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Pension Reform in Belgium

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Abstract

This paper reviews the financial implications of aging for the pension system in Belgium during 1995-2050. Our simulations indicate a strong rise in pension expenditure over the next half century, as is the case in other industrialized countries. In Belgium, the problem is particularly acute in the pension system for civil servants. The impact of amending indexation of pension benefits and their ceilings, of harmonizing pension schemes for public and private sector employees, and of increasing the mandatory retirement age is discussed. We also calculate rates of return on the participation in the Belgian pension system and present some evidence on the intergenerational impact of the different reform options.

JEL Classification Numbers: C53, E61, H55

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Contents

I. Introduction

This paper reviews the financial implications of the aging population for the pension system in Belgium in the period 1995-2050. After documenting the institutional particularities of the Belgian pension system, we present simulation results illustrating the effect of the demographic evolution on pension expenditures, based on the current rules governing the pay-as-you-go pension system in Belgium. Different reform options are discussed and their financial impact on the trajectory of pension expenditures is analyzed.

In this study, the focus is on regular retirement pensions in the public and private sector. Although this includes the majority of pensions paid in Belgium, it leaves out survivor's and disability pensions as well as pensions paid to the self-employed and through early retirement and minimum income schemes. The scheme for the self-employed is relatively small in magnitude 1/; early retirement schemes which are by definition self-liquidating since beneficiaries in those schemes revert to the regular retirement schemes once they reach the official retirement age, are also relatively small and should decline over the medium- to long-term. 2/ An important component not covered is the survivor's pension paid to widows and widowers of deceased pensioners. Currently, those pensions account for about 30 percent of all expenditures in the wage-earners pension scheme. Their evolution is difficult to gauge since it depends on changes in female labor participation rates, the evolution of life expectancy for men and women, rules regarding the combination of old-age pensions with survivor's pensions, and changes in social structures. On balance, however, they can also be expected to grow substantially, albeit at a slower pace than old-age pensions, due to increasing female labor market participation. 3/

The next section reports on projected key elements in the demographics of Belgium over the next half century. Section III

1/ About one-sixth of the private sector employees scheme, or less than one percentage point of GDP.

2/ To the extent that early retirement schemes were implemented to relieve unemployment pressures, the anticipated decline in the working age population will reduce incentives to maintain such schemes, since aging raises incentives to increase the overall participation rate.

3/ It is important to note that the pension schemes for both civil servants and wage-earners are run by the government and that in this paper the term "private sector pensions" denotes pensions paid to retired employees of the private sector, not supplementary pension paid on a voluntary basis through a scheme operated by the private sector.

provides some detail on the structure of the private and public sector pension schemes, followed by the simulation results in Section IV. Section V presents some reform options and their impact on the financial sustainability of the pension system in Belgium. Section VI presents an intergenerational perspective on pension reform in Belgium. Section VII concludes the paper.

II. Population Dynamics in Belgium

Belgium, like most other industrialized countries, is facing a steady aging of its population over the next half century. Rising life expectancy and lower fertility rates, combined with declining net immigration, are expected to lead to significant changes in the structure of the Belgian population.

Table 1 presents demographic projections through the year 2050 from a recent study on this subject (National Institute for Statistics, 1993). Although the total population remains almost constant over the next 50 years, the share of the elderly rises sharply from some 16 percent in 1995 to over 26 percent of the total population in 2050. This increase is almost entirely due to a fall in the working-age population; the school-age population also declines, albeit modestly. Hence, the elderly dependency ratio increases markedly, doubling over the next 55 years from 26 percent in 1995 to 51 percent in 2050, with a peak at more than 52 percent around 2040. 1/

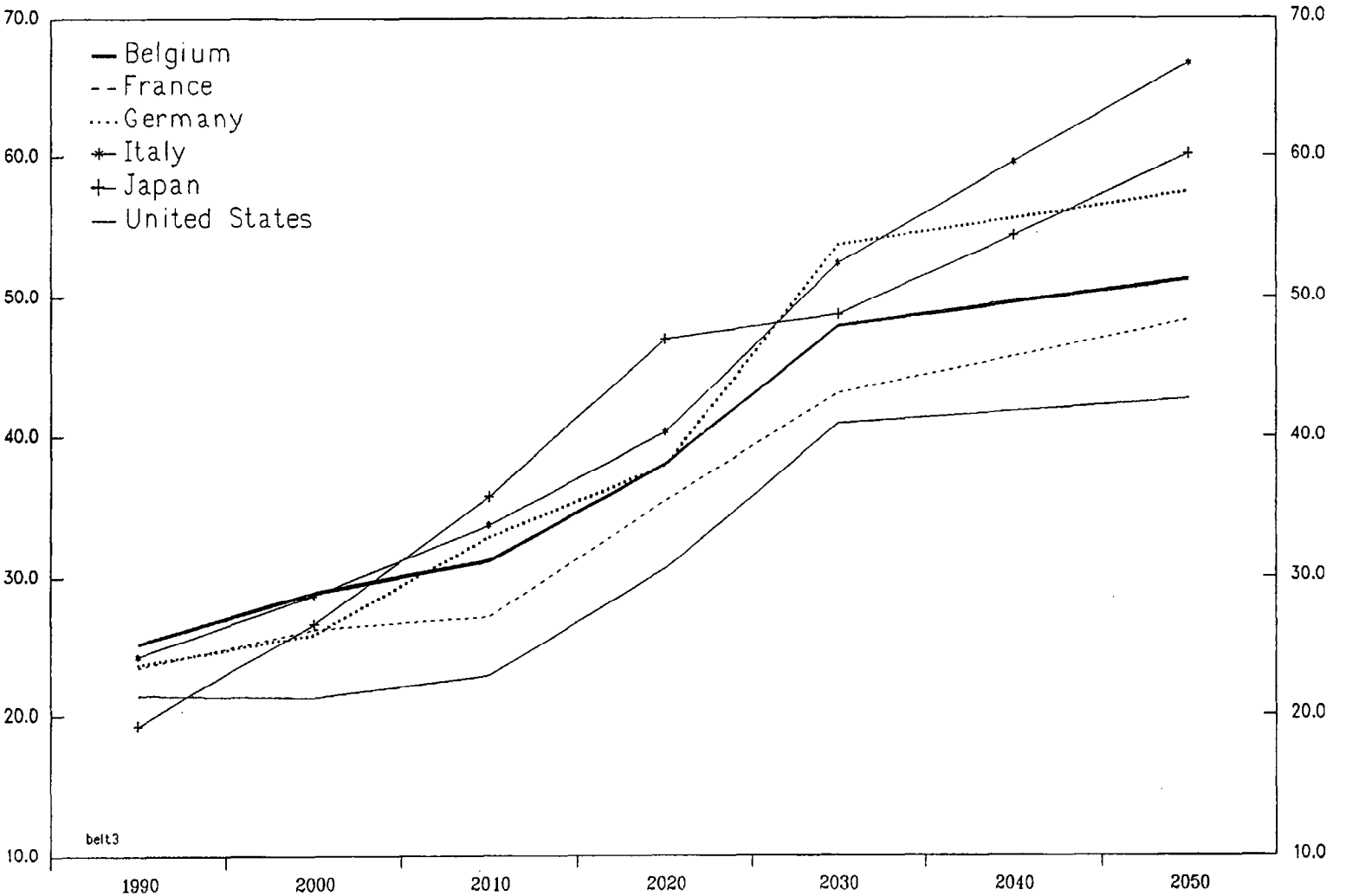
Chart 1 illustrates that this demographic evolution is not untypical among major industrialized countries. In fact, the evolution is somewhat less dramatic in Belgium, since already in 1990 it had the highest elderly dependency ratio of this group of countries. This remains the case until 2000 when this ratio becomes close to the average for France, Germany, Italy, Japan and the United States. Nevertheless, the fact that Belgium deteriorates somewhat less initially should not detract from the very serious implications that the doubling of the elderly dependency ratio will undoubtedly pose for the social security system in Belgium, in particular with regard to pension expenditures.

1/ The elderly dependency ratio is defined as number of persons over 65 divided by the population between 20 and 64 years. Table 1 also indicates that the ratio of the very elderly, e.g. the fraction of persons over 75 years in the population over 65, also rises dramatically. Depending on the indexation rules governing the pension system, this compositional effect within the group of retired people can have significant financial implications. Although it is outside the scope of this paper, this could also have major implications for the evolution of health care expenditures over the next 50 years.

CHART 1
BELGIUM

Elderly Dependency Ratio 1/

(International Comparison)



Sources: IBRD, World Bank Population Projections (1994); and NIS, Bevolkingsvooruitzichten 1992-2050 (1993).
1/ Population over 65 divided by working age population.

Table 1: Demographic Projections

	1995	2000	2010	2020	2030	2040	2050
				(In thousands)			
Total population	10115	10256	10429	10526	10582	10513	10350
Aged 0–19 years	2457	2486	2444	2332	2315	2276	2226
Aged 21–64 years	6053	6027	6085	5936	5591	5400	5369
Aged 65 years and over	1605	1742	1900	2258	2675	2837	2755
				(In percent)			
Elderly ratio	15.9%	17.0%	18.2%	21.5%	25.3%	27.0%	26.6%
Elderly dependency ratio	26.5%	28.9%	31.2%	38.0%	47.8%	52.5%	51.3%
Very elderly ratio	38.8%	42.6%	49.6%	45.4%	48.3%	55.5%	58.4%

Source: National institute for statistics, Bevolkingsvooruitzichten 1992–2050 (1993).

In the next section, we briefly discuss the organization of the Belgian pension system before presenting simulation results in Section IV.

III. The organization of the Belgian pension system

All Belgian pensioners receive their benefits on a pay-as-you-go basis, i.e. the contributions of currently employed persons are used to pay for the pensions of current beneficiaries. There are four major schemes through which pensions are paid: for civil servants, for wage-earners, for the self-employed, and a guaranteed minimum income scheme. Although these schemes operate under quite different rules for benefits and contributions (see below), they are all characterized by heavy government involvement. Private retirement accounts are available in Belgium but have so far been limited in size; assets of private funds amounted in 1991 to about 18 percent of GDP. 1/

The following account presents the main relevant features of the operation of the scheme governing the pensions of wage-earners and public sector employees, the main focus of our study. 2/

1. Private sector pensions

Pensions of wage-earners depend on: (1) salary during an entire career, (2) length of career, and (3) marital status when retired. Pensionable earnings are subject to a maximum ceiling, but there is no ceiling on contributions. Wage-earners earn a pension based upon their average salary during their whole career. Actual salaries are used to calculate the pension, although an imputed salary is used for spells of illness, unemployment, other career breaks, and for employment during the post-war period until 1955 for blue-collar workers and 1958 for white-collar workers. During 1955-75 (1958-75), this life-time salary was revalued on an ad hoc basis, keeping pace with consumer price inflation. After 1975, past salaries are automatically indexed to the consumer price index. 3/

Wage-earners can retire between the ages of 60 and 65. Men receive a full pension if they have worked for 45 years, women if they have worked for 40 years. If they have not worked for 45 years (40

1/ Mouvement Ouvrier Chrétien (1995).

2/ For a detailed overview of the Belgian pension system, see Eeckhout, Van Gool and Verdyck (1995); Claeys, Geeroms, Rigo and Delgado (1995); and Gauthier (1994). For a good analysis of recent trends in pension expenditure in Belgium, see National Bank of Belgium (1996).

3/ The adjustment before 1975 was de facto very similar to the CPI adjustments afterwards and the CPI is therefore used in our simulations to adjust salaries before 1975.

years for women), the pension is prorated. 1/ The pension is then calculated as a percentage of the average salary base. Married pensioners with only one pension in the household receive 75 percent of their average salary. Single pensioners, pensioners in a household with more than one pension, and beneficiaries of survivor's pension receive 60 percent. 2/ In case of multiple pensions, rules of aggregation implying a downward adjustment are in force. 3/ Once granted, pensions are indexed to the CPI. Since 1976, they are no longer indexed to wage growth. Limited discretionary increases were granted in 1990 and 1991. Minimum pensions were increased more frequently. Since January 1996, the household minimum pension amounts to BF 408,320 per year.

Finally, in 1993 the ceiling on all labor income for the calculation of pensions was BF 1,314,288. This ceiling is automatically indexed to consumer prices. In the past, the ceiling has been adjusted on a discretionary basis to incorporate real growth in the economy. Since 1982, the ceiling has only been increased for price changes. Currently, the ceiling is rather low--about 20 percent above the average wage in the economy--implying that the tax component of social security contributions is rather large. In the absence of a real increase of the ceiling the relative share of the tax component will grow further. Without changes, the pension scheme would move towards a flat basic pension scheme.

Private sector pensions are funded through social security contributions on labor income and government transfers. In contrast to benefits, there is no limit on the contributions. Since 1983, employees contribute 7.5 percent from their gross income to the fund and employers add another 8.86 percent to this fund. In 1991, the government contributed BF 193 billion, a little less than 3 percent of GDP, to social security and has committed itself to keep transferring the same nominal amount annually. This government transfer is used to cover shortfalls in the different "pillars" of the system--which include, inter alia, health insurance, unemployment benefits, family allowances, and wage-earners' pensions--according to need. In 1995, total transfers to the wage-earners pension scheme, including internal transfers within the social security system, amounted to about BF 80 billion, or 1 percentage point of GDP. In the simulations presented

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1/ Before 1991, the retirement age for men and women was 65 and 60 years respectively. The pension was reduced by 5 percent for each year of retirement before reaching this official retirement age.

2/ Limited supplementary benefits are granted in May each year. These are not taken into account in the simulations presented in this paper.

3/ The calculations in this paper abstract from this problem since they are based on the number of pensions, not pension payments per pensioner.

below, it is assumed that the budgetary transfers will be kept at 1 percentage point of GDP per annum over the entire period 1995-2050.

2. Civil servants' pensions

Public sector pensions are paid out of the general government budget. 1/ The mandatory retirement age is 65 for men and women with at least 20 years of employment. There are many regulations that allow for retirement before 65, depending upon the specific government sector (military, judicial system, etc.) The retirement pension depends upon (1) the reference salary, (2) the career length, and (3) the tantième, and is subject to a maximum. The tantième is the benefit accrual factor which converts the career length into the nominal replacement rate. The following formula is used for the pension calculation: 2/

*Pension = reference salary * years worked * tantième*

For most government sectors, the reference salary is the average pay scale, at the time of retirement and indexed, applicable during the last five years of the career. The career length is determined by the years of employment as a permanent civil servant. Certain other types of contracts, when followed by a contract as a permanent civil servant, and study years are also taken into account. The basic tantième is 1/60--but many government employees enjoy a more favorable tantième, ranging from 1/30 for university professors and magistrates to 1/50 for primary school teachers.

The product of the career length and the tantième is equivalent to the nominal replacement rate. This rate cannot exceed 75 percent. With the basic tantième, the maximum is reached after 45 years of work. For a magistrate, the maximum is reached after 18.5 years. 3/ In addition to the 75 percent relative limit, there are absolute limits on civil servants' pensions. The maximum pension in 1995 was BF 2,172,473 per annum or about two-thirds more than the ceiling in the wage-earners pension scheme. In 1995, the minimum pension was BF 411,054 for a single government employee and BF 513,818 for a married civil servant. Except for the minimum pension, there is no distinction based on household structure.

1/ The system covers civil servants in the Federal Government, civil servants in the administrations of the Regions and Communities and the local authorities, and certain public enterprises. In the simulations below, we assume that the features of the civil servants' pension scheme apply to all employees of public enterprises.

2/ Additional pension benefits are not taken into consideration.

3/ Assuming that the studies period is assimilated to 4 years of employment (Movement Ouvrier Chrétien, 1995).

Since civil servants' pensions are paid out of the general government budget, no social security fund is built up over time to meet their pensions; 7.5 percent is deducted from the gross income of civil servants and the government bridges the difference between current benefits and contributions.

It is clear that civil servants receive more generous pension benefits than their private sector counterparts. Not only are their nominal contributions lower; their benefits are subjected to a higher ceiling, and are based upon higher reference salaries (last 5 years of their career, compared to the entire career with past wages' indexation limited to the CPI in the private sector scheme). Moreover, the peréquation system implies that current pensioners share not only in the economic growth during their working life but also during their retirement, since any increase in salary for civil servants of a certain rank leads to a similar increase in the pension of retired civil servants with the same rank.

IV. Baseline Simulation

1. Simulation results

Table 2 summarizes the main demographic and macroeconomic assumptions underlying the baseline simulation.

The demographic assumptions imply a steady increase in the life expectancy for men and women, a slower rate of immigration, and a steady-state fertility of 1.85 children per woman. The developments described in Table 1 are based upon those assumptions. The productivity growth assumption of 1.5 percent per year is based upon OECD estimates for total factor productivity over the past 20 years in Belgium. Assumptions regarding the participation rates are taken from the Planning Bureau (Englert, Fasquelle and Weemaes (1994b) and Weemaes (1995)). Women are expected to continue increasing their participation in the labor force, while the participation rate of men is projected to decline slightly. As a result, the overall participation rate is projected to increase moderately. Assumptions regarding the unemployment rates are also from the Planning Bureau, using the stable employment scenario. The unemployment rate for men is projected to decline from 10 percent in 1995 to about 7.5 percent in 2030 and to stabilize afterwards; the unemployment rate for women is projected to decline from 19 percent in 1995 to 10 percent in 2035 and to broadly stabilize afterwards.

Table 2. Baseline Assumptions

	1992	2050
1. Demographic Assumptions		
Fertility rate (children/woman)	1.85	1.85
Life expectancy at birth (years)		
Men	72	81
Women	79	87
Net migration (thousands)	14,100	10,000
2. Macroeconomic Assumptions		
	(percentage change per year)	
Productivity growth:	1.5%	
Real interest rate:	3.5%	
Inflation:	2.0%	

Table 3 illustrates the most important macroeconomic developments for 1995-2050 based upon the assumptions summarized in Table 2. Real GDP growth averages around 1.5 percent over the next half century, based upon average productivity gains of 1.5 percent per year and no net employment creation. The evolution of employment is derived from the aforementioned assumptions about demographic trends, labor participation rates, and unemployment rates. The inflation rate is assumed to be 2 percent per year and the real interest rate is kept constant at 3.5 percent. Changes in the real interest rate have no contemporaneous effects on primary pension expenditures or revenue but are crucial for calculating interest receipts or payments on the net asset position of the pension fund and the net present value of future pension liabilities. 1/

Table 4 summarizes the developments in expenditures and revenue for the pension system until 2050. For the private sector, revenue is kept at a constant 4.5 percent of GDP, the level that balances the pension system in 1995. This revenue level is based upon the contributions during 1995 and the government transfers necessary to achieve financial equilibrium in the pension schemes for wage-earners in 1995.

1/ Since all the parameters of the model, including the features of the pension schemes, are fully adjusted for inflation, the inflation rate does not affect the results.

Table 3: Macroeconomic Projections

	1995	2000	2010	2020	2030	2040	2050
Population growth	0.2	0.3	0.1	0.1	0.0	−0.1	−0.2
Labor force participation	60.9	61.5	59.6	59.1	60.7	62.2	62.6
Men	72.1	72.3	69.7	68.5	69.1	70.3	69.8
Women	49.6	50.6	49.2	49.5	52.0	53.9	55.2
Employment growth	−0.6	−0.1	−0.2	0.1	0.0	0.1	−0.1
Productivity growth	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Real GDP growth	3.5	1.4	1.3	1.6	1.5	1.6	1.4
Real wage growth	1.8	1.5	1.5	1.5	1.5	1.5	1.5
Inflation rate	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Real interest rate	3.5	3.5	3.5	3.5	3.5	3.5	3.5

Source: INS (1993); Englert, Fasquelle, and Weemaes (1994a, 1994b); Weemaes (1995); and authors' simulations.

Notes: All figures in percentage change per year, except for labor force participation and the real interest rate.

Table 4: Baseline Projections for Pension System During 1995–2050

	1995	2000	2010	2020	2030	2040	2050
				(In percent of GDP)			
1. Revenue							
Private sector	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures							
Private sector	4.5	4.9	5.4	6.4	6.7	6.3	5.6
Public sector	2.1	2.6	3.1	3.6	4.3	4.5	4.4
TOTAL	6.6	7.4	8.6	10.0	11.0	10.8	10.1
3. Primary balance							
Private sector	0.0	−0.3	−0.9	−1.9	−2.2	−1.8	−1.2
Public sector	0.0	−0.5	−1.0	−1.6	−2.2	−2.4	−2.4
TOTAL	0.0	−0.8	−2.0	−3.5	−4.5	−4.2	−3.5
4. Pension Debt							
Private sector	0.0	−1.0	−7.8	−26.4	−55.6	−90.4	−127.4
Public sector	0.0	−0.9	−10.0	−26.5	−52.6	−89.8	−135.8
TOTAL	0.0	−1.9	−17.9	−53.0	−108.2	−180.2	−263.2

Source: Authors' simulations.

Private sector pension expenditures rise substantially from 4.5 percent of GDP in 1995 to 5.4 percent in 2010 and continue to rise to 6.7 percent in 2030. This is the period when the "baby-boom generation" reaches retirement age. The shortfall of the wage-earners' pension scheme similarly rises to 2.2 percent in the year 2030 before declining to 1.2 percent of GDP in 2050.

Two underlying trends that drive this evolution of pension expenditures in the Belgian private sector are illustrated in Table 5. First, the demographic evolution leads to a precipitous fall in the support ratio--the number of employees per pensioner in any given year. This ratio drops dramatically from 2.4 in 1995 to 1.3 in 2030, and is projected to decline only moderately afterwards, reaching 1.2 in 2050. Second, and partly offsetting the first factor, the replacement rate, i.e., the ratio of the average pension to the average wage is projected to decline from 35.4 percent in 1995 to 22.6 percent in 2050. The absence of adjustment in real terms of both the wage history and of pension benefits and the declining real ceiling of wage-earners' pensions, indexed to prices and not wages exercise indeed a strong dampening effect, even under the conservative growth assumption of around 1.5 percent. Productivity gains raise average wages at the same rate as GDP in our model since no employment is created on a net basis, but a larger fraction of employees are affected by the ceiling on pensionable earnings upon retirement. Hence, the average pension paid in any given year rises at a much slower rate than the average salary. 1/

The support ratio effect is projected to dominate the replacement rate effect until 2030, leading to the deterioration of the primary balance shown in Table 4. After 2030, the support ratio effect is projected to decline, while the replacement rate effect would continue at the same pace. As a result, the primary balance would improve moderately.

The combination of the support ratio and the replacement rate gives the so-called equilibrium contribution rate. The equilibrium contribution rate is the rate, as a proportion of the wage bill, that, including net budgetary transfers, would balance the financial accounts of the pension system on an annual basis. The equilibrium rate is equal to total pension outlays divided by the wage bill. This can be rewritten as the ratio of the replacement ratio to the support

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1/ Replacement rates are computed here before taxes; net-of-taxes replacement rates are higher.

Table 5: Developments in the Pension System in the Baseline Scenario

	1995	2000	2010	2020	2030	2040	2050
Number of pensioners							
Private sector	841.9	893.5	1041.7	1307.8	1509.7	1585.2	1583.4
Public sector	235.8	272.0	315.8	365.8	425.5	438.0	429.7
TOTAL	1077.7	1165.5	1357.5	1673.5	1935.2	2023.2	2013.1
Number of employees							
Private sector	2044.1	2053.1	2017.7	1988.3	1994.3	1994.8	1954.8
Public sector	784.5	752.0	751.0	736.0	726.0	723.0	721.0
TOTAL	2828.6	2805.1	2768.7	2724.3	2720.3	2717.8	2675.8
Support ratio							
Private sector	2.4	2.3	1.9	1.5	1.3	1.3	1.2
Public sector	3.3	2.8	2.4	2.0	1.7	1.7	1.7
TOTAL	2.6	2.4	2.0	1.6	1.4	1.3	1.3
Average pension							
Private sector	424.4	513.0	690.1	902.6	1163.2	1469.2	1834.9
Public sector	699.0	888.0	1300.9	1836.4	2637.4	3745.2	5300.1
TOTAL	484.5	600.5	832.2	1106.7	1487.4	1962.0	2574.5
Average wage							
Private sector	1200.4	1429.8	2022.8	2863.1	4051.7	5732.5	8110.7
Public sector	1277.7	1519.8	2150.0	3041.6	4302.9	6087.3	8611.6
TOTAL	1221.8	1453.9	2057.3	2911.3	4118.8	5826.9	8245.7
Replacement rate							
Private sector	35.4%	35.9%	34.1%	31.5%	28.7%	25.6%	22.6%
Public sector	54.7%	58.4%	60.5%	60.4%	61.3%	61.5%	61.5%
TOTAL	39.7%	41.3%	40.5%	38.0%	36.1%	33.7%	31.2%

Source: Authors' simulations.

Note: Number of pensioners and employees in thousands; the support ratio is the number of employees in percent of the number of pensioners; the average wage and pension are denoted in thousands of francs (at current prices); the replacement rate denotes the average pension in percent of the average wage, before taxes.

ratio. 1/ The equilibrium contribution rate for the wage-earners is projected to increase from 14.6 percent in 1995 to 21.7 percent in 2030 and then to decline gradually, reaching 18.3 percent in 2050.

Public sector pension expenditures exhibit a quite different pattern. Although public pensioners account for only 29 percent of the population receiving a pension, their more generous retirement package and more favorable indexation mechanism leads to ballooning expenditures over the next 55 years. Table 4 indicates that pension expenditures for the public sector will more than double over the next decades, from 2.1 percent of GDP in 1995 to 4.5 percent in 2040. Due to continuous standard-of-living adjustments (peréquation) and the absence of a strong ceiling effect, this rate does not decline after the peak of the demographic shock, since the replacement rate remains constant (see Table 5). Given the assumption that revenues, as a percentage of GDP, are kept constant at the 1995 level, the pattern of public sector pensions leads to a maximum annual shortfall of 2.4 percent of GDP in the public sector pension scheme in 2040, followed by a stabilization of the deficit afterwards. 2/

With the projected decline in the support ratio (from 3.3 in 1995 to 1.7 in 2030), the equilibrium contribution rate of civil servants would increase from 16.4 percent in 1995 to 36 percent in 2030. This implies that, in order to balance the public sector pension scheme, contributions should exceed one-third of the gross average bill.

If we consider the pensions for wage-earners and civil servants together, the overall evolution of retirement pension expenditures for employees in the public and private sector shows a continuing rise from 6.6 percent of GDP in 1995 to around 11 percent in 2030.

1/ With P denoting pension outlays, AP the average pension, NP the number of beneficiaries, W the wage bill, AW the average wage and NW the number of employees/contributors, the equilibrium rate (ER) can be expressed as follows:

$$ER = P/W$$
$$ER = (AP * NP)/(AW * NW)$$
$$ER = (AP/AW)/(NW/NP)$$

2/ Weemaes (1995) also provides simulations for public sector pension expenditures in the long run. Her study provides simulations for the pension bill for the administration (excluding defense and education) based on a refined distribution of retired civil servants over the different government agencies.

Subsequently, they decline slightly to reach 10.1 percent in 2050. 1/ If all net liabilities were financed through debt, the stock of new pension debt would be around 260 percent of GDP in 2050 (see Table 4). 2/

2. Sensitivity analysis

Before analyzing the impact of aging on debt dynamics, it is useful to explore the sensitivity of the results to changes in the projected values for demographic and macroeconomic fundamentals. In order to test the sensitivity of the above conclusions to alternative demographic scenarios, a simulation has also been prepared based on an alternative demographic projection put forward by the National Institute for Statistics. These projections assume a lower fertility rate (1.7 children per women instead of 1.85), the same mortality rate, and a higher rate of immigration. The results, reported in Panel A of Table 6, have an effect of up to 0.8 percent of GDP on the annual financial deficit of the pension system, compared to the baseline scenario. The largest differences, not surprisingly, arise at the end of the forecasting period. Although these differences are relatively minor over the next 25 years, they do significantly increase the stock of new pension debt projected to be accumulated over the next 55 years: it rises for the private and public pension

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1/ Although the methodology, assumptions and base year differ substantially, it is interesting to compare these results with the projections developed by the Bureau du Plan. Since we consider only retirement pensions and not survivor's pensions, we obtain a significantly lower level of expenditures throughout. The difference in level is, however, consistent with the recent fraction of survival pensions in total pensions, around 30 percent in 1995. Adjusted for the omission of survivor's pensions in this study, the evolution over the next half century is broadly similar: A steady rise in expenditures from 1995 until 2010 and a faster rise thereafter towards a new plateau from 2030 onwards. Moreover, the Bureau du Plan study also finds a more rapid growth for public than private pension expenditures. See Englert, Fasquelle and Weemaes (1994 a and b) for the results of the Bureau du Plan study and Claeys, Geeroms, Rigo and Delgado (1995) and Delville, Verplaetse, Defourny and Janssens (1995) for other simulations on pension expenditures in Belgium.

2/ The accumulated debt concept should be used with caution in this context. In principle, this concept should be used as a measure of the net pension liabilities that arise from moving from one steady state to another, in this case regarding the demographic evolution. Since it is not clear whether the current situation constitutes a steady state and whether the new steady state will have arrived in 2050, this figure should be used only as indication of the nature of the problem. Furthermore, the numbers generated by this measure are highly sensitive to the maintained interest rate assumption used in the compounding (see below).

Table 6: Sensitivity Analysis of Baseline Scenario

	2000	2010	2020	2030	2040	2050
			(In percent of GDP)			
Panel A: Baseline Scenario based on alternative demographic projections						
1. Revenue						
Private sector	4.5	4.5	4.5	4.4	4.4	4.3
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.9	5.5	6.6	7.0	6.5	5.9
Public sector	2.6	3.2	3.8	4.5	4.8	4.9
TOTAL	7.5	8.7	10.3	11.5	11.3	10.8
3. Primary balance						
Private sector	−0.4	−1.1	−2.1	−2.5	−2.0	−1.4
Public sector	−0.5	−1.1	−1.7	−2.4	−2.7	−2.8
TOTAL	−0.9	−2.2	−3.8	−4.9	−4.7	−4.2
4. Pension Debt						
Private sector	−1.3	−9.0	−29.8	−63.7	−105.6	−154.3
Public sector	−1.1	−10.8	−29.0	−58.5	−100.3	−156.2
TOTAL	−2.4	−19.8	−58.8	−122.2	−205.9	−310.5
Panel B: Baseline Scenario with stronger productivity growth						
1. Revenue						
Private sector	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.7	4.8	5.1	4.9	4.2	3.5
Public sector	2.6	3.1	3.6	4.3	4.5	4.4
TOTAL	7.2	7.9	8.7	9.2	8.7	7.9
3. Primary balance						
Private sector	−0.1	−0.3	−0.6	−0.4	0.3	1.0
Public sector	−0.5	−1.1	−1.6	−2.3	−2.4	−2.4
TOTAL	−0.6	−1.3	−2.2	−2.6	−2.1	−1.4
4. Pension Debt						
Private sector	−0.4	−2.3	−8.0	−14.6	−17.1	−12.1
Public sector	−0.7	−9.0	−23.6	−45.8	−75.2	−109.7
TOTAL	−1.1	−11.3	−31.6	−60.4	−92.3	−121.8
Panel C: Baseline Scenario with positive net employment growth						
1. Revenue						
Private sector	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.8	5.0	5.9	6.3	5.9	5.3
Public sector	2.5	2.9	3.3	4.0	4.2	4.1
TOTAL	7.3	7.9	9.2	10.3	10.1	9.4
3. Primary balance						
Private sector	−0.2	−0.5	−1.4	−1.8	−1.4	−0.8
Public sector	−0.4	−0.8	−1.2	−1.9	−2.1	−2.0
TOTAL	−0.6	−1.2	−2.6	−3.7	−3.5	−2.8
4. Pension Debt						
Private sector	−0.7	−4.1	−15.9	−37.4	−63.2	−88.5
Public sector	−0.8	−8.5	−22.6	−46.1	−78.6	−118.5
TOTAL	−1.5	−12.5	−38.5	−83.5	−141.8	−207.0
Panel D: Baseline Scenario with higher real interest rate						
Pension Debt						
Private sector	−1.0	−8.2	−28.6	−62.9	−108.0	−163.3
Public sector	−0.9	−10.5	−29.4	−60.8	−107.6	−172.3
TOTAL	−2.0	−18.8	−58.0	−123.7	−215.6	−335.5

Source: Authors' simulations.

Notes: Panel A presents simulation results for a lower fertility rate, the same mortality rate and a higher net immigration rate. Panel B assumes 2.25 percent productivity growth. Panel C assumes net employment creation in the private sector and Panel D assumes a real interest rate of 4.5 percent.

system to 154 and 156 percent of GDP respectively, compared to 127 percent and 136 percent in the baseline scenario.

Panels B through D of Table 6 illustrate the sensitivity of the projections to the macroeconomic assumptions. Panel B assumes a higher growth rate, as a consequence of more robust productivity growth (2.25 percent instead of 1.5 percent). The results in Panel C are based upon positive net job creation over the next 55 years along the lines of the optimistic scenario of the Planning Bureau (leading to a decline of the unemployment rate to 5 percent by the year 2020). Panel D entertains the assumption of a one percentage point higher real interest rate (4.5 percent instead of 3.5 percent).

The results are not surprising. Stronger growth through productivity gains improves the viability of the system substantially. Private sector pension expenditures barely pose a problem because the ceiling, which is only indexed to CPI inflation, "bites" even more rapidly in this case. Stronger productivity gains would also reduce the accumulation of new pension debt in the public sector pension scheme, but for a more limited extent. Positive net employment creation would slow down the new pension debt accumulation process; however, its impact would be significantly weaker than in the case of stronger productivity growth, in particular in the wage-earners' scheme. The weaker impact reflects the powerful effect of the CPI-indexed ceiling on benefits in the wage-earners' scheme, and also the fact that the magnitude of the two factors may not be comparable. A higher real interest rate has no effect on the primary balance of both pension systems but has draconian effects on the interest payments to finance shortfalls. The stock of new pension debt in 2050 rises by 72 percentage points of GDP from 263 percent of GDP in the baseline scenario to 335 percent of GDP in the scenario with a higher real interest rate.

3. Impact of aging on debt dynamics

Given the heavy government involvement in the Belgian pension systems for wage-earners and civil servants and the high level of general government debt (currently around 135 percent of GDP on a gross basis), some evidence is provided on the debt dynamics when the build-up of new pension debt is incorporated in the analysis. 1/

The debt sustainability literature indicates how to derive the primary surplus required to stabilize the ratio of general government debt to GDP. 2/ With a general government debt-to-GDP ratio of 135 percent, 5 percent nominal GDP growth and a 2 percent differential between the implicit

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1/ For a more detailed analysis along these lines, see Delbecque and Bogaert (1994).

2/ See Blanchard et al. (1990), among others.

interest rate on the public debt and GDP growth, a primary general government fiscal surplus of 2.57 percent of GDP is required to stabilize the debt-GDP ratio. 1/

In order to estimate the impact of aging and the additional pension expenditures burden on overall government debt, the concept of a financing gap was calculated. The financing gap calculates the required one-time, permanent increase in contributions or decrease in expenditures to keep the ratio of pension debt to GDP the same in 2050, the year of the aging peak, as it was in 1995. Since the simulations were done on the assumption that the two pension systems had not incurred any liabilities before 1995, this implies that the financing gap measures additional revenue or the reduction in expenditures that is needed on an annual basis to maintain a pension debt to GDP ratio equal to zero in 2050. Since the dependency ratio increases until 2050, the financing gap is used to build up assets in the two pension systems in the beginning of the period; this period of saving is followed by dissaving to return the two pension systems to a zero net asset position in 2050.

To avoid the build-up of new pension debt and hence to ensure that the net asset position of the consolidated old-age pension system 2/ (as a proportion of GDP) will be the same in 2050 as in 1995, a consolidation effort equivalent to 2.6 percentage points is required. This financing gap of 2.6 percent of GDP is shared evenly between the wage-earners' scheme and the public sector scheme. Alternatively, the consolidation effect can be expressed in terms of a required increase in the contribution rate or a required decrease in expenditures. For the wage-earners' scheme, the contribution rate should increase or expenditures should decrease by 4.4 percentage points to ensure that the net asset position of the old-age component would be balance in 2050. For the public sector, the required adjustment is 12.1 percentage points.

1/ It is important to note that this required fiscal surplus stabilizes but does not lead to a decline in the ratio of general government debt to GDP. In order to reduce the debt-GDP ratio to 60 percent of GDP by 2015, a primary surplus on the general government accounts of around 6 percent of GDP needs to be maintained.

2/ As mentioned before, this excludes self-employment and minimum pension schemes, as well as survivor's and disability pensions.

On a consolidated basis, the consolidated primary surplus required to avoid a further increase of public debt (inclusive of new pension liabilities) increases to 5.17 percent of GDP. 1/

V. Options for Reform

The baseline scenario may appear as being restrictive, in particular regarding the wage-earners' scheme. Indeed, it is assumed that neither pension benefits nor the ceiling increase in real terms in this scheme. As indicated above, this leads to a significant decline in the replacement rate.

The indexation to wage growth of both the pension benefits and the ceiling would stabilize the replacement rate. However, despite the relatively modest growth assumed for real wages (1.5 percent per annum), the financial implications would be very large. The financing gap for the wage-earners scheme--earlier defined as the required annual increase in contributions or decrease in expenditures to maintain the pension debt as a percent of GDP in 2050 at its 1995 level--would increase from 1.3 percent of GDP to 3.2 percent of GDP.

This section describes four different policy alternatives that could contribute to contain the steady rise of pension expenditures over the next 50 years compared to the baseline scenario. It is important to note that, despite the uncertainty concerning macroeconomic, social and demographic factors, these reform options are robust to the underlying assumptions since their qualitative effect on pension expenditures remains the same. Their quantitative effect on the viability of the pension system will, of course, be influenced by different macroeconomic and demographic patterns. 2/

The first policy option considered is an adjustment of the indexation mechanism for pension ceilings in the private sector. In the second policy option, the "peréquation" for public sector employees is abolished, so that the indexation of existing pensions is based only on developments in the consumer price index, not wages. The third policy option considers the impact of calculating civil

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1/ Delbecque and Bogaert (1994) obtain a consolidated required primary surplus of 7.2 percent of GDP, on the basis of higher projections of pension outlays (15.5 percent of GDP in 2030 compared to 11 percent of GDP in our baseline scenario). This is due to a broader coverage and more generous assumptions about increase in real terms of pension benefits and of the ceiling on wage-earners' benefits.

2/ The nature of these reform options implies that their quantitative impact on the sustainability of the pension system is quite different. Hence, no comparison on their relative effectiveness should be drawn from the simulations presented in this section.

servants' pensions according to most rules governing wage-earners' pensions. Specifically, the peréquation is abolished (as in the previous policy option) and public sector pensions are based on the salary during the entire career, not the last five years, with adjustment of past wages limited to inflation. However, the ceiling on benefits is not harmonized with the one for wage-earners. Finally, the impact of raising the retirement age to 65 years and eliminating the gender bias in the calculation of the pension is explored.

All of the reform measures are based upon the demographic and macroeconomic assumptions underlying the baseline scenario. 1/

1. Policy measure 1: partial adjustment to inflation of the ceiling for private sector pension

One of the reform options that could be considered is a gradual decline of the ceiling governing wage-earners' pensions. For illustrative purposes, we consider a scenario where this ceiling is only adjusted for 80 percent of any increases in the consumer price index. With the 2 percent inflation rate assumed in the payer, the 80 percent coefficient implies a difference of 0.4 percentage point per year compared to full CPI indexation. Table 7 reports the financial impact of such a measure on pension expenditures over the next 50 years.

The case for indexing only partially pension benefits to the CPI could be based on the possible bias in measuring inflation arising from substitution effect and technological progress that are not fully taken into account in the CPI index. 2/ It should be noted, however, that the consumption basket of the pensioner is likely to give more weight to health care and other services where productivity gains are more limited.

Since this measure does not affect public sector pensions, the figures for the public sector component are unchanged from the baseline scenario. For wage-earners' pensions, the effect is initially rather limited on total primary expenditures, on the order of 0.1 percent of GDP per year until 2010 vis-à-vis the baseline scenario. Afterwards, the impact of this measure increases to peak at 0.7 percent of GDP annually in 2050, again measured against the baseline scenario. Hence, the stock of debt incurred from shortfalls

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1/ The four options are only indicative of the type of reforms that could be considered. In particular, the ceiling on pensions in the public sector could be harmonized over time with the ceiling in the private sector. In addition, the different treatment along types of professions within the public sector and along marital status within the private sector could be abolished.

2/ To the best of our knowledge, there is no measure of the potential CPI bias in Belgium.

Table 7: Partial Adjustment of Ceiling for Private Sector Pensions to Inflation

	2000	2010	2020	2030	2040	2050
1. Revenue						
Private sector	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.8	5.4	6.1	6.3	5.7	4.9
Public sector	2.6	3.1	3.6	4.3	4.5	4.4
TOTAL	7.4	8.5	9.8	10.6	10.1	9.3
3. Primary balance						
Private sector	−0.3	−0.9	−1.6	−1.8	−1.2	−0.4
Public sector	−0.5	−1.0	−1.5	−2.2	−2.4	−2.4
TOTAL	−0.8	−1.9	−3.1	−4.0	−3.6	−2.7
4. Pension Debt						
Private sector	−1.0	−7.3	−23.8	−48.3	−75.1	−100.6
Public sector	−0.9	−10.0	−26.5	−52.6	−89.8	−135.8
TOTAL	−1.9	−17.3	−50.3	−100.8	−164.9	−236.4

Source: Authors' simulations.

Notes: In this scenario all assumptions of the baseline scenario are maintained except for the ceiling of private sector pensions which is now indexed to only 80 percent of inflation.

in the wage-earners' pension scheme falls from 127.4 percent of GDP in 2050 in the baseline scenario to 100.6 percent. The financing gap is reduced from 1.3 percent of GDP to 1 percent of GDP.

As Chart 2 illustrates, the impact of this measure--little initially and gradually increasing, independent of the demographic evolution--results from its effect on the number of retirees whose pension hits the maximum ceiling on pensions, and its cumulative nature.

2. Policy measure 2: adjustment of public sector pensions only to inflation

As is apparent from the results in the baseline scenario, the public sector pension scheme is substantially more generous than the wage-earners' pension scheme. In this reform option, presented in Table 8, the peréquation of existing pensions is abolished. Public sector pensions are now indexed to changes in the CPI, no longer to wage increases.

Since none of these measures affect the pensions of wage-earners, the results for that sector of the pension system, reported in Table 8, are the same as in the baseline scenario. The effect on public sector pensions is, however, significant. While expenditures for public pensions rose to 4.4 percent of GDP in 2050 in the baseline scenario, they are 0.7 percent lower in 2050 in this scenario and the annual shortfall in the public sector pension scheme drops to 1.7 percent of GDP in 2050 compared to 2.4 percent in the baseline scenario. The accumulated debt in 2050 is correspondingly reduced from 135.8 percent of GDP in the baseline scenario to 94 percent of GDP in this scenario. The financing gap declines accordingly from 1.3 percent of GDP in the baseline scenario to 1 percent.

3. Policy measure 3: Partial harmonization of the calculation of public and private sector pensions

In this section, the previous option is taken one step further and the impact of calculating public sector pensions according to the same rules as wage-earners' pensions (except for the ceiling) is analyzed. In addition to abolishing the "peréquation" (indexation to nominal wage growth), as explored in the previous option, public pension benefits are now calculated on the basis of the entire wage history for civil servants and no longer on the wages during the last five years of their career. The reference salary is also revalued based on price developments, not wage increases. The only major remaining difference is the ceiling on wages for computing benefits.

Chart 2:

Belgium: Indexation of Wage Earners' Pension Ceiling, 1995–2050

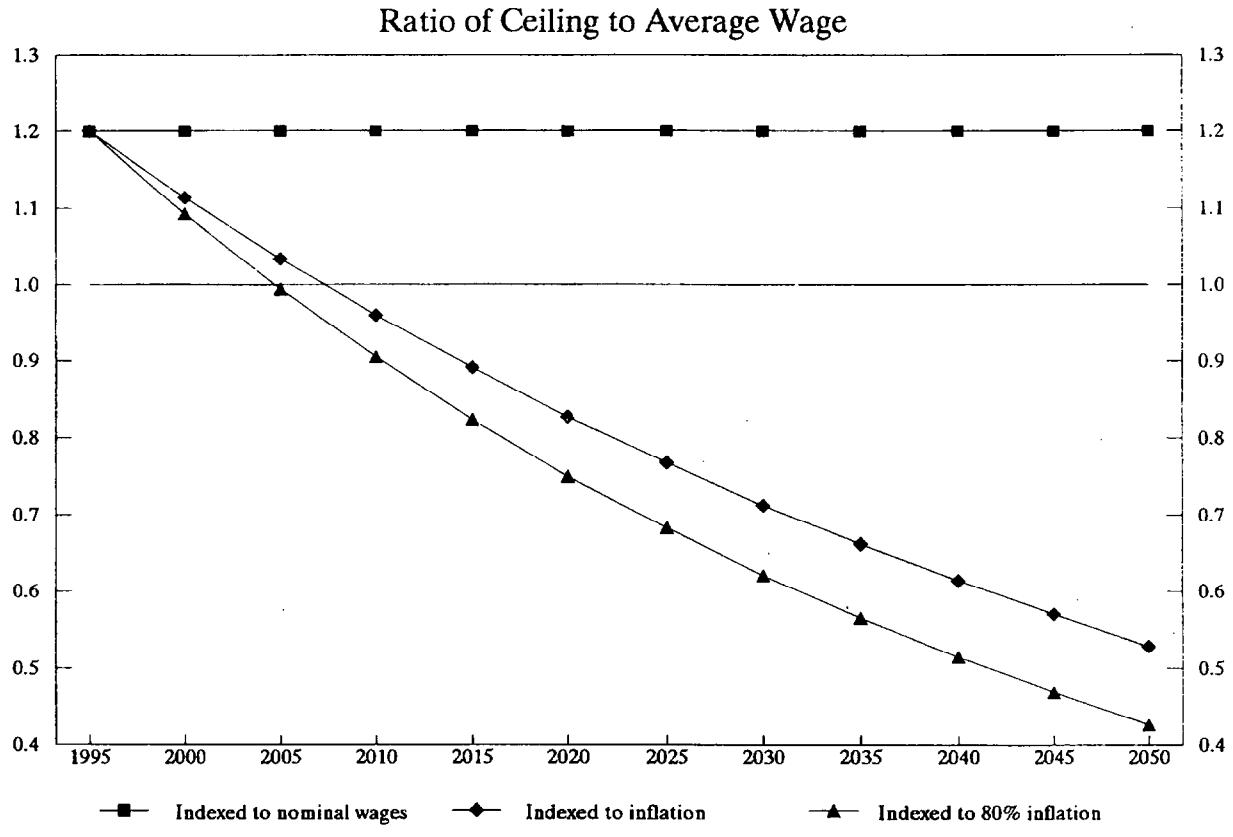

Table 8: Adjustment of Public Sector Pensions to Inflation Only

	2000	2010	2020	2030	2040	2050
1. Revenue						
Private sector	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.9	5.4	6.4	6.7	6.3	5.6
Public sector	2.3	2.7	3.2	3.8	3.8	3.8
TOTAL	7.1	8.2	9.6	10.5	10.2	9.5
3. Primary balance						
Private sector	−0.3	−0.9	−1.9	−2.2	−1.8	−1.2
Public sector	−0.2	−0.6	−1.1	−1.7	−1.7	−1.7
TOTAL	−0.5	−1.5	−3.0	−3.9	−3.5	−2.9
4. Pension Debt						
Private sector	−1.0	−7.8	−26.4	−55.6	−90.4	−127.4
Public sector	0.0	−4.7	−15.9	−34.8	−61.2	−94.0
TOTAL	−1.0	12.6	−42.3	−90.4	−151.6	−221.4

Source: Authors' simulations.

Notes: In this scenario all assumptions of the baseline scenario are maintained except for the "péréquation" of public sector pensions; those are now indexed to inflation and no longer to nominal wages.

The results, reported in Table 9, indicate that this measure significantly reduces the burden of public sector pensions. 1/ Pension expenditures for the public sector drop rapidly because of the abolition of the peréquation. Until 2010, the impact of this measure is large compared to the baseline scenario but limited compared to the previous scenario when only the peréquation was abolished. After 2010, however, expenditures for public pensions grow at a substantially slower rate and are reduced by about 1 percent annually by 2030. In addition, expenditures drop in line with wage-earners' pensions after 2030; this is in stark contrast with the baseline scenario where the peréquation and a high ceiling led to a continuing increase in public sector pension expenditures. The impact on the accumulated debt by the year 2050 is quite dramatic: it now stands at 72.2 percent of GDP in 2050 compared to 135.8 percent in the same year in the baseline scenario, and to 94 percent when only the "péréquation" is abolished. The financing gap is correspondingly reduced from 1.3 percent of GDP in the baseline scenario to 0.8 percent of GDP.

4. Policy measure 4: an increase in the retirement age for men and women and in the reference period for women's pensions

This last policy option increases the retirement age for men and women working in the private and public sector to 65 years, and raises the qualifying period for women working in the private sector to receive a full pension to 45 years. Currently, men in the private sector can retire at any time between 60 and 65 years and are entitled to a full pension after 45 years of service. Women, who can also retire once they turn 60, receive a full pension based upon 40 working years in the private sector.

Labor force participation rates beyond the age of 55 are very low in Belgium. A significant increase would have a major impact on the financial position of the pension scheme. First, given the large tax component element of the wage-earners' scheme, it would generate substantial additional revenue without incurring large additional liabilities. Second, a higher female participation rate would reduce the average nominal replacement rate. 2/ Third, in a pay-as-you-go system, an increase in the replacement rate may smooth out demographic shocks. There is a partial self-correcting mechanism at play as

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1/ Again, this measure does not affect private sector pensions compared to the baseline scenario.

2/ Currently, about half of male pensioners enjoy the 75 percent replacement rate for one pension couples; almost no female pensioner is head of a household. The burden of survivor's pensions ("droits dérivés") would also be reduced with a higher female participation rate.

Table 9: Harmonization of Private and Public Sector Pensions

	2000	2010	2020	2030	2040	2050
1. Revenue						
Private sector	4.5	4.5	4.5	4.5	4.5	4.5
Public sector	2.1	2.1	2.1	2.1	2.1	2.1
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	4.9	5.4	6.4	6.7	6.3	5.6
Public sector	2.3	2.7	3.0	3.3	3.1	2.9
TOTAL	7.1	8.1	9.4	10.1	9.4	8.5
3. Primary balance						
Private sector	−0.3	−0.9	−1.9	−2.2	−1.8	−1.2
Public sector	−0.1	−0.6	−0.9	−1.2	−1.0	−0.8
TOTAL	−0.4	−1.5	−2.8	−3.4	−2.8	−1.9
4. Pension Debt						
Private sector	−1.0	−7.8	−26.4	−55.6	−90.4	−127.4
Public sector	0.0	−4.6	−14.8	−30.6	−50.3	−72.2
TOTAL	−1.0	−12.4	−41.2	−86.2	−140.7	199.5

Source: Authors' simulations.

Notes: In this scenario all assumptions of the baseline scenario are maintained except for the abolition of the péréquation, and the calculation of public sector pensions based on the entire career length.

population aging is expected to lower the unemployment rate and induce an increase in the labor market participation rate. 1/

Overall expenditures drop significantly once these changes are adopted (see Table 10). Pension expenditures peak at 9.5 percent of GDP per year in 2030-2040, compared to 11 percent of GDP in the baseline scenario, with the decline evenly spread between the public and private sector pension schemes. The effect on the accumulated debt in 2050 is very significant: the accumulated debt in the baseline scenario (263 percent of GDP in 2050) falls to around 110 percent in the same year, once the changes in this scenario are instituted. The financing gap would decline from 1.3 percent of GDP to 0.3 percent for the wage-earners' scheme and from 1.3 percent to 0.9 percent for the civil servants' scheme.

VI. An intergenerational Perspective on Pension Reform in Belgium

The previous section presented a set of reform options, all of which contribute to the containment of pension expenditures. However, the mechanism to contain expenditures is very different and is likely to impact different generations in the two major pension systems very differently. A partial adjustment of the ceiling on pensions in the private sector to inflation puts the burden of adjustment on later generations who will see their pension as a fraction of their pre-retirement income decline very rapidly since an increasing share of pensioners will "bump" against the ceiling when they retire. By definition, this reform option does not affect existing pensioners; civil servants and other public sector employees are also not affected in this option.

The second policy measure places the burden of adjustment on recipients of pensions in the public sector scheme. Since this option abolishes the automatic indexation of pensions to wages ("péréquation"), it affects all generations equally. The partial harmonization of public sector pensions to the private sector regime, the third reform option, puts the burden of adjustment on public sector employees, albeit more heavily on future retirees, as existing pensioners would not be affected by the switch to the entire work career as the basis for computing pension benefits. An increase in the retirement age for men and women and in the career lengths for women, espoused in the fourth policy option, affects public and private sector employees equally with a burden that slightly decreases over time since life expectancy is expected to rise over the next half century; future female retirees would support a heavier burden than men, while all current pensioners would be unaffected.

1/ However, it is difficult to influence the participation rate. The retirement is determined not only by legal prescriptions, but also by social preferences and the firms' behavior.

Table 10: Higher Retirement Age and Longer Career Length

	2000	2010	2020	2030	2040	2050
1. Revenue						
Private sector	4.6	4.6	4.6	4.6	4.6	4.6
Public sector	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL	6.6	6.6	6.6	6.6	6.6	6.6
2. Primary expenditures						
Private sector	3.9	4.3	5.2	5.8	5.6	5.0
Public sector	2.1	2.6	3.0	3.6	3.8	3.8
TOTAL	5.9	7.0	8.2	9.4	9.5	8.8
3. Primary balance						
Private sector	0.8	0.3	−0.6	−1.1	−1.0	−0.4
Public sector	−0.1	−0.6	−1.0	−1.6	−1.8	−1.8
TOTAL	0.7	−0.3	−1.6	−2.8	−2.8	−2.2
4. Pension Debt						
Private sector	2.3	8.0	6.8	−1.8	−14.8	−25.9
Public sector	0.5	−3.5	−12.8	−29.4	−54.5	−86.4
TOTAL	2.8	4.5	−6.1	−31.2	−69.3	−112.3

Source: Authors' simulations.

Notes: In this scenario all assumptions of the baseline scenario are maintained except for a uniform retirement age of 65 years for men and women, and a 45 year career length for women.

In order to provide a yardstick to measure the burden on different generations in the two major schemes, Table 11 presents data on the rate of return for an average employee, retiring in different years, in both pension systems. 1/ This Table indicates what interest rate an employee with an average salary and a full career earns from his participation in his pension scheme. Given the description in Section III, it is not surprising that public sector employees are considerably better off than their private sector counterparts, regardless of their age. Their pension is calculated on their salary during the last 5 years of their career, is adjusted for wage growth after they retire and is subject to a much higher ceiling. Hence, the return differential is around 1.2 percent for different generations. Since private sector pension ceilings are only adjusted for inflation, the return on participating in the private sector pension scheme drops gradually for future generations. Indeed, the real return for wage-earners who retire in 2020 is 2.84 percent per year, compared to 4.93 percent for an employee who retires in 1990, a 42 percent decrease.

Table 11. Real Rate of Return on Participation in Belgian Pension System

Retirement date	Private sector	Public sector
1990	4.93	6.13
2000	4.00	5.29
2010	2.87	4.11
2020	2.84	4.02

Source: Authors' calculations.

Applying this yardstick suggests that the burden of adjustment should fall more strongly on existing pensioners or older employees--who are closer to retirement--and on civil servants since both of those groups are treated relatively favorably. Accordingly, a harmonization of public sector and private sector pension schemes, a reduction in benefits for existing pensioners, and an immediate increase of the retirement age are preferable options on intergenerational equity grounds. From the simulations in the previous section, it is clear that a combination of measures will be

1/ See the appendix for description of the methodology and the data.

needed to put pension expenditure on a sustainable path. Since it is unlikely that increasing the retirement age and a harmonization of both pension systems will be sufficient to attain this goal, the rate of return calculations could argue for reducing benefits or increasing contributions on older employees and imposing an "inter-generational solidarity tax" on current pensioners to build a buffer stock to prefund future pension expenditures.

VII. Conclusion

This paper highlights the strains that the aging of the population will put on the Belgian pension system over the next 50 years. It illustrates that the problems, while serious, are manageable--both in absolute size and in comparison with other industrialized countries, as has been documented elsewhere. 1/ Part of the reason for this result is that labor market participation in Belgium is currently so low--and, correspondingly, the elderly dependency ratio so high--that any return to labor market participation and unemployment rates seen in other industrialized countries will soften the demographic impact on pension expenditures. This underscores the critical contribution to the public finances that could be made by policy measures that would strengthen labor market performance in Belgium over the coming years. In addition, the absence of a ceiling on contributions while benefits are capped maintains a strong financing base for the pension schemes.

Under all circumstances, however, the financial strains are severe: they should be tackled urgently to safeguard the financial viability of the pension system. In that regard it is important to reiterate that the present study only considers retirement pensions and does not deal with survivor's pensions. Those pensions currently account for about 30 percent of private sector pension expenditures and will continue to be of major importance over the next 50 years. If those are taken into account, they will certainly add to the pension burden by several percentages of GDP. Beyond pension liabilities, population aging will have other effects on public finance. While expenditures for education, family allowances, and unemployment benefits are expected to gradually decline as a proportion of GDP, health care outlays, including a possible long term nursing care program ("assurance dépendance"), are expected to increase significantly. 2/

The reform options discussed above would all contribute towards restoring the financial viability of the pension system in Belgium.

1/ See Leibfritz et al. (1995).

2/ See Englert, Fasquelle and Weemaes (1994b) and Claeys, Geeroms, Rigo and Delgado (1995).

None of them can eliminate the shortfalls completely by itself; a combination of measures will be required to maintain the system. Some of them, such as eliminating the péréquation for public sector pensions, would have an immediate impact on pension expenditures. Others, such as changing the reference period for pension calculations, will only generate tangible financial gains over the medium term (unless implemented retroactively). Implementing such changes as early as possible is thus of paramount importance to ensure that they have their full financial impact by the time the baby boom generation reaches retirement age. The balance of the voting process will obviously influence the outcome. The ratio of population of age 55 and above to the total voting population is about 35 percent currently; this ratio is projected to increase to close to 50 percent in 2030.

Once the magnitude of the problem at stake has been assessed and potential reform options identified, the issue of the choice of the most appropriate way to ensure the long-term viability of the pension system arises. Leaving aside the possibility to move towards a fully-funded scheme with defined contributions, the choice within a pay-as-you-go framework is between reduced benefits or increased contributions. 1/

Against the reduction of benefits, it can be argued that the replacement rate is low in Belgium, at least for wage-earners. 2/ The meaningful replacement rate, however, is the net-of-tax, net of social contributions replacement rate. With the high level of social contributions based on wages, the progressivity of the tax schedule and the advantageous tax treatment of pension income, the net replacement rate is significantly higher than the gross replacement rate. Against the increase of pension contributions, it can be argued that it would have adverse effects on employment and competitiveness, especially in a country where non-wage labor costs are already very high. In addition, higher social security contributions reduce the tax basis for the central government and the local authorities. 3/

There may be other options. As is indicated in Section VI, public sector employees are treated relatively favorably with regard to their pension benefits. Harmonizing the public sector scheme with the wage-earners' scheme is thus one of the most obvious ways to

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1/ 'Defined contributions' means that the risk related to the return on the accumulated assets is borne by the contributor.

2/ See Mouvement Ouvrier Chrétien (1995).

3/ A former minister of the budget called the crowding-out of tax collection resulting from the tax deductibility of social security contributions the 'cuckoo's effect.'

address the issue of pension liabilities. 1/ Another measure to be considered is an increase in the retirement age in line with increased life expectancy. Other measures to be considered include the elimination of the generous tax incentives granted to privately-run pension funds and the favorable tax treatment of pension income. 2/ Finally, equity considerations between generations should also underpin the policy choice. If, as is indicated in Section VI, the current generation of pensioners has contributed less and is better off than the following ones, measures to reduce current pensions could be considered.

1/ As generous pensions are perceived as a compensation for lower wages in the public sector, this may have implications on the civil servants' wage policy. Liquidity constrained civil servants would prefer higher wages and lower pension benefits.

2/ The revenue effect of eliminating these tax expenditure exceeds one percentage point of GDP, or about the half of the estimated financing gap.

APPENDIX

Description of Methodology for Pension Projections

This appendix describes the methodology and the assumptions underlying the projection of pension schemes' financial situation in Belgium until the year 2050. Projections cover the old-age pension scheme for the wage-earners and the old-age scheme for the public sector. The coverage is not complete: survivor's pensions, early retirement, guaranteed minimum income for the elderly, and self-employment schemes are not taken into account. 1/

A1. Net asset position of the pension schemes

In order to evaluate the fiscal implications of aging, the methodology views the two old-age pension schemes as two funds, separated from the other pillars of the social security system and the government operations. The two funds are assumed to be created on the first day of the projection period, with no initial assets and with all old-age pension related revenue and expenditure diverted to and covered by them.

The net asset position of each fund (Aj_t) evolves as:

$$Aj_t = (1+r_t)Aj_{t-1} + Tj_t - Ej_t \qquad j=1,2 \qquad (A1)$$

where Tj_t is total revenue, including budget transfers, of fund j, Ej_t is total expenditure, including administrative costs, of fund j and r_t is the nominal interest rate on assets. With small letters a, t, and e denoting ratios to GDP and g_t the growth rate of nominal GDP, equation (A1) can be rewritten as:

$$aj_t = [(1+r_t)/(1+g_t)]aj_{t-1} + tj_t - ej_t \qquad j=1,2 \qquad (A2)$$

On pure pay-as-you-go principles, receipts and outlays are adjusted annually to ensure that the net asset position remains balanced over the entire time period. Simulations will show the evolution of the net asset position as a proportion of GDP under alternative sets of assumptions.

1/ The methodology reflects the main characteristics of the two old-age schemes; however, many of the detailed provisions of the old-age schemes were neglected. Simulations are based on the schemes as described in section 3 of the main text. As an illustration, for the public sector scheme, we ignore, inter alia, the ceiling on a maximum pension, lower tantièmes for some categories of civil servants, and years of study assimilated to the work career. We also assume that the provisions of the public enterprises' pension schemes are identical to those for the civil service.

A2. Revenue projection

Revenue of each fund consists of pension contributions (Cj_t) from employers and employees and net budget transfers (Bj_t), including internal transfers within the pillars of the social security system:

$$Tj_t = Cj_t + Bj_t \qquad j=1,2 \qquad (A3)$$

Net budget transfers as a proportion of GDP (Bj_t) are assumed to remain constant at the 1995 level. In addition, the share of old-age pension in total budgetary transfers is assumed to be stable at the January 1995 level.

Projected pension contributions to each fund (Cj_t) are calculated as:

$$Cj_t = \Sigma_{s=m,f} \Sigma_{k=1}^{n} NCj_t^{s,k} Wj_t^{s,k} \phi j_t \qquad j=1,2 \qquad (A4)$$

where $Ncj_t^{s,k}$ is the number of contributors of sex s and age cohort k to fund j, $Wj_t^{s,k}$ is the average gross wage of contributors of sex s and age cohort k to fund j, and ϕj_t is the effective average old-age contribution rate, invariant across gender and cohorts, to fund j.

The number of contributors of sex s and age cohort k to each fund is derived from projections about population, participation rates, and unemployment rates by gender and age cohort. Demographic projections are from the National Institute for Statistics and participation rates projections are provided by the Planning Bureau. Unemployment rate projections by gender and cohort are obtained by combining the overall unemployment rate by gender projected by the Planning Bureau with the unemployment distribution by gender and cohort observed in June 1995. This distribution is assumed to remain unchanged over the 1995-2050 period. Total employment distribution is in turn derived from demographic, participation rates and unemployment rates projections. Total employment in the public sector is projected by the Planning Bureau; its distribution by age and gender is assumed to replicate the one for the entire economy. Employment distribution among wage-earners is calculated as a residual, after subtracting self-employment.

The average gross wage of contributors of sex s and age cohort k to each fund is calculated as follows. First, the overall wage bill is calculated, assuming that it will remain constant as a proportion of GDP. The overall average wage is calculated by dividing the wage bill by total employment. Then, based on the assumption that the ratio of average wage between the public sector and the entire economy remains constant at the 1991 level, combined with the employment projection in this sector, the public sector wage bill is computed. The wage bill for wage-earners is obtained as the residual, as is the average wage in the private sector. Finally, the age and gender

distribution of the average wage in France in 1994 is combined with the average wage projections to obtain the labor income distribution in the public and private sectors. 1/

A3. Expenditure projection

Total outlays in each fund in a given year is the sum of expenditure for pensioners who retired during the given year ($P1j_t$) ("new pensioners"), expenditure for pensioners who retired during previous years ($P2j_t$) ("pre-existing pensioners"), and administrative costs ($ADMj_t$):

$$Ej_t = P1j_t + P2j_t + ADMj_t \qquad j=1,2 \qquad (A5)$$

Administration costs are assumed to be equivalent to 0.5 percentage point of pension expenditure:

$$ADMj_t = (P1j_t + P2j_t) / 200 \qquad j=1,2 \qquad (A6)$$

Expenditure for pensioners, both new and existing, are calculated by age cohort and gender:

$$Pij_t = \Sigma_{s=m,f} \Sigma_{k=1}^{n} NBj_{it}^{s,k} PBj_{it}^{s,k} \qquad i=1,2;j=1,2 \qquad (A7)$$

where $NBj_{it}^{s,k}$ is the number of new and pre-existing pensioners of sex s and age cohort k of fund j, respectively, and $PBj_{it}^{s,k}$ the average pension benefit of new and pre-existing pensioners of sex s and age cohort k of fund j, respectively.

The number of new retirees of sex s and age cohort k of fund j is derived from the number of labor force participants of the age group 45-49 15 years earlier. The number of pre-existing pensioners is based on the number of new pensioners in preceding years and demographic projections.

The average pension benefits of new pensioners is calculated on the basis of the pension systems features mentioned in Section III of the main text. For wage-earners, the wage distribution below the ceiling is derived from the wage distribution without ceiling used for contribution calculations and the overall labor income distribution by decile, assumed to be constant across time, age groups, and gender. The share of retiring wage-earners granted the 75 percent nominal replacement rate is assumed to decline by 2 percentage points every 5 years for men, starting from about 50 percent, and to marginally increase for women, starting from almost 0 percent.

1/ Data on the age and gender distribution of the average wage could not be found for Belgium.

A4. Projection of macroeconomic and demographic variables

The nominal interest rate is given by the following formula:

$$r_t = [(1+\rho_t)(1+\pi_t)]-1 \qquad (A8)$$

where ρ_t is the real interest rate and π_t the inflation rate, fixed exogenously at 3.5 percent and 2 percent, respectively. The GDP deflator is assumed to equal the inflation rate. Given that all parameters are indexed to the CPI, the results, as proportions of GDP, are not affected by the inflation rate. 1/

Output in real terms is given by a Cobb-Douglas production function with labor-augmenting technical progress:

$$Y_t = K_t^{\alpha} E_t^{1-\alpha} \qquad (A9)$$

where Y_t is real GDP, K_t is the capital stock, and E_t is effective labor input. Real GDP growth is given by:

$$\Delta Y_t/Y_t = \alpha(\Delta K_t/K_t) + (1-\alpha)(\Delta E_t/E_t) \qquad (A10)$$

Labor-augmenting technical progress is exogenously fixed at the constant rate λ of 1.5 percent per annum. Employment grows at rate n_t derived from exogenous assumptions about population, labor force participation and unemployment rates by gender and age cohort. Demographic projections are from the National Institute of Statistics (1993); participation and unemployment rates are from the Planning Bureau. Overall, employment in the baseline scenario is broadly stable. Based on the employment and labor productivity growth assumptions, real GDP growth, $(1+n_t)(1+\lambda)-1$, is estimated at about 1.5 percent.

Real wage growth is assumed to equal labor productivity growth; as a result, the total wage bill as a proportion of GDP is constant over the entire period.

A5. Rate of return calculations

The rates of return data in Table 11 are calculated as follows. Consider an employee who has a "typical" wage profile (defined below) throughout his career. During his working life, he and his employer contribute a percentage of his gross salary to the pension system. When he retires, he receives a pension based on his entire wage history according to the rules described in Section III.

1/ Except in the policy scenario where indexation is limited to 80 percent of the CPI.

The rate of return is then defined as that interest rate that equalizes the net present value of all his contributions with the net present value of his benefits. In order to obtain the real rate of return, average inflation during the working and retired life is subtracted.

Historical data on the wage history are based on employment and wage bill data in the OECD Analytical Data Base. Data for 1992-2050 are taken from the simulations in Section IV. Life expectancy data, needed to calculate the years during which a pension is received, are extrapolated based on historical trends. Since data on a typical wage profile are not available, a life-cycle profile was imposed on the average wage data. For wage-earners, we assume that an employee starts 12.5 percent below the average wage and ends his career 12.5 percent above the average wage at the time of retirement. For public sector employees, the spanning between starting and end salaries is assumed to be 10 percent (around the respective begin and end-year averages). 1/

1/ The rate of return calculations reported in Table 11 were only marginally sensitive to these assumptions.

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