LONG-TERM FISCAL SUSTAINABILITY IN BELGIUM

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1 Introduction[1]

Since the beginning of the eighties, the legal pension system has been reformed at several occasions in Belgium. The government felt the need for conceiving these reforms while preserving the long-term financial sustainability of the pay-as-you-go public schemes. In order to do that, the government wanted to have some evaluations of the short- and long-term budgetary cost of various alternative choices and of their feasibility.

The Federal Planning Bureau carried out the analyses. For this purpose, the Bureau started to develop the Maltese-model by the end of the eighties. However, in order to assess the full impact of the pension reforms, and in particular the side effects of the reforms on other public expenditure, it appeared necessary to extend the model to all social expenditure, Social security contributions, tax income and debt dynamics.

Moreover, the principle of global management of the Social security has been introduced in Belgium in 1995. Consequently, the assignment of the social contributions and the transfers from the central

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government specifically to the various branches of the Social security lost all its practical significance.

A global approach appeared to be particularly appropriate to evaluate the 1996-reform, which implied transfers of large volumes of benefits between the branches.

The modelling effort concerned particularly the identification of the eligibility conditions in the various social schemes and the main parameters of the legislation entering in the computation of the benefits. A relatively detailed model of the pension system, as it really functions, made possible to analyse the budgetary impact of possible reforms of the legal framework.

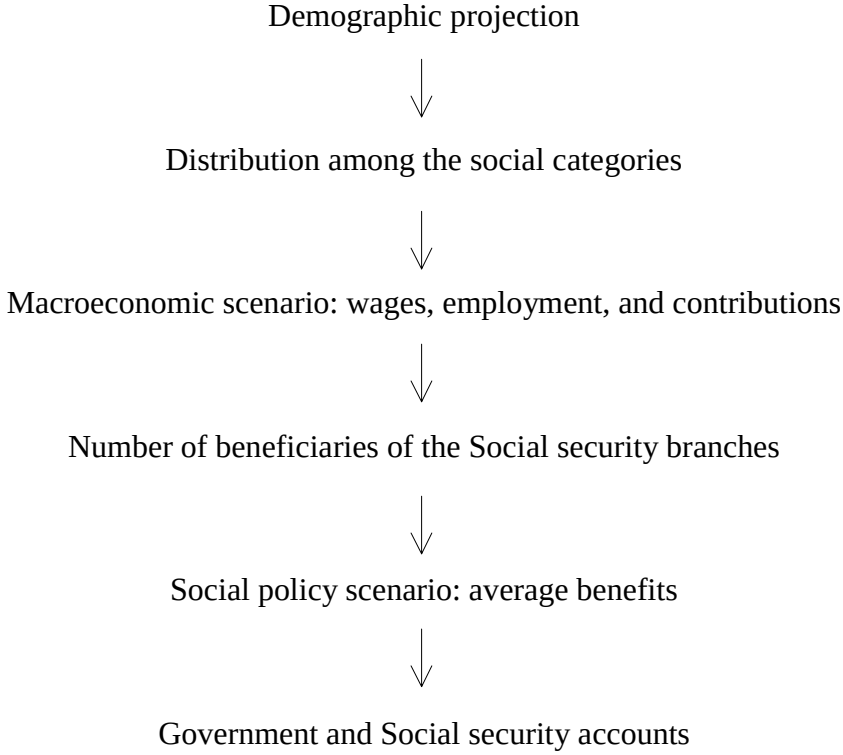
Within the context of a demographic and macroeconomic scenario, this paper gives some long-term budgetary implications of ageing after the 1996 pension system's reform. A "no change in policy" hypothesis is adopted in order to assess the long-term financial viability of the present system and, more generally, of the whole public finances. In this respect, the pursuit of a relatively restrictive social policy concerning the parameters of the legislation and the eligibility conditions is considered.

Over such a long period of time, the projections provided by the Maltese-model only have a prospective and exploratory vocation and should not be considered as a forecasting exercise.

The scope of this paper is not to enter into a full description of the Maltese model and of the long-term projections. They were presented earlier in various papers published by the Planning Bureau (Fasquelle et Weemaes (1997), Festjens (1997) and Lambrecht (1997)).

The following figure presents a simplified flow chart of the different modules that compose the model. It starts from a detailed demographic projection by age and gender. The population is then distributed in social categories such as students, working population, pensioners, etc. A macroeconomic scenario allows computing national income, employment, waging income, taxes and contributions. The number of beneficiaries of all Social security branches is deduced. A social policy scenario gives the hypotheses necessary to calculate the average allowances per beneficiary. Finally, this information is gathered to present the projection of the government and Social security accounts.

Simplified flow chart of Maltese



The paper is structured as follows. Section 1 briefly reviews the central demographic and social-economic scenario. In section 2, the budgetary implications of this scenario are explained and evaluated with a particular attention to the pension and health care expenditure. Section 3 highlights the long-term budget sustainability of the scenario and its implications within the Stability and Growth Pact.

2 The central demographic and macroeconomic scenario

A Demographic scenario

The central demographic scenario was provided by a team composed of the main Belgian demographers, the National Institute for Statistics and the Federal Planning Bureau. Other possible scenarios were also considered and published in 1996 (Institut National de Statistique et Bureau fédéral du Plan (1996)). M. Lambrecht (1997) carried out a thorough analysis of the demographic projections.

Three parameters are important:

- The average final descendants of a woman, would decline smoothly from a current level of 1.85 per woman to 1.75 and stabilise at that level, as a consequence the total fertility rate, currently 1,6, would smoothly rejoin that level of 1,75 in 2010;
- Life expectancy at birth would increase regularly by eight years between now and 2050;
- Migration net inflows would slow down from 10,000 nowadays to 3,000 in 2050.

The main results of the central projection are given in table 1. Thanks to the increase in life expectancy and to the migration inflows, the total population remains broadly stable, but the structure of the population changes dramatically. The dependency coefficient of aged people increases from 39 per cent in 1995 to 62 per cent in 2030. The proportion of people over 80 increases significantly from 4 percent in 1995 to 6 per cent in 2030 and 10 in 2050.

B Two macroeconomic scenarios

The productivity and wage rate were supposed to grow at the same pace. Two sets of hypotheses for the productivity and wage growth were considered: the 2.25 scenario and the 1.75 scenario. These assumptions are within the range provided by the QUEST-model used by the Commission (Commission services, 1999). Total employment is supposed to remain stable over the projection period. This may seem pessimistic considering the job creations observed during the last five years (nearly 1 per cent per year), but, while highly welcome in the case

Table 1. Age structure of the population in the central demographic scenario

	1995	2030
Total population (millions)	10.1	10.3
Structure (per cent)		
0-19	24	21
20-59	55	49
60+	21	30
80+	4	6
Old age dependency coefficient (60+ divided by 20-59)	39	62

of Belgium, such a growth is hardly sustainable in the long run and it was obtained with a low productivity profile. In the context of a declining working age population, a stable employment in the future supposes, on the one hand, that the employment rate, which is abnormally low in Belgium (57 per cent in Belgium in 1998 against 61 on average in the EU, in France and in Germany, 68 in The Netherlands, 79 in Denmark, 70 in Sweden or 71 in UK[2]), will progressively increase and reach in 2030 the present European average and, on the other hand, that the pressures on the labour market are such that productivity will come back to its past trend.

The employment rate increase can be obtained through different channels[3]: the progressive reduction of the very high unemployment rate, the increase in the employment rate of the people older than 50, especially the female population (the 1996 reform contributes to this increase), the pursuit of the growth of the general female participation rate and, finally, a reduction of the early retirements. It is difficult to

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2 Source: EU 1999 Joint Employment Report.

3 The hypotheses are given in Annex 1.

extrapolate over such a long period in the future the labour supply behaviour. However, the cohort phenomenon can play a major part since we know that the young generation enters into the labour market with higher qualifications and that the female participation rate is much higher in younger generations than in the older ones.

Assuming a stable level of employment seems therefore a prudent scenario. It is nevertheless conditioned by the reversal of the trend for people to leave early the labour market and for firms to reduce their demand for older workers. Structural reforms will probably be decided in response to the tightness of the labour market: it is under way for the early retirement schemes but it is far from satisfactory regarding to lifelong learning.

As a result, GDP is supposed to grow by 2.25 and 1.75 in the two productivity scenarios. The macroeconomic hypotheses are not far from the average growth rate observed by Maddisson for Belgium on the last 150 years (Maddison): 2 per cent for productivity and 2.25 per cent for growth.

3 Budgetary implications of ageing

A Methodology

MALTESE actually refers to a system of interdependent sub-models. The demographic model constitutes the starting point; the point of arrival is the model, which generates the global account of the Social security and the account of the entire public administration, including deficits, interest charges and corresponding debts.

The expenditure of each branch of the Social security is modelled by multiplying the number of beneficiaries and the average benefit. The health care consumption is slightly different: it identifies an average consumption per capita, which is function of age and gender and is also strongly linked - with an elasticity superior to 1 - to the economic growth. The receipts are calculated at a global level.

a Number of beneficiaries

The evolution of the number of beneficiaries in each branch of

the Social security is generated from the various age groups and genders which result from the demographic projection, taking into account the non-resident beneficiaries and those having simultaneously several benefits. This distribution is a function of:

- The trend of school attendance and participation rate in the various age groups and genders;
- The macroeconomic scenario with regard to the distribution of the working population between employment and unemployment in the various categories (mainly employees in companies, the self-employed and the civil servants):
- The modifications of the rules of entitlement provided for in legislation. For example, the programmed raising of the retirement age for women involves a reduction of the female rates of retirement between 60 and 65 years;
- The situation of the labour market. The entry coefficient in early retirement fluctuates indeed according to the rate of unemployment in the corresponding age group.

The demographic projection is so transformed in a socio-demographic projection, which presents a coherent vision of the distribution of the population between the various socio-professional categories, in particular the various categories of employment, unemployment, disability, pension,... of allowances for entitled beneficiaries.

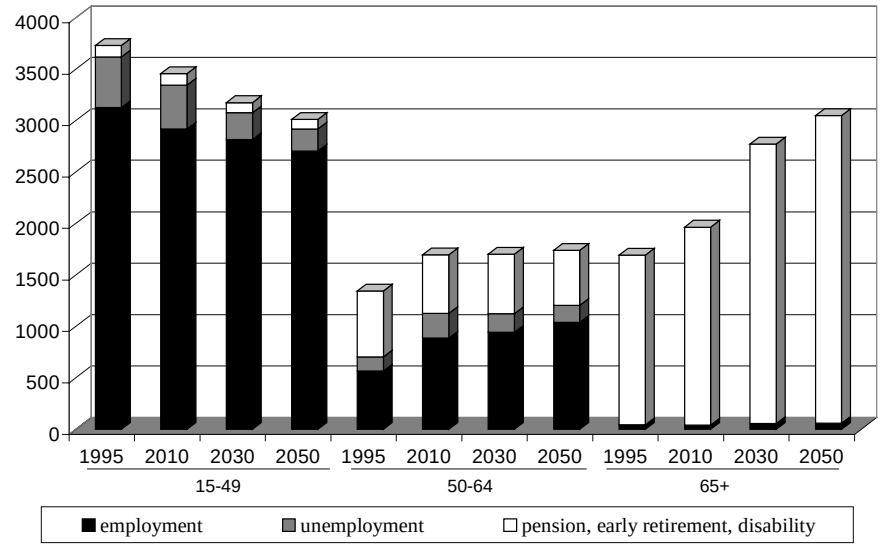
Graph 1 presents the distribution of population between social categories.

b Average amount

The evolution of the average benefit is modelled, in each branch, by reproducing as accurately as possible the influence of the main parameters of legislation on the successive cohorts of beneficiaries.

In particular, several parameters have an overwhelming influence on the financial sustainability of the system:

Graph 1. Projection of social categories per age classes
(in thousands)



- Wage ceilings and basic allocations taken into account in the computation of the benefits;

- Indexation rules of allowances, ceilings and basic allocations (beyond the price indexation, which is inherent in the Belgian system of Social security);

- Replacement rates applied to the different allowance categories;

- Rules of entitlement to particular allowances (examples: supplements for dependants, age supplements, rank of a child, etc...).

The socio-demographic and macroeconomic hypotheses allow determining the evolution of the basic wages, of the number of beneficiaries reaching the ceiling, as well as the demography of the beneficiaries.

In this paper, we will focus our presentation on pensions and health care expenditure.

Table 2. Social and tax policy scenario
(growth rate in per cent)

	GDP growth rate scenario	
	2.25	1.75
1. Expenditures		
Pensions		
- wage ceiling	1.75	1.25
- welfare adjustment	0.5	0.0
Other Social security branches		
- wage ceiling	1.75	1.25
- welfare adjustment	0.5	0.0
Benefits not related to wages (family allowances, basic pensions)	1	0.5
2. Social security and tax receipts Contribution rate	Constant rates	

The hypotheses of the baseline scenario concerning the evolution of ceilings and welfare adjustment rules (beyond a regular indexation to prices) are given in table 2. The other parameters such as the legal replacement rates are kept unchanged.

In the general pension scheme, the hypotheses of the social scenario are based on the 1996-reform. For the other income support schemes, the hypotheses are similar to the pension scenario. This corresponds to a less restrictive policy than was observed during the last 20 years.

Table 3 shows the resulting projected average benefits in the pension and unemployment branches of the Social security. Ceiling and welfare adjustments below the average wage growth lead to declining replacement ratios in mostly every branch of the Social security. A detailed explanation of the reduction of replacement rates in the pension system will be given below.

Table 3. Projection of the average benefits in the 2.25 growth scenario
(*in per cent of the average wage***)**

	1991	1996	2030	2030/1996
Average in income support schemes	34.5	31.2	28.8	- 7.7
pensioner	32.9	31.9	29.7	- 6.9
unemployed	36.2	27.6	23.8	- 13.8

B Public pension expenditures

a Budgetary cost projection

In Belgium, a first pillar pays the vast majority of pensions (about 80 per cent): the pay-as-you-go public schemes. The general scheme for wage earners and self-employed (about two thirds of public pension expenditure) is mainly financed by social contributions (80 per cent) and transfers from the central government (20 per cent). Other schemes (about one third of public pension expenditure) depend directly or indirectly on the government budget: the pension scheme for civil servants, some public-owned enterprises schemes and a public assistance scheme.

Private pensions (about 20 per cent of the total amount of pensions and covering 1/3 of active employees in private sector), which are based on the capitalisation principle as firm or sector pension funds (second pillar) or some individual savings (third pillar), benefit from tax privileges.

Since the beginning of the eighties, the legal pension system has been profoundly reformed at several occasions. In 1983, the wage ceiling applied on Social security contributions was suppressed while maintained for the computation of the benefits. This was general for all the Social security schemes, though it was of particular importance for the pension system. The 1990-reform replaced two very different systems of early retirement into one single system, called “flexible retirement age”. In 1995, the global management of the Social security was introduced by

which the contributions were no longer linked to a specific Social security scheme but provided, with the transfers from the general government budget and with a so-called alternative financing, the financial resources of the whole Social security. The 1996-reform raised gradually the legal retirement age for women from 60 to 65 in order to respond to the legal obligation to treat men and women equally.

The pension model has allowed analysing most of these reforms. It constitutes a particularly elaborate model within the various branches of the Social security. A detailed presentation is given in annex 2. In a nutshell, the pension in the general scheme is, when retiring, determined by computing the average of the wages obtained during a theoretical career of 45 years (for men) indexed to current prices and multiplying this average by 60 per cent or 75 per cent for family with one income. Wages are taken into account up to a ceiling that is also price-linked. In real terms, this ceiling was constant during the past 17 years. As we shall see, it is a powerful mean to erode the pension expenditure in the future. Since the 1996-reform, the ceiling is linked to the average real wage, the wage drift not included. When the pension amount is determined, it evolves with a price indexation mechanism. Each year the government decides a "welfare adjustment", which allows the pensions to benefit to some extent from the general increase in real income. During the past 20 years, no welfare adjustment was granted in the different Social security branches, except in the early nineties for a ad hoc and limited adjustment in the general pension scheme for wage earners and some unemployment benefits (seniority supplements).

Table 4 shows the pension budgetary cost of ageing for the two sets of hypotheses about productivity and wage growth.

While important in nominal terms, the increase in pension expenditure is limited in proportion of GDP since it reaches 2.3 per cent in the 2.25 growth scenario and 2.8 per cent in the 1.75 growth scenario between 2000 and 2030. This result is very different from the previous projections presented by the Planning Bureau and reported in different papers; especially in the basic paper used by the Commission in its work written by Franco and Munzi (1997) before the 1996-reform of the general pension scheme. This result is also much less pessimistic than those published in the IMF (Chand, S and A. Jaeger (1996)) and OECD works (Rosevaere, D. and al.) and by de Callatay and Turtelboom (1997) based on a different methodology.

Table 4. Pension budgetary cost
(per cent of GDP)

	2.25 growth scenario	1.75 growth scenario
	2000-2030	2000-2030
General scheme	1.8	2.3
- wage earners	1.7	2.2
- self-employed	0.1	0.1
- guaranteed income	0.0	0.0
Civil service	0.5	0.5
TOTAL (early retirement non included)	2.3	2.8
Early retirement	0.1	0.1
TOTAL	2.4	2.9

The relatively modest impact of ageing on pension expenditure is mainly due to the declining average pension-wage ratio that results from modelling the various policy parameters in the projections of the Planning Bureau. Assuming a constant replacement rate would give an increase of pension expenditure that would amount to 4.1 per cent of GDP between 2000 and 2030 instead of 2.3. (See table 6).

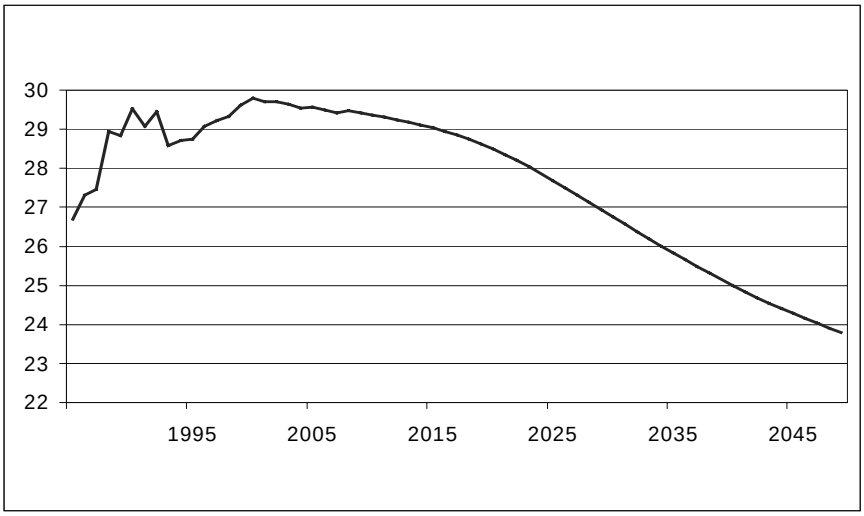
Moreover, the 1996-reform increases the retirement age and restricts the eligibility conditions for early retirement, especially for women.

Graph 2 displays the average pension-wage ratio in the general pension scheme. Since 1990, a declining average pension-wage ratio can be observed, temporarily interrupted by the introduction of the 1996-reform, but accelerating from 2020 onwards.

b Why does average pension-wage ratio decline?

The average pension-wage ratio decline is the result of three factors: the changes in the entitlement patterns, the impact of the wage ceiling, the low welfare adjustments combined with increasing average age of the pensioners.

Graph 2. Average pension-wage ratio in the general pension scheme
(per cent of current average wages)



(i) Changes in entitlement patterns

As mentioned in annex 2, there is a fixed legal replacement rate that is applied to the average wages. This replacement rate is in most cases 60 per cent, but it can be 75 per cent for those who are married and have only one income in the family.

A rising number of women who have worked since the mid-sixties and who have built up a longer and better paid career, will be entitled to their own pension. Therefore, the family pensions of today will be followed by an increasing number of new pensioners opting for pensions for both spouses.

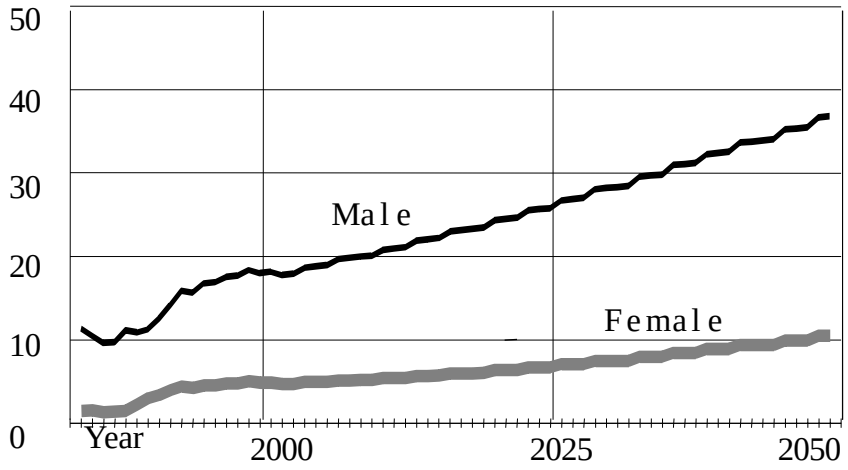
More pensions of the new generations of male pensioners will be calculated at 60 per cent of their working career, instead of 75 per cent. The pension of the new generations of female pensioners, also calculated at 60 per cent of mostly an incomplete working career, is not much higher than the 15 per cent loss in the pension of the husband. Although this couple cumulates a higher retirement income than the family pension, the “average” pension per pensioner decreases.

(ii) Impact of the wage ceiling on the pension benefit when entering retirement

In general, as the pension benefit is based on the wages earned during a 40- to 45-year career before entering retirement, the average pension benefit grows parallel to the average (over the career) wages of successive generations.

However, these wages are submitted to a wage ceiling having a different evolution than wages.

Graph 3. Share of wage earners earning more than the wage ceiling
(*in percent*)



Before 1982, the ceiling was on average linked to the wage rate, mostly delayed and catching up afterwards.

Since 1982, the ceiling has, on the contrary, only been linked to price inflation. For high salaries, the percentage of the wages exceeding the ceiling - which is not taken into account for the calculation of pension benefits - began to increase. The number of wage earners with wages above the ceiling has increased from 7 per cent in 1985 to 13 per cent today.

The average pension in this group will increase at the same rate as the ceiling, generating a maximum pension benefit growing slower than the average wages. Therefore, if the ceiling remains disconnected from wages for too long, the earnings-related pension scheme will become in the long run a flat basic pension scheme.

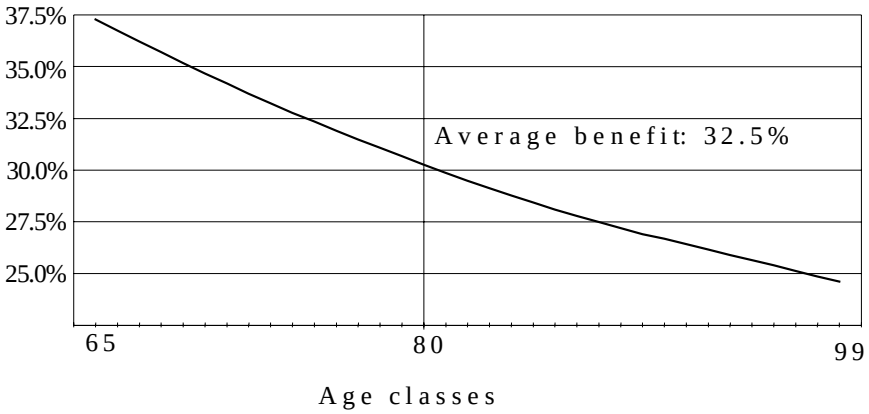
To strengthen the legitimacy of the legal pension scheme, the 1996-reform has linked the wage ceiling to conventional wages from 1999 onwards. The wage assumptions of this long-term outlook are: 2.25 per cent wage growth rate, including a wage drift of 0.5 per cent and 1.75 per cent growth rate of conventional wages.

Graph 3 illustrates that, even with a full adjustment of the ceiling to conventional wages from 1999 onwards, because of the shift towards better-paid jobs (wage drift), the proportion of wage earners above the ceiling keeps growing - although at a slower pace than during the past 17 years. This increasing proportion erodes progressively the average pension-wage ratio in the general pension scheme.

(iii) Low "welfare adjustment" combined with a longer life expectancy

Without or with benefit adjustments highly disconnected from the average wage growth, people receiving a pension will see a progressive reduction of the ratio of their pension relative to the current wages. Their absolute situation will not change, but their relative position will be downgraded. This can be seen in the graph 4 where it is assumed, as in the basic projection, that the yearly welfare adjustment amounts to 0.5 per cent while the real wages increase by 2.25 per cent. When the life expectancy at the age of retirement was weak, this was not really a source of concern. Now, life expectancy increases and, according to demographic projections, it will keep growing. The combination of highly disconnected welfare adjustments and the growing life expectancy mechanically entails a reduction of the average pension in proportion of the current average wages. Moreover, the cohort of the baby-boom generation (which is particularly large in number) will play a significant part in increasing the average ratio at the time they will retire (around 2010) and in accelerating the downward movement of the ratio afterwards. The low welfare adjustment is therefore a powerful mean to keep the pension expenditure under control, but it downgrades the relative position of the older pensioners. That is the reason why it should be appropriate to focus the welfare adjustment on the older cohorts.

Graph 4. Ratio of a pension to the current wage rate during retirement period
(Profile in steady state)



C Health care expenditures

The long-term evolution of health care expenditure is less easy to predict. Intuitively, one expects a significant impact of an ageing population on this expenditure since the relative cost of health care is higher for elderly people than for the other age groups. But, on the other hand, technological progress and the priority given to health care consumption in the allocation of income seem to be much more dominant factors in explaining the past evolution of health care expenditure. In order to assess the impact of ageing and other determinants, an econometric approach has been adopted which is explained in annex 3. The following table 5 gives the change in per cent of GDP of the private consumption in health care. Ageing would contribute to two thirds of the change; i.e. between 2000 and 2030 the cost of ageing could reach 1.7 per cent of GDP.

In Belgium, the system is such that the government largely controls the increase in public health care expenditure. The econometric results have therefore to be considered as a benchmark.

Two points are, nevertheless, worth mentioning:

Table 5. Private consumption in health care in the 2.25 per cent scenario
(change in per cent of GDP)

	2000-2030	2010-2030
Total	2.5	1.8
Trend	0.7	0.6
Demographic effects	1.8	1.2
Ageing effect	1.7	1.2
Volume effect	0.1	0.0

- The elasticity of health care expenditure to GDP is on average 1.15 (ageing effect not included) between 2000 and 2030. Accordingly, the growth rate of health expenditure also depends on GDP growth. In the 2.25 growth projection, the real annual growth of health care expenditures is 3.1 per cent (exceeding the present and past targets of the government) and in the 1.75 per cent growth projection this growth rate amounts to 2.7 (including the ageing effect). Between 2000 and 2030, ageing contributes by 0.6 per cent to the real annual average growth of expenditure.

- The share of Social security expenditure in health care consumption is about 70 per cent. If this share remains unchanged in the future, the increase in health care consumption by 2.5 per cent of GDP between 2000 and 2030 will correspond to 1.7 per cent increase in terms of Social security expenditure[4] (of which 1.2 per cent resulting from the demographic effect).

[4] The impact of ageing on health care expenditure that is not covered by the Social security but partly subsidised by the government, such as the old people's home, are not treated in this paper.

D Budgetary cost of ageing

Table 6 summarises the budgetary cost of ageing in per cent of GDP for the periods 2000-2030 in the two macroeconomic scenarios. The table shows that pensions and health care costs increase significantly. These costs are partially compensated by the other social expenditure, unemployment benefits, family allowances that are slightly decreasing. As a consequence, between 2000 and 2030, the total budgetary cost amounts to 2.6 per cent of GDP for the 2.25 growth hypothesis and 3.1 per cent in the 1.75 growth hypothesis. This is a rather low cost of ageing compared with what is presented in other papers. It must be kept in mind that this result is conditional to the various restrictive and prudent hypotheses adopted in this work and especially, first, to the ability to keep employment stable by increasing the employment rate particularly for the older workers, secondly, to allow the average pension-wage ratio to decline by moderating the welfare adjustments and the growth of ceilings of benefits in every social program, and thirdly, to keep under control the growth of health care expenditure. Under these conditions which are feasible, it is possible to ensure the long-term sustainability of the public finances.

Table 6. Summary of the budgetary cost of ageing*
(*increase between 2000 and 2030*; *in per cent of GDP*)

	2.25 growth scenario	1.75 growth scenario
Pensions	2.3	2.8
Health care	1.7	1.7
Disability	-0.1	-0.1
Unemployment	-0.8	-0.8
Early retirement	0.1	0.1
Family allowances	-0.6	-0.6
Total	2.6	3.1

* *Education expenditure and publicly owned enterprise pensions have not been taken into account.*

4 Long-term sustainability of public finances

The implementation of the Stability and Growth Pact implies that Member States should submit to the Commission a Stability Programme, which is aimed at defining a short-term and medium-term budgetary policy. The medium-term objective should be the financial balance on average over the cycle. In any phase of the cycle, this equilibrium allows conducting a contra-cyclical budgetary policy, and, especially, to let the automatic stabilisers operate.

The question of long-term sustainability of public finances has also been raised within this framework, and at the Helsinki Summit, the co-ordination of economic policies was strengthened by a regular review of the sustainability of the public finances.

While examining this question, the evolution of the receipts and expenditures in a business-as-usual scenario as well as the budgetary impact of ageing on social expenditure in the next century should be considered.

A Basic sustainability condition

The basic condition for sustainability [Bogaert (1984), Blanchard (1990), Delbecque (1994)] implies that the sum of the discounted value of future primary surpluses covers in the long-term the repayment of public debt. This can be formalised as follows.

Debt increase is defined as the interest charge minus the primary surplus:

$$B_t - B_{t-1} = rB_{t-1} - S_t$$

Expressed in per cent of GDP, this equation becomes:

$$b_t - b_{t-1} = \frac{r-\delta}{1+\delta} b_{t-1} - s_t$$

where b and s represent respectively the public debt and the primary surplus in percent of GDP, r represents the interest rate and δ the growth rate of GDP. If this equation is resolved by recurrence to the future, one obtains the intertemporal budget constraint (supposing r and δ remain

constant):

$$b_t = \sum_i^n \beta^i s_{t+i} + \beta^n \cdot b_{t+n}\,, \qquad \text{with} \qquad \beta = \frac{1+\delta}{1+r}$$

β is the discounting factor.

If this process is continued indefinitely and if the difference between the interest rate and the growth rate is positive

$$b_t = \sum_i^\infty \beta^i s_{t+i}\,, \qquad \text{with} \qquad \lim_{n\to\infty} \beta^n b_{t+n} = 0$$

This condition allows to measure the extent of potential short-term adjustments (and, consequently, of changes in policy) a country has to make in order to respect the intertemporal budget constraint. As it applies to the short-term, it corresponds to the minimal necessary adjustment: any delay will add to debt and increase the extent of the adjustment.

In order to evaluate the series of future primary surpluses in the context of no change in policy, it is often supposed that the primary surplus remains unchanged in percent of GDP. This hypothesis is obviously inadequate to account for the budget items that will be affected by the ageing of population. In order to take this element into account, the intertemporal budget constraint should be redefined, by identifying expenditure resulting from the demographic shock:

$$b_t = \sum \beta^i \left(s^*_{t+i} - p_{t+i}\right)$$

in which s^* represents the primary surplus excluding expenditure resulting from the demographic shock and p expenditure resulting from the demographic shock. This equation determines the level of primary surplus without expenditure resulting from the demographic shock (s^{**}), which, if it is reached immediately and permanently maintained constant, verifies the intertemporal budget constraint:

$$s^{**} = \left[b_t + \sum \beta^i p_{t+i}\right]\left(\frac{r-\delta}{1+\delta}\right)$$

which gives the minimal sustainable primary surplus trajectory:

$$s^r_{t+i} = s^{**} - p_{t+i} \quad , \forall i$$

In table 7, the minimal primary surplus, recommended in 2000 for satisfying the sustainability criterion is calculated. The two growth scenarios of nominal GDP were crossed with different hypotheses on the implicit interest rate of public debt. It is, indeed, difficult to forecast the level of the implicit interest rate for such a long period. We see, however, that, over the last 25 years, the difference between interest rate and growth rate amounted to 2.5 per cent, which corresponds to the couples interest rate growth rate of 4.75 - 2.25 per cent or 4.25 - 1.75 per cent. For both these hypotheses, the minimal sustainable primary surplus is respectively 4.6 and 5.1 per cent, which is less than the present primary surplus, exceeding now 6 per cent in Belgium.

Table 7. Minimal sustainable primary surplus in 2000
(in per cent)

Real interest rate hypothesis	GDP growth rate hypothesis	
	2.25	1.75
4	3.7	4.8
4.25	4.1	5.1
4.75	4.6	5.5
5.5	5.3	6.1

B Budget margins with the Stability and Growth Pact strategy

The strategy of the Stability and Growth Pact is totally different from that based on the sustainable primary surplus. The Stability and Growth Pact recommends, indeed, that a financial balance should be reached (on average over the cycle). Such a strategy leads to a primary surplus, the level of which would depend on the level of the debt in per cent of GDP. As the latter tends to diminish mainly according to the growth rate of GDP, the same is true for the interest burden in percent of

GDP. Although nominal debt remains constant, in per cent of GDP it tends asymptotically to zero.

Maintaining financial balance would therefore require reducing the primary surplus to the same extent than the interest burden.

The following question arises then: does the Stability and Growth Pact-strategy lead to a primary surplus inferior to the minimal sustainable primary surplus? If so, a more rigorous budgetary strategy than that of the Stability and Growth Pact should be pursued by adopting a financial surplus during a first stage: financial surplus corresponding to the difference between the primary surplus recommended by the sustainability criterion and that of the Stability and Growth Pact. This does not seem to be the case for Belgium in the growth hypotheses and for the budgetary evaluation of ageing, presented so far.

For the Stability and Growth Pact, Belgium should indeed reach a primary surplus slightly superior to 6 per cent, for several years in order to restore its financial balance whereas the sustainable primary surplus amounts to 4.5 to 5 per cent.

This is confirmed from another point of view. As shown in table 8, it follows that, during the demographic shock (2000-2030), the Stability and Growth Pact-strategy should provide some margins, in excess of the “no policy change” scenario.

The second question, that may arise, is to know whether, in spite of the fact that the Stability and Growth Pact-primary surplus is superior to the sustainable primary surplus, the less than zero deficit condition is met each year in the “no policy change” scenario. Indeed, margins in the Stability and Growth Pact-strategy diminish progressively according to the decrease of debt in per cent of GDP. In certain future periods, this decrease might prove insufficient to cover the annual increase in expenditure resulting from ageing. This is not the case, as can be seen in table 8. Nevertheless, in the 1.75 growth scenario the cost of ageing is very close to the reduction of the interest burden. In both scenarios, the period 2002-2010 should lead to excess margins.

In table 8, only the budgetary cost of ageing is envisaged. It is nevertheless clear that other possible structural costs should be considered. In particularly, in the long run, Europe and globalisation should lead to tax competition or tax harmonisation and more emphasis

should be put on the correction of environmental negative outcomes. Ideally, in the future, these concerns should be taken into account in the sustainability issues.

Table 8. Budgetary cost of ageing and reduction of interest burden in Stability and Growth Pact strategy during the demographic shock
(*in per cent of GDP*)

	2002-2010*	2010-2020	2020-2030	2002-2030
1. GDP growth rate at 1.75				
- Cost of ageing	0.7	1.4	1.1	3.2
- Reduction of interest burden	1.5	1.6	1.2	4.3
2. GDP growth rate at 2.25				
- Cost of ageing	0.6	1.3	0.8	2.7
- Reduction of interest burden	1.8	1.8	1.2	4.8

* *The government has decided to reach a zero deficit in 2002. Budget margins, equivalent to the reduction of the interest burden, appear thus from 2002 onwards. Hypotheses: inflation rate 1.6 per cent and real interest rate 4 per cent.*

5 Conclusions

Although this kind of exercises are very stylised, one can conclude that, after the various reforms of the Social security schemes, the sustainability of the public finances could be achieved in Belgium provided that a few conditions are satisfied.

The employment level should grow or be stable. This implies that the employment rate increases regularly when the working age population decreases. In Belgium, the large number of unemployed, the low employment rate and the larger female participation rate in the

younger cohorts represents a large and sufficient reserve of labour force. Nevertheless, actions should be taken as, for instance, lifelong learning incentives and reduction of disincentives created by early retirement schemes in order to increase employment rates of elderly workers both from the employer and the employee sides.

The social policy scenario should remain relatively restrictive without diminishing the benefits, but by strictly controlling their growth through two parameters: the welfare adjustments of the benefits and the ceiling of the real growth rate of the health care expenditure. Nevertheless, the reference scenario considered in the paper is more generous than the policy applied during the last 20 years.

The global management of the Social security will help since some expenditure should decrease and partially compensate the costs of ageing.

The pursuit of the Stability and Growth Pact medium-term objective of "close to balance or in surplus" will entail, when it is reached, a double dividend: first, it will mathematically lead to the rapid reduction of the debt ratio and, consequently, it will lead to the reduction of the interest burden in per cent of GDP. This reduction will provide budget margins that can be used either to increase employment or to reduce the debt further during the 2000-2010 period, where the ageing problem is not yet very acute, and, afterwards, to compensate the costs of ageing.

Obviously, the budget margins implied by the Stability and Growth Pact condition are particularly favourable for Belgium since the debt ratio is large and declining at a fast pace. Nevertheless, it assumes that the resources coming from the reduction of the interest burden and belonging to the central government will increasingly finance the Social security and reduce the share of the contributions, thus reduce the insurance character of the system.

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ANNEX 1

EMPLOYMENT AND UNEMPLOYMENT RATES PER AGE CLASSES IN THE BASELINE SCENARIO

	2000	2010	2030
Employment (*in per cent of working age population*)			
15-49	62.4	61.1	65.2
50-64	39.3	43.2	49.1
65+	2.3	2.3	2.3
Total	57.0	56.3	61.2
Unemployment (*in per cent of active population*)			
15-49	12.8	12.7	8.4
50-64	21.9	26.0	19.7
Total	13.8	14.8	10.3

ANNEX 2

MODELLING PENSION EXPENDITURES IN THE GENERAL SCHEME FOR WAGE EARNERS

Over the last ten years, the Federal Planning Bureau has developed a model for calculating the pensions paid annually by the Social security of wage earners. Following is an outline of the method used. The text refers to basic equations that can be found in the appendix.

The pensions paid through the legal scheme for wage earners equal by definition the sum of payments made in each legal category. The legal pension scheme indeed distinguishes various categories. These categories are identified by the combination of various criteria such as gender, marital status, etc, which define homogeneous groups. The categories of pensioners that are distinguished are:

- married men enjoying a pension at a preferential rate because their wife does not receive transfer income or earned income;
- men or women, married or not married, receiving an individual pension in their own right;
- widows or widowers receiving a so-called “survivor’s pension”; they become entitled to this pension after the death of the spouse who received a retirement pension;
- widows or widowers cumulating their own pension with a survivor’s pension coming from the deceased partner.

For each category, the sum of the pensions paid to each cohort is calculated, a cohort being the total number of individuals born in the same year. The survival probabilities depend on the age and the year of birth. The same is true for the probabilities of transition from one category to another.

For each cohort and each category, the amount of pensions paid equals the product of the number of individuals concerned and the average pension per individual (Equation 1).

To each category correspond a number of people, an outflow out of that category and an inflow into the category.

The outflow is mainly related to the probability of death and to

the probability of transition from one category to another. As far as the pensions are concerned, the change of category is primarily the consequence of the death of the spouse, which possibly entitles the surviving spouse to a survivor's pension.

The inflow is the result, on the one hand, of the change in category: from wage earner to pensioner and, on the other hand, of the probability of passing from one category to another.

The inflow of the recipients who reach the legal retirement age (for the sake of simplicity let's suppose 65 years) and the evolution of the stock of pensioners in the various categories obey the following laws of motion:

- In the case of the cohorts of pensioners: for one year, the number of people in the cohort belonging to a particular category equals the number of the previous year minus the people who have left this category, notably by death, plus those who have passed over from another category (Equation 2);
- In the case of the cohort that reaches 65 years: the number of people in the cohort who enter into a particular category of pensioners equals the number of wage earners in the cohort conditional on the probability of belonging to that category and the probability of death between 64 and 65 years (Equation 3).

The average pension per cohort and category is calculated in a similar way as individual pensions. Following as much as possible these rules of "microeconomic" calculation has the advantage that the parameters crucial for the calculation of the pensions are well identified, facilitating the evaluation of any modification in these parameters.

For the cohorts aged 65 years or more and thus already retired, the average pension equals the average pension that the cohort received the year before, adjusted by a factor that consists of two components. The first is a price index linkage; the second is a discretionary adjustment, decided each fiscal year. (It is assumed that the changes in category, and in particular those because of death, do not modify the distribution of income within each cohort and in each category) (Equation 4).

For the cohorts that reach the retirement age, the average pension in a particular category equals the average pension obtained the previous year by the cohort that went into retirement the previous year,

multiplied by the increase in an index. This index represents the history of the standard career of the cohort, quantified by the parameters used for the calculation of the pension (Equation 5).

For each category and cohort, the standard pension is calculated by applying a "replacement coefficient ", which is different across categories, to the career average of the average wages under the ceiling obtained by a representative individual. These average wages under the ceiling are indexed to the consumer price index. The concept of an average wage under the ceiling is used because legislation only takes into account the wages up to a ceiling to calculate an individual's pension. The ceiling itself is decided each year by the government on the basis of legislation that provides for a wage-linked adjustment. The ceiling is at the minimum indexed to the consumer price index (Equation 6).

In order to calculate the average wages under the ceiling of a cohort, the wage distribution of a cohort is used. This distribution enables us to calculate the proportions of wage earners whose wages are respectively higher and lower than the ceiling (Equation 8) and to calculate the average wage of wage earners who are below the ceiling (Equation 9). Unfortunately, this calculation can only be made for one year. The other years will be extrapolated by supposing that the distribution function remains constant around the average, which itself may evolve in time. With all these elements, it is possible to calculate the average wages under the ceiling as the weighted sum of the average wages of wage earners. The weights are respectively the proportion of wage earners being under the ceiling and the proportion of wage earners being above the ceiling (Equation 7).

APPENDIX TO ANNEX 2

Basic equations of the pension expenditure model

1 The amount of pensions paid

$$M(s,t) = \sum_{a=t-100}^{t-65} A(a,s,t) \cdot B(a,s,t) \qquad (1)$$

with:

a: year of birth of the cohort

s: category of pensioners

t: year for which the amount of pensions is calculated

A (a, s, t): the number of pensioners in cohort *a* being in category *s* at time *t*

B (a, s, t): the average pensions of cohort *a* being in category *s* at time *t*

M (a, s, t): the amount of pensions paid to the pensioners being in category *s* at time *t*

2 Evolution of the number of pensioners

$$A(a,s,t) = A(a,s,t-1) \cdot \left[1 - \sum_{s'} \prod (a,s,s',t \right]$$
$$+ \sum_{s'} A\left[(a,s',t-1) \cdot \prod (a,s',s,t) \right], \qquad (2)$$
$$\forall a \,|\, t - a \geq 65 \text{ and } \forall s' \,|\, s' \neq s$$

with:

$\prod (a,s,s',t)$ the probability of passing from category *s* to category *s'*

$$A(a,s,t) = S(a-1,s,t-1)\left[1-\varphi(a,s,s',t)\right] + \sum_{s'}\left[S(a,s',t-1)\cdot\varphi(a,s',s,t)\right], \quad \forall s' \neq s \quad \forall a \mid a = t-64 \text{ and } \forall s' \mid s' \neq s \tag{3}$$

with:

$S(a, s, t)$: the number of wage earners in cohort a being in category s

$\varphi(a,s,s',t)$ the probability for a wage earner in category s to pass in category s' when going into retirement

3 Evolution of the average pension

3.1 Cohorts of people who have already retired

$$B(a,s,t+1) = B(a,s,t)\cdot(1+c_{t+1}), \qquad \forall a \mid t-a > 65 \tag{4}$$

with:

$B(a, s, t)$: the average pension per cohort and per category

c: the adjustment coefficient for the pensions: price-linking and possibly in addition so-called "welfare" adjustment.

3.2 Cohorts of people who reach the retirement age

$$B(a,s,t) = B(a-1,s,t-1)\cdot\frac{p(a,s,t)}{p(a-1,s,t-1)}, \quad \text{for } a \mid t-a = 65 \tag{5}$$

with:

$p(a, s, t)$: the standard pension per cohort and per category with $a = t-65$

3.3 Standard pension per cohort and per category

$$p(a,s,t) = \frac{\phi(s)}{N(s)} \cdot \sum_{i=t-N(s)}^{t} w(s,i) \cdot r(t,i) \qquad (6)$$

with:

$N(s)$: the maximum number of career years which are taken into account to calculate the pension per category (example: previously in the general pension scheme for wage earners: 45 years for men, 40 years for women)

$\phi(s)$: the "rate of replacement" related to the average wages per category during the career (example: 75 per cent for one-income families, 60 per cent for singles or two-income families)

$w(s,i)$: the average wage under the ceiling in the year i

$r(t,i)$: adjustment coefficient for the wages in the year i for a person who goes into retirement in the year t (mainly price-linking)

3.4 Average wages under the ceiling

$$w(s,i) = \bar{w}(i) \cdot \eta(s,i) + w_u(s,i) \cdot [1 - \eta(s,i)] \quad , \quad for \ \forall s,$$
$$for \ t \mid t - a = 65 \qquad (7)$$
$$and \ for \ i = t, t-1 \ldots t - N(s)$$

with:

$\bar{w}(i)$: the wage ceiling in year i

$\eta(s,i)$: the proportion of wage earners in year i of the cohort that goes into retirement in year t and whose wages exceed the ceiling $\bar{w}(i)$

$w_u(s,i)$: in year i, the average wages of the wage earners whose wages fall short of the ceiling $\bar{w}(i)$

3.5 The proportion of wage earners whose wages exceed the ceiling $\bar{w}$

(One assumes a time-invariant distribution - observed for one basic year - of the wages divided by the average wages)

$$\eta(s,i) = \int_{\bar{x}(i)}^{\infty} f(x(s)) \cdot dx(s) \tag{8}$$

with:

f(x(s)): the proportion of wage earners whose wage rate is *x*

x(s): the wages divided by the average wages $\omega(o)$ earned in the basic year of the sample

$\bar{x}(i)$: the wage ceiling. As the wage ceiling evolves in time, it should be made comparable with the wages of the basic year. Therefore, it is expressed as following: $\bar{w}(i)$ divided by $\omega(i)$ at year *i*, i.e. the ceiling of year *i* divided by the average wages of year *i*.

3.6 The average wages in year *i* of the cohort receiving in that year *i* wages under the ceiling

$$w_u(s,i) = \left[\int_{o}^{\bar{x}(i)} x(s)\, fx(s)\, dx(s) \right] \cdot \left(\frac{\omega(i)}{\omega(o)} \right) \tag{9}$$

with:

$\omega(i)$: the average wages in year *i*

$\omega(o)$: the average wages in the basic year

ANNEX 3

MODELLING HEALTH CARE CONSUMPTION

Two types of determining factors are taken into account in the model of health care consumption: the demographic determinants and the trend mainly due to technological and sociological progress.

1 Demographic determinants

The demographic determinants are the size of the population and the change of the structure of the population per age and gender.

The impact of changes in the structure of the population on health care consumption is estimated on the basis of data concerning relative consumption per age and gender within a representative sample and for a given year:

$$i_{a,s} = \frac{c_{a,s} / n_{a,s}}{c/n}$$

in which:

- $i_{a,s}$ relative consumption per age a and gender s,

- $c_{a,s}$ consumption per age and gender (c representing total consumption of the sample),

- $n_{a,s}$ the population in the sample per age and gender (n representing total population in the sample).

On the basis of these data, an index is constructed, the growth rate of which is supposed to give the increase in health care consumption per capita, solely due to demographic structure variation:

$$S_t = \frac{\sum_s \sum_a (i_{a,s} \cdot N_{a,s,t}) / N_t}{\sum_s \sum_a (i_{a,s} \cdot N_{a,s,t=0}) / N_{t=0}}$$

in which

- S_t the structural index

- $N_{a,s,t}$ the Belgian population of age a and gender s in year t (t=0 being the basic year of the index).

2 The "trend" of health care expenditure

The trend of health care consumption is defined here as the part of this evolution, which does not result from demographic effects, as described above.

The trend results from volumes and prices. Both demand and supply and also public health care objectives contribute to the growth of volumes. Moreover, national accounts show that the average growth of the deflator of private health care consumption is superior to that of the GDP-deflator. This reflects the cost of important technological developments in that sector.

The model used sets a linear relation between health care consumption per capita, at unchanged demographic structure, and deflated by GDP-prices, on the one hand, the GDP per capita and an autoregressive term, on the other hand. Thus the trend includes the volume effect and the effect of the difference between the price of health care and that of GDP.

$$\frac{C_t}{N_t \cdot P_t \cdot S_t} = \beta_1 + \beta_2 \cdot \left(\frac{PIB_{t-1}/P_t}{N_{t-1}} \right) + \beta_3 \cdot \left(\frac{C_{t-1}}{N_{t-1} \cdot P_{t-1} \cdot S_{t-1}} \right) + \mu_t$$

in which:

- C_t total private health care consumption in t,

- N_t the Belgian population,

- P_t the GDP-deflator,

- S_t the index of demographic structure (cf. above).

The regression shows a marginal propensity to consume β_2 of 2.1 francs for an increase in national income by 100 francs per capita. Over a long-term period, this ratio totals up to 11 francs or to an amount superior to the actual part of health care consumption in the GDP.

This functional form was used because of its simplicity. Other regressors, such as the income per worker or the average allowance rate of health insurance, were rejected because of their poor explanatory power.

Advantages and drawbacks of this approach

Considering a demographic effect and a trend linked to the evolution of national wealth is in conformity with the principles of modelling the long-term evolutions in the MALTESE-model (forecasts on the basis of the demographic evolution expected and of hypotheses with respect to the macroeconomic aggregates). This modelling, however, is of little pertinence in a short- or medium-term perspective in which the evolution of both volumes and prices largely depends on the budget orientations, the evolution of instruments for monitoring expenditure, the result of conventions between the medical sector and health insurance funds, etc.

Aggregating the contribution of the price- and the volume effects can be justified by the fact that, clearly, these effects are poorly apprehended by the national accounts, in a sector that knows rapid technological developments and, therefore, undoubtedly shows a poor temporal homogeneity of output in goods and services.

An important proviso relates to the rigidity of the coefficients of relative consumption per age and gender. One might, indeed, suspect that, as a result of a stronger technical development in certain sub-sectors of health care or as a result of different income effects according to the age groups, consumption in certain age or gender groups might develop at a different rate than the average one. The implicit hypothesis here is that the growth of health care expenditure is homogeneously spread over the

different age and gender groups. The forecast may well underestimate the increase due to ageing and overestimate the increase due to the trend.

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