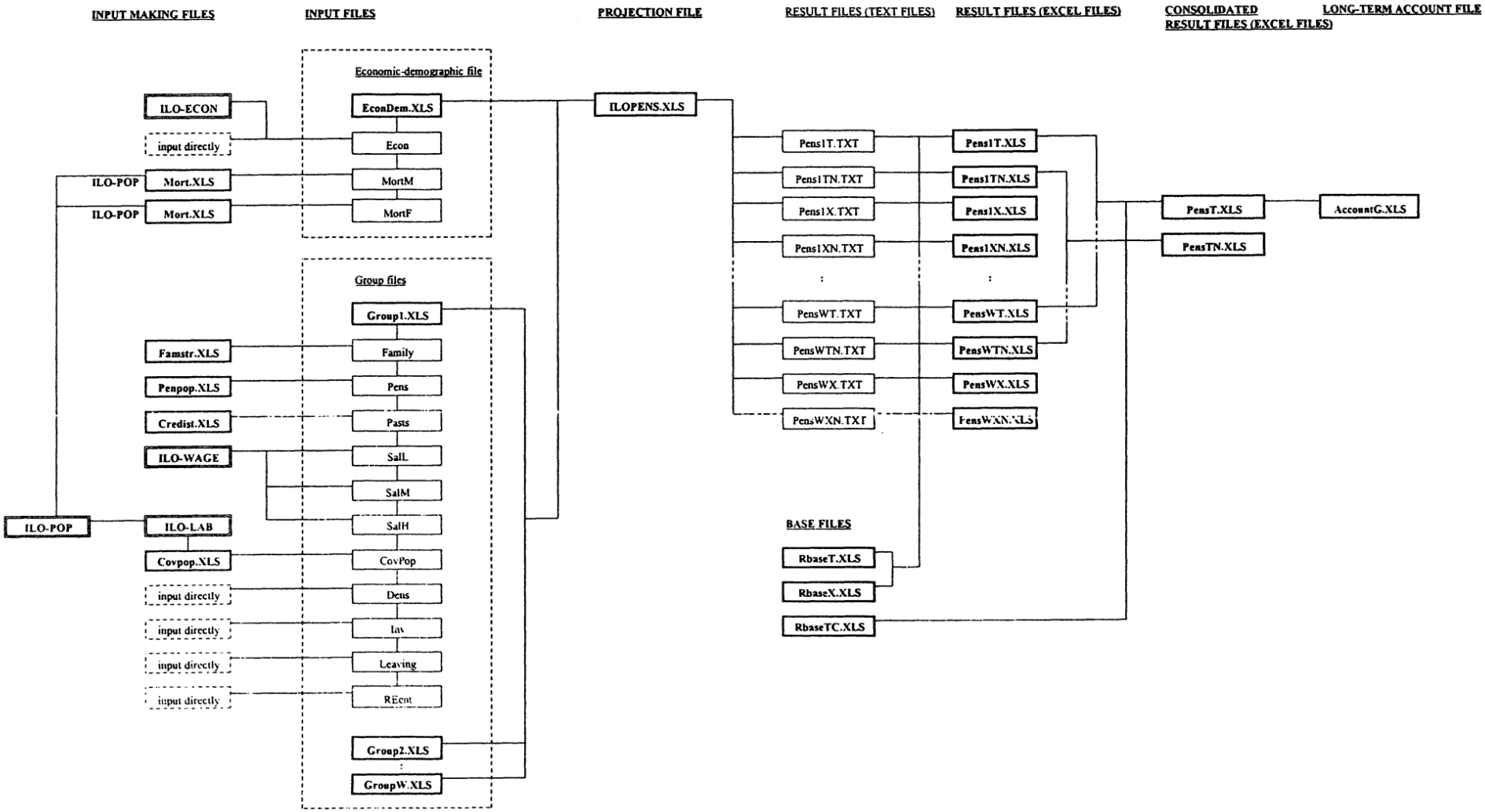
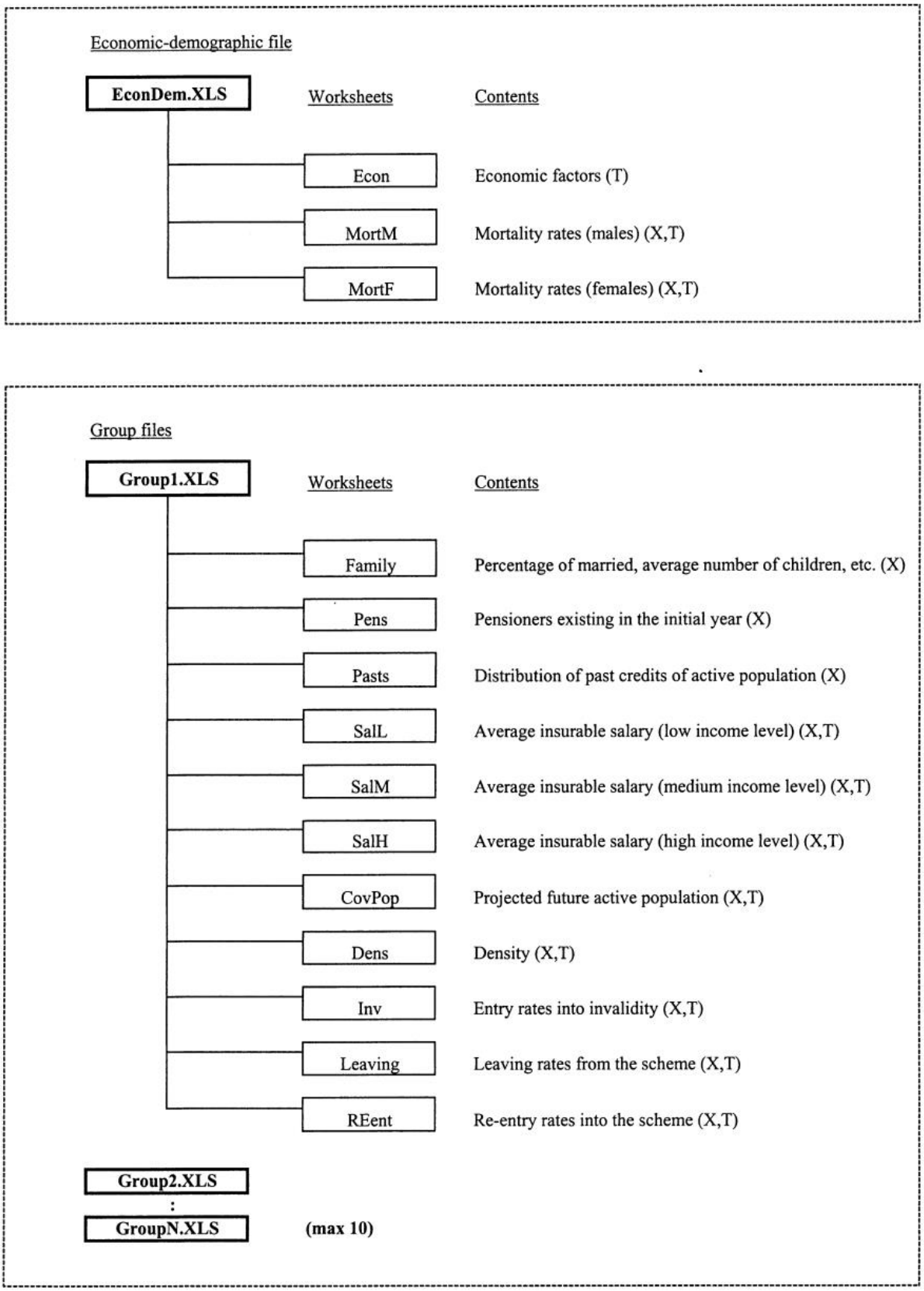


Chart 2 illustrates the key Input files of the national pension model with respect to the economic-demographic framework (Economic-demographic file) and with regards to each population grouping, i.e., the subgroups which the active insured population is disaggregated into (Group files).

Chart 2: Content of input files



Key result-output data files include:

- Long-term Account file - at an aggregate level
    - Total number of contributors and amount of insurable earnings
    - Total number of pensioners and amount of pension benefit expenditure
    - Projected income and expenditure statement
- Result files - at a detailed level, disaggregation of the above output results by:
    - Population grouping, such as gender and residency status
    - Age
    - Categories of pension benefits – newly awarded and total in payment.

4. APPENDIX: COMMON AGREED REPORTING TABLES

TABLE 2 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	65	65	65	65	65	65
	earliest retirement age	65	65	65	65	65	65
	penalty in case of earliest retirement age	none	none	none	none	none	none
Men - with 40 contribution years	statutory retirement age	65	65	65	65	65	65
	earliest retirement age	57	57	57	57	57	57
	penalty in case of earliest retirement age	none	none	none	none	none	none
Women - with 20 contribution years	statutory retirement age	65	65	65	65	65	65
	earliest retirement age	65	65	65	65	65	65
	penalty in case of earliest retirement age	none	none	none	none	none	none
Women - with 40 contribution years	statutory retirement age	65	65	65	65	65	65
	earliest retirement age	57	57	57	57	57	57
	penalty in case of earliest retirement age	none	none	none	none	none	none

Comments: None

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

	2005	2006	2007	2008	2009	2010	2011	2012
1 Eurostat total pension expenditure	9,6	8,6	8,2	8,8	9,9	9,4	9,5	9,8
2 Eurostat public pension expenditure	:	:	:	:	:	:	:	9,8
3 Public pension expenditure (AWG)	:	:	:	:	:	:	:	:
4 Difference (2) - (3)								
5 Expenditure categories not considered in the AWG definition, please specify:	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*:*
5.1 …	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*:*
5.2 …	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*:*
5.3 …	*:*	*:*	*:*	*:*	*:*	*:*	*:*	*:*

Comments: (see comments Table 3 in country fiche) No major differences are reported between AWG and ESSPROS

TABLE 4 Projected gross and net pension spending and contributions (% of GDP)

Expenditure	2013	2020	2030	2040	2050	2060	Peak year*
Gross public pension expenditure	9,3	10,5	11,9	12,6	12,4	13,4	2060
Private occupational pensions	:	:	:	:	:	:	:
Private individual pensions	:	:	:	:	:	:	:
Mandatory private	:	:	:	:	:	:	:
Non-mandatory private	:	:	:	:	:	:	:
Gross total pension expenditure	9,3	10,5	11,9	12,6	12,4	13,4	2060
Net public pension expenditure	8,3	9,3	10,6	11,2	11,0	11,9	2060
Net total pension expenditure	8,3	9,3	10,6	11,2	11,0	11,9	2060
Contributions	2010	2020	2030	2040	2050	2060	Peak year*
Public pension contributions	10,1	10,1	10,0	10,0	10,1	10,1	2015
Total pension contributions	10,1	10,1	10,0	10,0	10,1	10,1	2015

Comments: (see comments Table 4 in country fiche)

TABLE 5 Projected gross public pension spending by scheme (% of GDP)

Pension scheme	2013	2020	2030	2040	2050	2060	Peak year *
Total public pensions	9,3	10,5	11,9	12,6	12,4	13,4	2060
of which earnings related:							
Old age and early pensions	6,7	8,0	9,5	10,3	10,2	11,0	2060
Disability pensions	0,8	0,8	0,7	0,5	0,4	0,6	2014
Survivors' pensions	1,9	1,7	1,7	1,8	1,8	1,8	2013
Other pensions	:	:	:	:	:	:	:
of which non-earnings related (including minimum pension and minimum income guarantee):							
Old age and early pensions	:	:	:	:	:	:	:
Disability pensions	:	:	:	:	:	:	:
Other pensions	:	:	:	:	:	:	:
of which							
country-specific scheme 1	:	:	:	:	:	:	:
country-specific scheme 2	:	:	:	:	:	:	:
country-specific scheme 3	:	:	:	:	:	:	:

Comments: None

TABLE 6a 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	1,2	1,4	0,7	-0,2	1,0	4,0	0,279
Dependency ratio effect	0,6	2,0	1,6	1,1	1,4	6,8	0,140
Coverage ratio effect	-0,4	-0,5	-0,5	-0,7	-0,4	-2,4	-0,052
*Coverage ratio old-age**	*-0,2*	*0,1*	*0,4*	*-0,3*	*-1,6*	*-1,6*	*-0,036*
*Coverage ratio early-age**	*-0,6*	*0,4*	*-1,8*	*-2,2*	*6,5*	*2,3*	*0,031*
*Cohort effect**	*-0,1*	*-2,3*	*-1,7*	*-0,1*	*-1,0*	*-5,2*	*-0,114*
Benefit ratio effect	1,1	0,1	-0,3	-0,6	-0,2	0,1	0,002
Labour Market/Labour intensity effect	-0,2	-0,2	-0,1	0,1	0,1	-0,3	-0,006
Employment ratio effect	*-0,2*	*-0,2*	*-0,1*	*0,1*	*0,1*	*-0,3*	*-0,006*
Labour intensity effect	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,1*	*0,001*
Career shift effect	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*-0,001*
Residual	0,0	-0,1	-0,1	0,0	0,0	-0,2	0,363

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

TABLE 6b Factors behind the change in public pension expenditures between 2013 and 2060 using pensioners 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	1,2	1,4	0,7	-0,2	1,0	4,0	0,279
Dependency ratio effect	0,6	2,0	1,6	1,1	1,4	6,8	0,140
Coverage ratio effect	-0,4	-0,5	-0,5	-0,7	-0,4	-2,4	-0,052
*Coverage ratio old-age**	*-0,2*	*0,1*	*0,4*	*-0,3*	*-1,6*	*-1,6*	*-0,036*
*Coverage ratio early-age**	*-0,6*	*0,4*	*-1,8*	*-2,2*	*6,5*	*2,3*	*0,031*
*Cohort effect**	*-0,1*	*-2,3*	*-1,7*	*-0,1*	*-1,0*	*-5,2*	*-0,114*
Benefit ratio effect	1,1	0,1	-0,3	-0,6	-0,2	0,1	0,002
Labour Market/Labour intensity effect	-0,2	-0,2	-0,1	0,1	0,1	-0,3	-0,006
Employment ratio effect	*-0,2*	*-0,2*	*-0,1*	*0,1*	*0,1*	*-0,3*	*-0,006*
Labour intensity effect	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,1*	*0,001*
Career shift effect	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*-0,001*
Residual	0,0	-0,1	-0,1	0,0	0,0	-0,2	0,415

Comments: (see comments Table 6 in country fiche) The standard decomposition of the ratio of public pension expenditure to GDP into the dependency ratio, the coverage ratio, the benefit ratio and the employment rate is not significant in the case of Luxembourg public pension projections. As the share of cross-border workers in employment is supposed to stay above 35% over the whole projection period, pure demographic components as well as labor force considerations, essentially focused on resident population, do only partially capture the expected impacts. In order to make this kind of analysis meaningful for Luxembourg, the decomposition is therefore limited to two components: the dependency ratio and the benefit ratio in Table 6 of the country fiche.

TABLE 7 Replacement rate at retirement (RR), benefit ratio (BR) and coverage by pension scheme (in %)

	2013	2020	2030	2040	2050	2060
Public scheme (BR)	51,3	57,8	58,5	57,1	54,4	53,4
Public scheme (RR)	:	:	:	:	:	:
Coverage	100,0	100,0	100,0	100,0	100,0	100,0
Public scheme old-age earnings related (BR)	57,3	64,6	64,4	62,0	58,8	57,8
Public scheme old-age earnings related (RR)	:	74,6	64,8	68,2	63,9	64,6
Coverage	63,7	68,0	72,8	75,6	75,6	75,7
Private occupational scheme (BR)	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:
Coverage	:	:	:	:	:	:
Private individual scheme (BR)	:	:	:	:	:	:
Private individual scheme (RR)	:	:	:	:	:	:
Coverage	:	:	:	:	:	:
Total (BR)	51,3	57,8	58,5	57,1	54,4	53,4
Total (RR)	:	74,6	64,8	68,2	63,9	64,6

Comments: (see comments Table 7 in country fiche)

TABLE 8 System dependency ratio and old-age dependency ratio

	2013	2020	2030	2040	2050	2060
Number of pensioners (thousand) (I)	172,0	205,0	277,3	348,7	396,1	455,8
Employment (thousand) (II)	246,8	293,2	355,6	412,1	453,2	475,0
Pension System Dependency Ratio (SDR) (I)/(II)	69,7	69,9	78,0	84,6	87,4	96,0
Number of people aged 65+ (thousand) (III)	76,2	94,4	133,5	174,7	210,3	249,4
Working age population 15 - 64 (thousand) (IV)	374,9	434,5	517,0	597,0	662,5	701,3
Old-age Dependency Ratio (ODR) (III)/(IV)	20,3	21,7	25,8	29,3	31,7	35,6
System efficiency (SDR/ODR)	3,4	3,2	3,0	2,9	2,8	2,7

Comments: As the share of cross-border workers in employment is supposed to stay above 35% over the whole projection period, pure demographic components as well as labor force considerations, essentially focused on resident population, do only partially capture the expected impacts. In order to make this kind of analysis meaningful for Luxembourg, the decomposition is therefore limited to three components: the numbers of pensioners and contributors and the support ratio in Table 8 of the country fiche.

TABLE 9a Pensioners (public scheme) to inactive population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	7,6	7,1	5,8	5,0	5,8	5,6
Age group 55-59	82,6	50,2	44,3	36,2	29,8	63,0
Age group 60-64	133,9	142,6	148,6	138,1	107,1	169,0
Age group 65-69	165,9	146,9	160,3	160,7	133,0	106,4
Age group 70-74	159,6	157,6	144,0	162,6	147,0	106,4
Age group 75+	158,4	163,2	164,9	165,2	174,4	164,8

TABLE 9b Pensioners (public schemes) to total population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	3,2	2,9	2,4	2,1	2,5	2,4
Age group 55-59	35,5	19,1	15,2	11,6	9,7	20,7
Age group 60-64	101,5	109,2	111,8	102,4	79,6	125,5
Age group 65-69	154,9	137,8	150,4	150,4	124,3	99,4
Age group 70-74	155,0	154,2	141,1	159,3	143,9	104,1
Age group 75+	158,4	163,2	164,9	165,2	174,4	164,8

TABLE 10a Female pensioners (public scheme) to inactive population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	7,9	5,1	3,2	2,8	3,4	3,3
Age group 55-59	55,8	36,7	30,1	27,1	22,8	56,9
Age group 60-64	95,1	114,4	141,4	146,8	112,9	175,7
Age group 65-69	126,9	106,8	120,9	122,3	110,2	89,3
Age group 70-74	127,6	116,4	105,0	122,3	115,6	88,8
Age group 75+	145,1	125,2	109,4	109,6	117,7	114,8

TABLE 10b Female pensioners (public scheme) to total population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	3,7	2,3	1,4	1,3	1,6	1,5
Age group 55-59	29,8	15,2	10,1	7,9	6,9	17,5
Age group 60-64	78,1	91,1	108,5	109,1	84,3	131,0
Age group 65-69	122,7	102,9	115,2	115,9	104,1	84,3
Age group 70-74	126,4	115,4	103,9	120,9	114,0	87,7
Age group 75+	145,1	125,2	109,4	109,6	117,7	114,8

Comments: (see comments Tables 9 and 10 in country fiche) In general, the ratios presented in Tables 9a, 9b, 10a and 10b are not meaningful since the numerator includes resident and cross-border beneficiaries whereas the denominator only includes resident population.

TABLE 11a 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)	0,0	328,2	531,0	773,0	862,6	2450,6
II. Average contributory period	0,0	30,8	32,4	34,7	35,4	36,6
III. Monthly average pensionable earnings	0,0	6128,1	6972,3	10021,6	13566,1	19043,4
IV. Average accrual rates (%)	0,0	1,8	1,7	1,7	1,6	1,6
V. Sustainability/Adjustment factor	:	1,0	1,0	1,0	1,0	1,0
VI. Number of new pensioners ('000)	0,0	8,0	11,2	11,0	9,2	18,3
VII Average number of months paid the first year	0,0	12,0	12,0	12,0	12,0	12,0
Monthly average pensionable earnings / Monthly economy-wide average wage	0,0	1339,0	1148,0	1168,6	1114,8	1102,8

TABLE 11b 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)	0,0	223695,1	331378,4	464015,3	537529,3	1421999,4
II. Average contributory period	0,0	31,3	33,0	35,4	35,9	36,8
III. Monthly average pensionable earnings	0,0	6902,4	7736,0	10862,7	14348,2	20495,3
IV. Average accrual rates (%)	0,0	1,8	1,7	1,7	1,6	1,6
V. Sustainability/Adjustment factor	:	1,0	1,0	1,0	1,0	1,0
VI. Number of new pensioners ('000)	0,0	4,8	6,2	6,0	5,4	9,8
VII Average number of months paid the first year	0,0	12,0	12,0	12,0	12,0	12,0
Monthly average pensionable earnings / Monthly economy-wide average wage	0,0	1508,2	1273,8	1266,6	1179,1	1186,8

TABLE 11c 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)	0,0	94939,3	193961,3	303914,6	324264,2	1025766,2
II. Average contributory period	0,0	30,1	31,6	33,8	34,8	36,4
III. Monthly average pensionable earnings	0,0	4489,4	5820,7	8829,7	12415,0	17297,4
IV. Average accrual rates (%)	0,0	1,8	1,7	1,7	1,6	1,6
V. Sustainability/Adjustment factor	:	1,0	1,0	1,0	1,0	1,0
VI. Number of new pensioners ('000)	0,0	3,2	5,0	5,0	3,9	8,5
VII Average number of months paid the first year	0,0	12,0	12,0	12,0	12,0	12,0
Monthly average pensionable earnings / Monthly economy-wide average wage	0,0	981,0	958,4	1029,6	1020,2	1001,6

Comments: (see comments Table 11 in country fiche)

TABLE13 Public and total pension expenditure under different scenarios (p.p. deviation from the baseline)

	2013	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	9,3	10,5	11,9	12,6	12,4	13,4
Higher life expectancy (2 extra years)	0,0	0,0	0,1	0,1	0,2	0,4
Higher lab. productivity (+0.25 pp.)	0,0	0,0	-0,1	-0,2	-0,3	-0,3
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,1	0,2	0,2	0,3
Higher emp. rate (+2 pp.)	0,0	-0,1	-0,3	-0,3	-0,3	-0,1
Higher emp. of older workers (+10 pp.)	0,0	-0,2	-0,5	-0,5	-0,5	-0,2
Lower migration (-20%)	0,0	0,2	0,7	1,1	1,2	0,8
Risk scenario	0,0	-0,2	0,0	0,4	0,7	1,1
Policy scenario: linking retirement age to increases in life expectancy	0,0	-0,1	-0,5	-0,8	-1,0	-1,9
Total Pension Expenditure						
Baseline	9,3	10,5	11,9	12,6	12,4	13,4
Higher life expectancy (2 extra years)	0,0	0,0	0,1	0,1	0,2	0,4
Higher lab. productivity (+0.25 pp.)	0,0	0,0	-0,1	-0,2	-0,3	-0,3
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,1	0,2	0,2	0,3
Higher emp. rate (+2 pp.)	0,0	-0,1	-0,3	-0,3	-0,3	-0,1
Higher emp. of older workers (+10 pp.)	0,0	-0,2	-0,5	-0,5	-0,5	-0,2
Lower migration (-20%)	0,0	0,2	0,7	1,1	1,2	0,8
Risk scenario	0,0	-0,2	0,0	0,4	0,7	1,1
Policy scenario: linking retirement age to increases in life expectancy	0,0	-0,1	-0,5	-0,8	-1,0	-1,9

Comments: (see comments Table 13 in country fiche)

TABLE 14 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 *	7,38	7,18	2,48	-4,38	2,10	:	0,00
2009 **	15,24	8,39	5,23	0,04	1,25	:	0,32
2012 ***	9,44	11,25	0,28	0,06	-2,07	0,06	-0,13
2015****	4,05	6,76	-2,40	-0,28	0,10	0,06	-0,20

* 2004-2050; ** 2007-2060; *** 2010-2060; **** 2013-2060

Comments: (see comments Table 14 in country fiche) The standard decomposition of the ratio of public pension expenditure to GDP into the dependency ratio, the coverage ratio, the benefit ratio and the employment rate is not significant in the case of Luxembourg public pension projections. As the share of cross-border wo rkers in employment is supposed to stay above 35% over the whole projection period, pure demographic components as well as labor force considerations, essentially focused on resident population, do only partially capture the expected impacts. In order to make this kind of analysis meaningful for Luxembourg, the decomposition is therefore limited to two components: the dependency ratio and the benefit ratio in Table 14 of the country fiche.

TABLE 15 Decomposition of the difference between 2009 and the new public pension projection (% of GDP)

	2010	2013	2020	2030	2040	2050	2060
Ageing report 2012	9,2%	9,7%	10,8%	14,0%	16,5%	18,1%	18,6%
Change in assumptions		-0,1%	-0,3%	-1,6%	-3,2%	-4,1%	-4,3%
Improvement in the coverage or in the modelling		-0,3%	-0,2%	-0,4%	-0,5%	-1,5%	-0,8%
Change in the interpretation of constant policy							
Policy related changes		+0,0%	+0,1%	-0,1%	-0,2%	-0,2%	-0,1%
New projection		9,3%	10,5%	11,9%	12,6%	12,4%	13,4%

Comments: None