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DEVELOPMENT OF LONG-TERM SCENARIOS FOR HEALTHCARE EXPENDITURE IN BULGARIA

The study is connected with preparing of the country report for Bulgaria in the Work Package (WP) IX titled "Development of Scenarios for Health Expenditure in the Accession Economies" within the project "Ageing, Health Status and Determinants of Health Expenditure" (AHEAD) under the Sixth Framework Programme of the European Commission. Eighteen research units from thirteen countries in Europe are included in this project; in WPIX are included: Bulgaria, Estonia, Hungary, Poland and Slovakia.
The main objective of the study is to explore the interrelations between the most important indicators related to the health care expenditure in Bulgaria (based on 2003) in a long-term perspective up to 2050 and using an intermediary control (target) year 2025. For this purpose a model of the International Labour Organisation (ILO) is applied.
The study presents the basic features of the ILO model, specificity of the data used and the involved assumptions about the future behaviour of the different variables as well as the basic obtained results. Finally concluding remarks and policy implications are given.
JEL: J00, H5, I18, C32, C53

Introduction

The expenditures on health care in the countries from Central and Eastern Europe (CEE), new members of the EU has never been based yet on the model of inter-dependence of socio-economic factors of the health state and the changes in the structure of population. The development of long-term scenarios here is based on the analysis of previous carried out study within WPII "Health and Morbidity in the Accession Countries" and thus the health care expenditures are interrelated with the status of health of the nation.[3]

In order to unify the applied methodology by the partners from the CEE countries included in WPIX (Bulgaria, Estonia, Hungary, Poland and Slovakia) and to compare the obtained results a model of the International Labour Organisation (ILO) Financial and Actuarial Service was used. This choice is due to the high quality of the proposed model, including the combined influence of the demographic, economic and health care finance indicators.

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[3] See Rangelova, R.(2006), Health and Morbidity in the Accession Countries. Report Bulgaria, ENEPRI Research Report № 20, Brussels <www.ceps.be>.

The main objective of this study is to describe the interrelations between these three groups of indicators related to the health care expenditure in Bulgaria for 2003 taken as a base year and further to produce a long-term projections up to 2050, using an intermediary control (target) year 2025. The outlined projections can be useful for the future health care and social policy in Bulgaria.

The study is organized as follows. Firstly, the basic features of the ILO model are described. Then the specificity of the data sources and the involved assumptions about the future behaviour of the different variables are presented. Further the basic results obtained in the three main groups (demographic, economic and health care finance) are shown. Due to availability of analogous projections for the other countries included in WPIX comparisons of the final results for them are outlined. Finally concluding remarks and policy implications are given.

1. General Description of the ILO Health Budget Model

The basic features of the applied ILO model could be found described in the book

of Cichon, M. et al. (1999).[4] This model is chosen because its good logical structure allows answering the questions related to the health policy goals and strategies. The main relationship between the basic factors determining health expenditure and revenues is shown in Figure 1.

Figure 1

Basic structure of the ILO model

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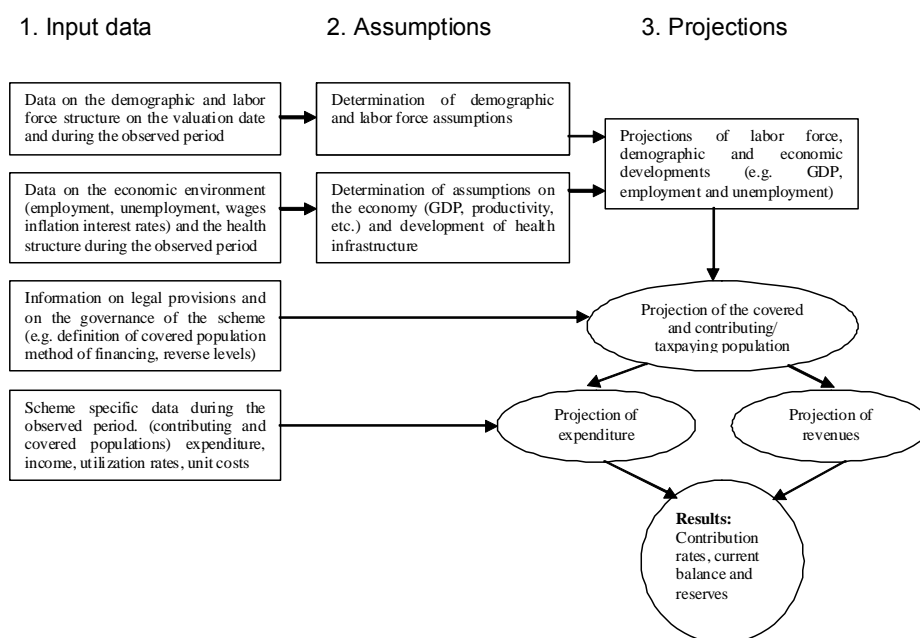
[4] Cichon, M. et al. (1999), Modelling in Health Care Finance. A compendium of quantitative techniques health care financing. International Labour Organisation. International Labour Office – Geneva.

The formal realization of this model contains four main modules and they are as follows:

The economic and demographic module provides a projection and simulation of the population and labor force number, level of employment, and other economic indicators needed as input data for calculation of the expenditure and revenues by the scheme. In view of obtaining more precise results, the labor force data are disaggregated to general subgroups by activity sectors and by employed/self-employed. Then the external prognostic values are set for the middle of projection period.

The income module projects the assessment base for contributions using the economic and demographic data supplied by the above module together with the assumptions regarding the contributor and compliance ratios of the contributing population. The contributors are divided into the following subcategories: employed persons, self-employed persons, contributing pensioners, voluntarily insured persons.

Generally the result in this module (value of total income) is obtained as a sum of contribution income, transfers and subsidies, investment income as well as diverse other revenues. The crucial point here is the first component of the total income (i.e. the sum of contribution income) because of its underreporting in the practice. One possibility to overcome this is by using the so-called "catch-men-factor" as a multiplier for the total earnings of each of subgroups. Yet we find that no research could be taken as a reliable source for estimation of the non-declared incomes in order to use these estimates for obtaining the factor values.

The expenditure module projects expenditure in various benefit categories, administrative and other expenditure on the basis of the projection of the covered population and assumptions for the future utilization and cost developments. The last category is quite heterogeneous, yet its value is only a tiny fraction of total expenditures. The covered population number includes all the persons who are entitled to benefits. For the needs of assessment, the benefit package is disaggregated in 5 groups, including: ambulatory care, inpatient care, pharmaceuticals, technology and other benefits.

The result module calculates the annual balance of income and expenditure, and the necessary contribution rates. The crucial indicator here is the necessary PAYG cost, which is estimated by using the formula:

$$PAYGR(t) = \frac{TBE(t) + AC(t) - OI(t)}{TTB(t)},$$

where the following variables participate for year t:

PAYGR (t) is pay-as-you-go cost rate of the scheme, TBE (t) - total benefit expenditure, AC(t) - sum of administrative and other non-benefit costs, OI(t) - income from sources other than contributions and taxes (for example from the investment of contingency reserves), TTB(t) - total tax (or contribution) for the financing of the scheme (for example total insurable earnings if the scheme is financed by contributions, total tax base of the government if the scheme is financed by general revenues, total income tax if the scheme is financed from earmarked taxes on income, etc.).

At the last stage of the analysis sensitivity tests are applied to check the reliability of model results. For this purpose the value of a given parameter is changed for each test. The obtained results are compared with the status quo projection. We used a test built on 3 variants of life expectancy indicator, assuming fast, middle and slow improvement.

To summarize, the ILO model includes the most important national variables like indicators for population development, employment, insurance system, government budget, etc. which are related to the heath care expenditure in their combined influence on it. This approach makes the model very valuable as a theoretical decision and a useful tool for the practice. At the same time like in every one model created there are some restrictions involved in which regarding the results one should take into consideration (Box 1).

Box 1
The capabilities and limitations of the ILO model

Capabilities:	Limitations:
• The model is based on a good set of basic national demographic, labour market and economic variables; they have a combined influence on the projections • Projections cover both revenues and expenditures side of the health care budget • The model allows to obtain the best fit for insurance estimates revenues • Results are policy oriented, concentrated on insurance system balance and sustainability; thus advantages and disadvantages of a given policy towards health care expenditure could be analyzed	• Projections of variables depend only on assumptions about the country's (internal) reality. The model does not include the rest of the world, for example the process of migration, external sources of revenues, etc. • The model does not cover in much details the budgetary revenues (for example, from general taxes) • Although the model allows to obtain the best fit for insurance revenues, at present the development of health insurance system in the CEE countries, including Bulgaria is still underdeveloped

The lack of some disaggregated data and the questionable reliability of other data are a major challenge from the point of view of the model realization in the case of Bulgaria. At first, expenditure data are far from being available, especially regarding private spending. Data on the health service activities and public expenditure information are not fully available as well.

In general, the national specificity of the Bulgaria's real economic, demographic, social and health budget situation does not impose any essential adjustments of the ILO model. One can however speculate to what extent a model based on one year reflects the main socio-economic trends going on in a transition country like Bulgaria in the last over 15 years, in particular concerning the demographic and economic performance. A

fast process of depopulation and ageing population is a typical phenomenon for this country as well as a high migration in the period under review.[5] Taking one or two years as a base predetermines the future tendencies and trends, which however in the case of Bulgaria (2003-2005) are not too bad because the transition period has already passed and the situation has been more or less stabilized.

2. Data sources for the ILO health budget model

Input data from the following sources are used:

- National Statistical Institute (NSI): demographic data – number of population, including population by gender, population age structure, total fertility rate, mortality rate, birth rate, rate of natural increase, life expectancy at birth, etc.; macroeconomic data – GDP volume and growth, CPI (inflation), GDP deflator, income of population; data on employment and unemployment taken from periodically organized National Survey on Labour Force.

- Bulgarian National Bank (BNB): macroeconomic data – interest rates.

- Employment Agency (EA) to the Ministry of Labour and Social Policy is the main and reliable source of labour market information: economically active population, employed persons both total number and by gender, employment rate, unemployment rate, etc.

- National Insurance Institute (NII): data on the socio-insurance system, number and structure of insured, insurance payments, etc.

- Ministry of Health Care: government budget including health revenues and expenditure, health care system balance.

- National Center for Health Information (NCHI) at the Ministry of Health: health statistics, in particular utilization of the health care expenditure by age groups

- National Health Insurance Fund (NHIF): health revenues and health expenditure, health finance system balance.

- UNs population projections[6] (they will be discussed below)

- Forecast for GDP growth: this is a very important (crucial) variable in the ILO model determining to a great extent the obtained results related to the health finance. We take as a base the long-term GDP growth forecast up to 2030 prepared by the Bulgarian economist Ivan Angelov.[7]

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[5] According to the official statistical data nearly 9% of the Bulgaria's population have emigrated since 1989. See Rangelova, R. (2006), New Bulgaria's Emigration: Scale, Socio-demographic Profile, Economic Consequences. In; "Facing Challenges: Selected Key Issues of Economic Transformation and European Cooperation". Proceedings of the Hungarian-Bulgarian Bilateral Workshop, 16 September 2005. Edited by G. Foti and T. Novak, Institute for World Economics, Hungarian Academy of Sciences, Budapest, 50-73.

[6] The Sex and Age Distribution of the World Population. UN World Population Prospects. The 2001 Revision. Department of Economic and Social Affairs. Population Division, New York.

[7] Angelov, I. (2005), The Competitiveness – The Greatest Challenge for Bulgaria in the EU (Macroeconomic View). Key paper at the scientific and applied conference "Integration of Bulgaria into

- As far as there are not available social budget models for long-term social security projections performed by the Government, different organizations or experts in Bulgaria, in some cases the authors of this study has given their own visions (expert estimates).

Problems and limitations:

- Because of the ongoing transition period in Bulgaria during the last over 15 years and respectively the fast change of the economic indicators is difficult to accept the current data as pre-determining a too long-term perspective of nearly a half of century.

- The health insurance system in Bulgaria was introduced several years ago, and the past years were a period of mastering the process of nominating the insured people and gathering the insurance funds. This process in Bulgaria was combined with (and hampered by) the high percentage of unemployment rate, shadow economy, including hidden employment, as well as frequently changed regulations on the insurance system.

- Due to the late-started health reform in Bulgaria (1 July 2000) going along with a wide-spread people's disapproval and the very questionable implementation data on the health statistics (health care utilization, revenue and expenditure, etc.) , the latter are not a reliable base for a too long-term perspective projection.

Anyway, taking into account the available data as well as their own considerations, the authors of the study have made some adjustments which consist mainly in the following:

- There are two sources of data on labour market activity using different methodology: *the first one* is the annually organized National Survey on Labour Force at the National Statistical Institute, and *the other* is the monthly and annually more detailed surveys of the Employment Agency to the Ministry of Labour and Social Policy. The data from the two sources were analysed as the final choice was put mainly on the first one.

- Mainly because of the difference between the classifications used in the Bulgaria's national system of accounting and those used in the ILO model we have made some adjustments in order to lead the input data closer to the model's requirements. For example according to the Bulgaria's national accounting system the employed persons by branch are grouped by form of ownership (engaged in the public sector and in private sector but not in other formal sectors); insurance revenue by contributors are grouped by basic contributors like workers, employees, employers, etc., but not by the branches as it has given in the ILO model, in particular formal sector, other formal sectors, self-employed in agriculture, self-employed out of agriculture and so on.

the European Union: Challenges of the Competitiveness", Institute of Economics, Bulgarian Academy of Sciences, Sofia, 16 March 2005.

3. Assumptions on Variables' Development

In principle, analysing the expenditure side of one economic activity any given model (like this of the ILO health care expenditure model) includes variables on the two sides of money transfer: revenues and expenditure. As a result of the ILO model realization[8] the development of the three basic groups of variables have been calculated: demographic, labour market, and macroeconomic. Further they are consecutively discussed.

3.1. Development of the Demographic Variables

It is explainable that the first and most important variable in the ILO is the number of population and its basic characteristics and their development through the projection period.

The periodically performed population projections of the UNs are may be the most used by the analysts. It is because the well developed methodology for calculations of these projections, and on the other hand, because of the wide number of included countries (nearly 250). The data presented in these reports cover the estimated sex and age distribution from 1950 until the current days and projections by high-, medium-, and low-variant for the years up to 2050. Most of the estimates presented there are derived from available national data that have been evaluated and adjusted (if necessary) for deficiencies and inconsistencies. According to the 1996 revision if the population in Bulgaria in 2005 by high variant would be 8,185 thousand in 2005 and should change to 7,788 thousand in 2050, by the medium variant these figures are respectively 8,110 thousand in 2005 and to 6,690 thousand in 2050, and by the low variant – the number of the population should drop from 8,082 thousand in 2005 to 5,773 thousand in 2050.[9] The number of the Bulgaria's population however still in 2005 is nearly 7,719 thousand, i.e. under even the low variant, which implies that it is very likely for the projections to overestimate the future number. Obviously the authors of the UNs methodology consider this tendency and try to correct their further projections. Thus the number of the population in Bulgaria in 2050 in the latest issue is estimated by the medium variant as 6,068 thousand but not 6,690 thousand as it is in the 1996 issue.

There are other population projections produced by international organisations (for example Eurostat), national institutions or individual authors in Bulgaria. At present the NSI together with the Bulgarian Academy of Sciences work on National Strategy for Population Development in Bulgaria, which includes new population projections for the period up to 2050.

All known projections show the process of population ageing in Bulgaria will deepen. May be the most pessimistic are the projections of the demographer Donkov (1999).[10] He has developed 10 scenarios for the dynamics of the Bulgarian

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[8] The model realisation is performed using the software product Excel.
[9] The Sex and Age Distribution of the World Population. UN World Population Prospects. The 1996 Revision. Department of Economic and Social Affairs. Population Division, New York, 237-240.
[6] Donkov, K. (1999), Projections for Bulgaria's Population in the Period 1997-2050. Statistics. Journal of the National Statistical Institute, Sofia, № 2, 18-42.

population up to 2050. In each of these scenarios different hypotheses for the future dynamics of the three basic variables (fertility, mortality and migration) are combined. The first three scenarios are basic. They present the demographic changes in combination with unidirectional by intensity changes in the used variables (for example slight decline in mortality and slight increase in fertility). The first scenario presents the so-called stationary model of demographic development (when the total fertility rate is 2.1 children), which is regarded desirable for the country in long-term prospects. The second and third scenarios show models of declining population. The last 7 scenarios include different combination of the individual variables from the first three scenarios, which is done mainly in view of extending the analytical quality of the projections. Given Bulgaria's number of population in 1997 8,282 thousand, according to the first Donkov scenario by 2050 it will be 5,820 thousand, and by the second and third scenarios – respectively 5,243 thousand and 4,710 thousand. The pace of ageing is followed together with changes in the population number, in particular the changes in the relationships between different age and sex groups. The past nearly 10 years since the beginning of these projections (1997) however show the predicted smaller number of the Bulgaria's population is quite possible.

Projections for the Bulgaria's population for the purpose of the ILO model realisation are taken from the described UNs source, the latest version, and the medium variant. This is because: firstly, we highly evaluate the fact that the medium variant does give moderate changes in the population number, secondly, we use the same source as do the other partners in the AHEAD project from CEE countries, and thirdly, there are available data for population number by single age but not only by age group. These projections also predict continuing depopulation of Bulgaria (see Table 1).

Table 1

Bulgaria: Bio-demographic variables, 2005-2050

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Total number of population, thousand	7 848	7 707	7 539	7 348	7 138	6 919	6 704	6 493	6 279	6 058
Including										
Male	3 800	3 730	3 656	3 571	3 472	3 366	3 261	3 158	3 054	2 945
Female	4 048	3 977	3 882	3 777	3 666	3 553	3 444	3 335	3 225	3 113
Total Fertility Rate (TFR)	1,27	1,38	1,49	1,59	1,67	1,75	1,81	1,85	1,88	1,89
Estimated life expectancy. at birth, years										
Total	72,5	73,6	74,7	75,6	76,5	77,3	78,0	78,6	79,1	79,6
Male	69,2	70,4	71,5	72,5	73,4	74,2	75,0	75,7	76,2	76,7
Female	75,7	76,7	77,7	78,6	79,4	80,2	80,9	81,4	81,9	82,4
Birth Rate, per 1000	8,9	9,4	9,3	8,7	8,2	8,3	8,9	9,4	9,5	9,4
Death Rate, per 1000	11,9	13,4	13,9	14,0	14,2	14,6	15,2	15,9	16,4	16,7
Rate of Natural Increase., Per 1000	−5.7	-4,0	-4,6	-5,3	-5,9	-6,3	-6,3	-6,5	-6,8	-7,4
Population growth,%	-0,30	-0,39	-0,47	-0,54	-0,60	-0,63	-0,63	-0,65	-0,68	-0,74
Population age structure, including (%)										
Population aged 0-14	14,4	12,9	13,4	13,9	13,6	13,1	12,9	13,4	14,2	14,7
Population aged 15-65	70,3	70,7	68,9	66,8	65,8	65,0	64,0	61,9	59,0	56,8
Population aged 65 and over	15,3	16,5	17,7	19,2	20,6	21,9	23,1	24,7	26,8	28,5

According to the projections the number of Bulgaria's population will decrease by roughly 2 million – from nearly 8 million in 2003 to nearly 6 million to 2050. The proportion male/female will keep in favour of female population (Figure 2).

Projections of the population number in Bulgaria, total, male and female,

2003-2050
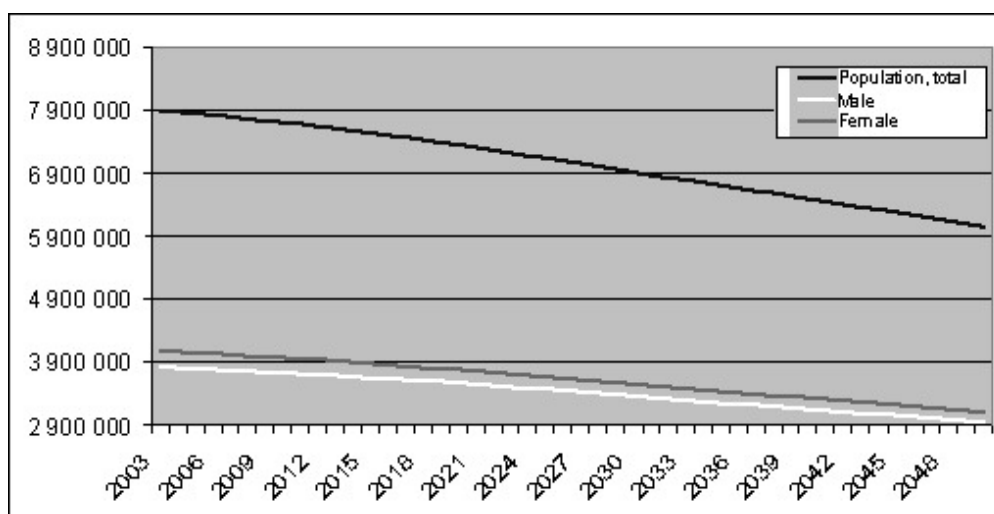
The depopulation process will be accompanied by continuing ageing population. Still in 2003 the proportion of the group of the young population (0-14 years of age) in total population is lower than that of the old population (65 years and over).11 This ratio will deepen and until the end of the projected period it is expected the proportion of the old population will be over twice higher than that of the young people (Figure 3). The second unfavourable change in the age structure in Bulgaria is the considerably reduction of the working-age population (Figure 4).

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[11] See Rangelova, R. and S. Zlatanov (2005), Ageing and Health Status of Bulgaria's Population. South-East Europe Review for Labour and Social Affairs. Vol. 8, № 2, 71-94; Rangelova, R. (2002), Bio-Demographic Change and Socio-economic Trends in Bulgaria. Economics and Human Biology (journal), Elsevier Science, Vol. 31, Issue 3, 413-428.

Figure 3
Projection of the population number by age in Bulgaria, young (0-14 years of age)
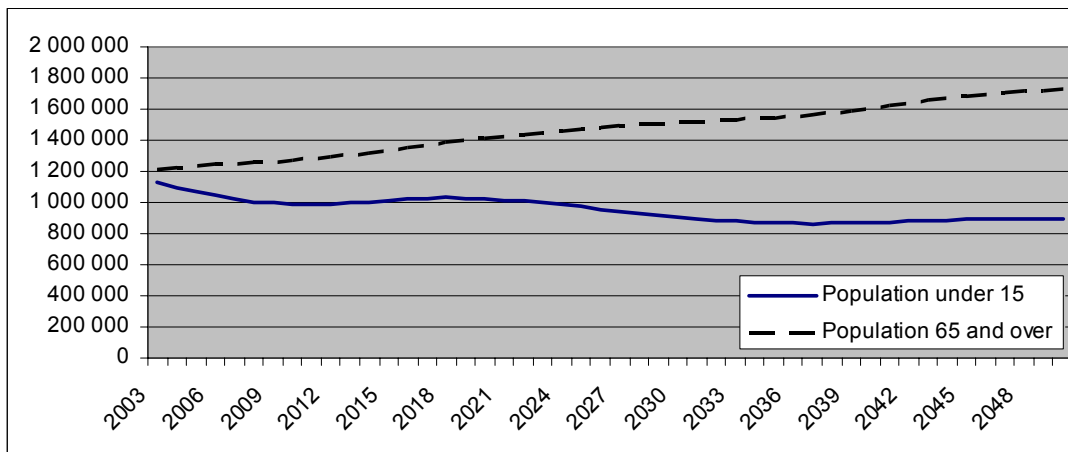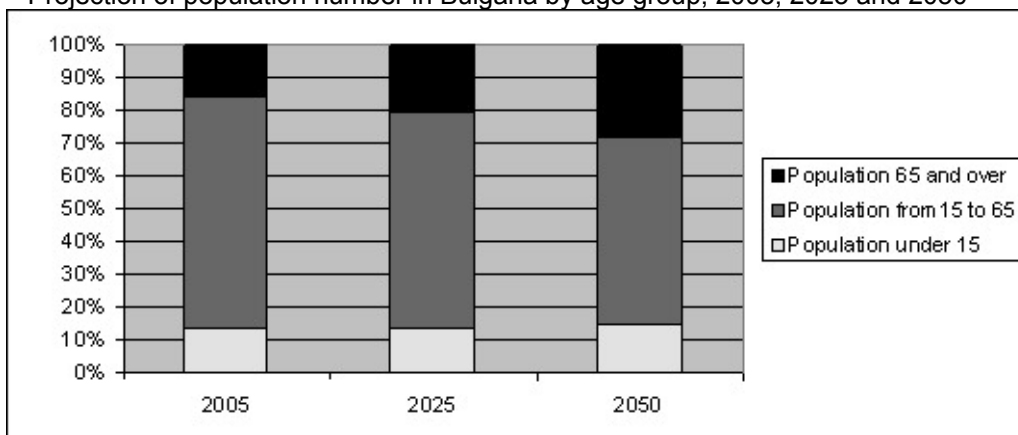and old people (65 and over), 2003-2050

Figure 4
Projection of population number in Bulgaria by age group, 2003, 2025 and 2050

An interesting detail of the population development projection is the expected increasing total fertility rate in the context of the decreasing number of women in fertility age. This implies that an increase of the intensity of the people's reproduction is outlined: from average 1.23 children of an woman in fertility age in 2003 to 1.89 in 2050, which however will stay still under the magnitude required for the so-called stationary reproduction 2.1 (Table 1 and Figure 5).

Figure 5

Projection of the female population at fertility age and assumed total fertility rate, 2003-2050
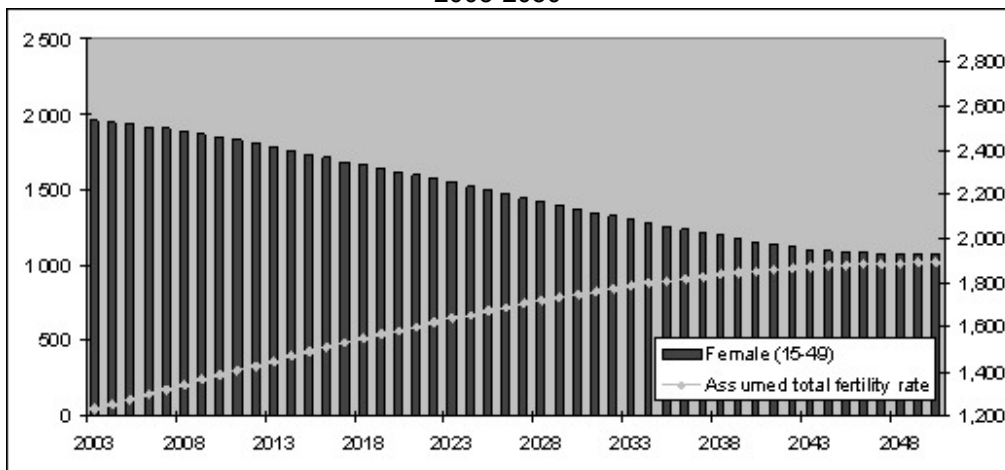
The so-called age pyramids present the most illustrative picture of the ageing population. The age pyramids of Bulgaria's population in the base 2003 year, the middle target 2025 year and the main target 2050 year of projections are shown on Figure 6. Still in 2003 the age pyramid is narrowed at the bottom, which means decreasing of the young population. It is expected that in the future this tendency will deepen gradually and will strongly change (and even lose) the shape of an age pyramid, concerning not only the changed ratio between the young and the old people's group but also the reduced proportion of the working-age population.

Figure 6

Age pyramids of Bulgaria's population, 2003, 2025 and 2050

Year : 2050
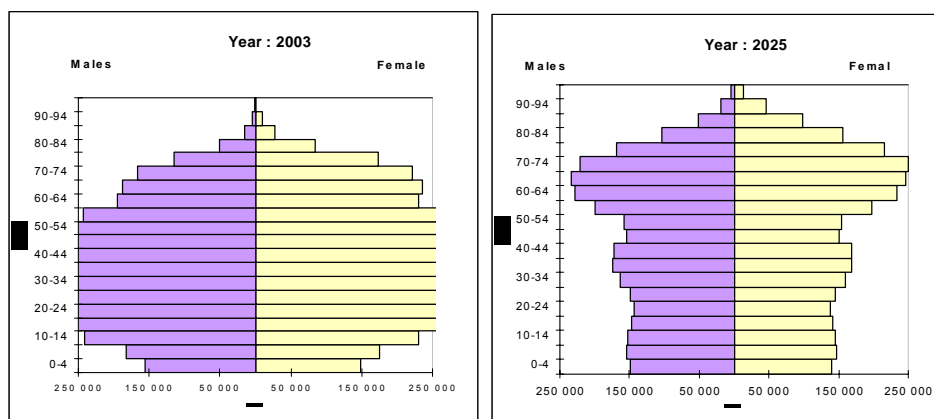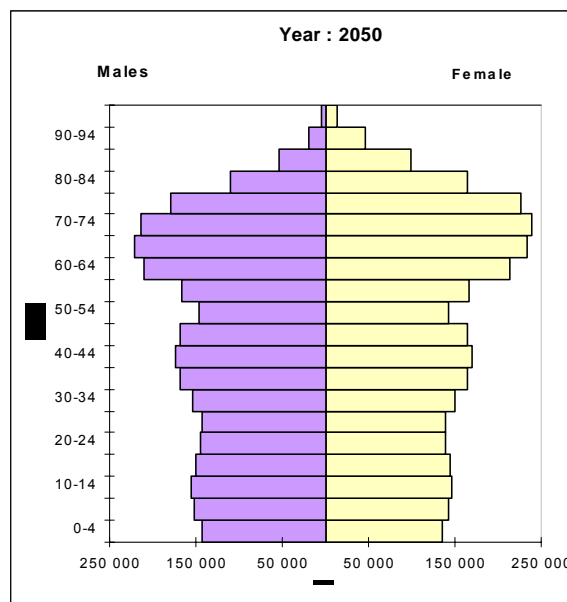
Males   **Female**

Around 2003 the average life expectancy at birth in Bulgaria is 72 years for both sexes as the life expectancy of females is higher by nearly 7 years in comparison with that of males. The ILO model allows to calculate three variants assuming different extent of improvement of life expectancy – fast, middle and slow (Table 2). According to the first variant the life expectancy (fast improvement) for both sexes will increase by nearly 9 year, and according to the third variant (slow improvement) – by less than 6 years. The three variants indicate that the female life expectancy will overpass 80 years, and that of male will approach 80 years only by the first variant, and will reach the current level of female life expectancy by the third variant.
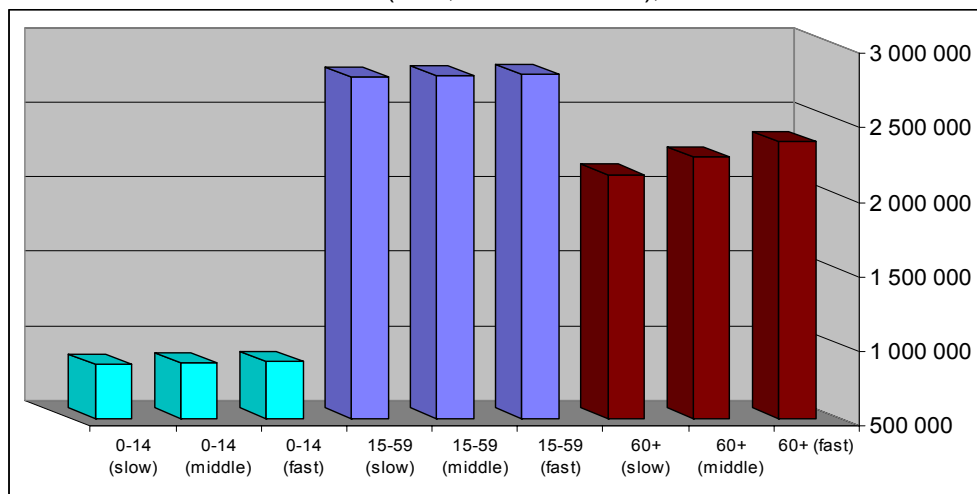
Table 2

Bulgaria: Projected variants of Life Expectancy in Bulgaria, 2005-2050

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
I variant - fast improvement of life expectancy										
Both sexes combined	72,6	73,9	75,1	76,1	77,1	78,1	79,0	79,8	80,5	81,1
Male	69,3	70,7	71,9	73,0	74,0	75,0	75,9	76,7	77,5	78,2
Female	75,8	77,0	78,1	79,1	80,1	81,0	81,8	82,6	83,3	83,8
II variant - middle improvement of life expectancy										
Both sexes combined	72,5	73,6	74,7	75,6	76,5	77,3	78,0	78,6	79,1	79,6
Male	69,2	70,4	71,5	72,5	73,4	74,2	75,0	75,7	76,2	76,7
Female	75,7	76,7	77,7	78,6	79,4	80,2	80,9	81,4	81,9	82,4
III variant – slow improvement of life expectancy										
Both sexes combined	72,5	73,4	74,2	74,9	75,6	76,2	76,7	77,2	77,6	78,0
Male	69,1	70,1	71,0	71,8	72,6	73,3	73,8	74,3	74,8	75,2
Female	75,6	76,4	77,2	77,9	78,4	78,9	79,4	79,9	80,3	80,6

In Figure 7 the age structure of the population in Bulgaria is shown according to the three variants of life expectancy improvement – slow, middle and fast. It is quite evident the increasing proportion of the old people (age 60 and over) depending on the degree of the assumed life expectancy improvement.

Figure 7

Age structure of population - projections by the three life expectancy improvement variants (slow, middle and fast), 2050

3.2. Development of the Labour Market Variables

The second important group of variables presents the development of the labour market in Bulgaria (Table 3). We consider the labour market activity in order to outline the people's resource that will ensure economic performance in the country and respectively the revenues which have to meet the required the health expenditure.
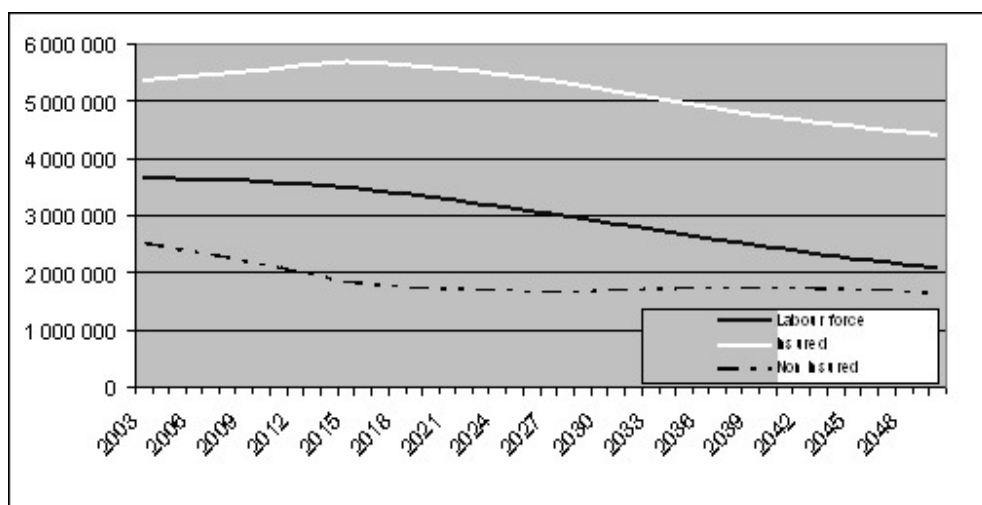
Table 3

Bulgaria: Labour market variables, 2005-2050

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Labour force, number	3 662	3 601	3 492	3 328	3 126	2 907	2 677	2 455	2 258	2 107
Labour force, growth,%	-0,15	-0,44	-0,75	-1,10	-1,32	-1,51	-1,69	-1,71	-1,60	-2,43
Employment growth –total, %	0,18	1,11	-0,66	-1,02	-1,24	-1,47	-1,65	-1,67	-1,56	-1,12
Male	0,27	1,20	-0,58	-0,93	-1,15	-1,46	-1,63	-1,65	-1,54	-1,10
Female	0,08	1,01	-0,76	-1,12	-1,34	-1,49	-1,67	-1,69	-1,58	-1,14
Unemployment rate – total, %	13,15	8,39	6,04	5,64	5,24	4,92	4,72	4,52	4,32	4,12
Male	13,36	8,91	6,49	5,77	5,12	5,24	5,84	5,95	5,70	4,84
Female	12,91	7,78	5,51	5,48	5,38	4,53	3,33	2,73	2,60	3,23
Insured, number	5 598	5 681	5 681	5 599	5 444	5 230	4 966	4 738	4 569	4 421
Non insured (% of total population)	28,7	26,3	24,6	23,8	23,7	24,4	25,9	27,0	27,2	27,0

The declining number of the total population in Bulgaria is accompanied by a decreasing number of the labour force (Figure 8). The other two lines in the same figure present the development of the total number of insured people in Bulgaria (the upper line) and that of the total number of non-insured people (the lowest disposed line). In general they reflect the process of gradually including of more people in the insurance system.

Projections of number of labour force, insured and non-insured people, 2003-2050

Concerning the employment growth, it is expected to be positive somewhere to 2010-2015 and this is connected with the effort to diminish the high unemployment rate at the beginning of the new century (Table 3). After that it however marks comparatively high and constant decrease until 2050, as the highest decrease is expected during the third and the fourth decade of the current century. This tendency could be connected mainly with the decreasing number of the total population and in particular the number of working-age population.

The official unemployment rate in Bulgaria for the base 2003 year was high (13.5%). In fact however, regarding the unemployment we should take account also the so-called discouraged unemployed, who have considerably high number (434.5 thousands in 2003). Due to an anticipated implementation of more flexible labour market policy and development of adequate labour market regulations as well as proposed faster economic development connected with the full-membership in the EU, we could expect still in the near future to reduce sharply the registered unemployment as well as the hidden employment. In 2006 the unemployment rate is already under 9% (which is on a par with the average for the EU countries) and continues declining. According to the projections, the unemployment rate is likely to decrease significantly and could reach a little over 4% by the end of the projected period. This could be connected implicitly with the assumed by us comparatively

high GDP growth rates for the following decades. Considering the unemployment rate by gender, it turns out that the female unemployment will decrease more rapidly than the male unemployment, in particular after 2030.

In the context of the decreasing number of employed and the prevailing number of female population over male it is a little strange the obtained trend of slightly increasing gender ratio of employed in favour of male: from 1.15 in 2003 to 1.22 in 2050 (Figure 9).

Figure 9

Projection of total number employed and gender ratio male/female, 2003-2050
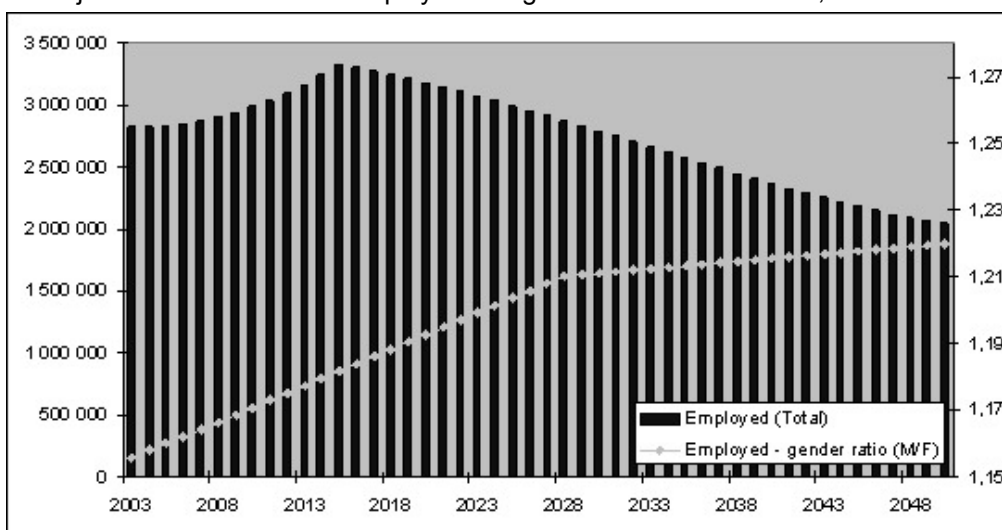
Development of the employees by the two basic in the model sectors – public sector and other formal sector – is outlined as comparatively similar during the whole projected period (Figure 10). We could explain this tendency mainly by the influence of the taken by us a proportion between the two sectors in the base year.

Figure 10

Projections for the public sector employees and other formal sector employees,
2003-2050
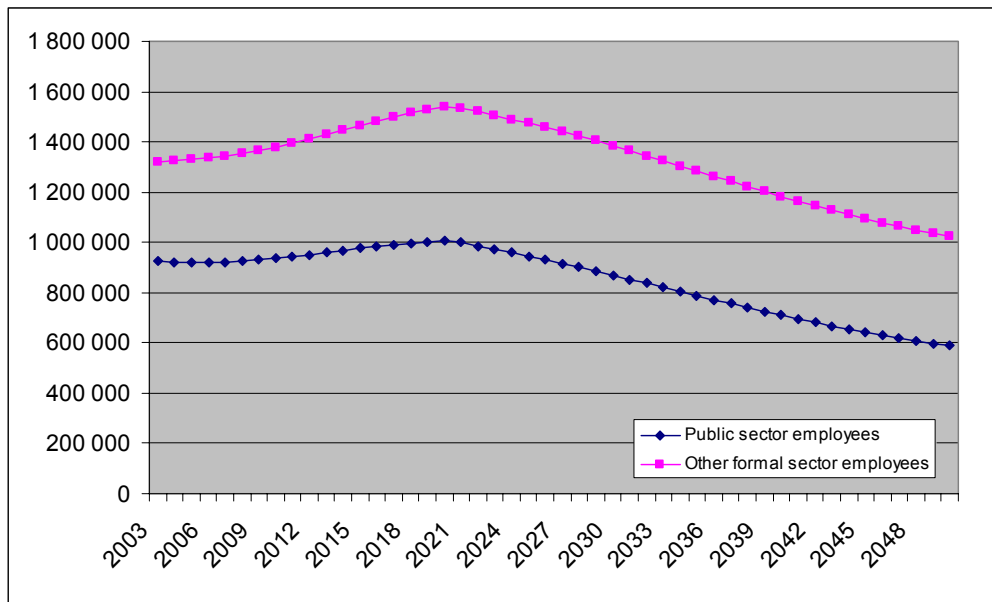
The number of the insured people in Bulgaria is expected to decrease in accordance with the depopulation process. While however the number of total population is expected to decrease from 2003 to 2050 by 23%, and the number of labour force by nearly 42%, the number of insured is expected to decline only by 21%, which means other things being equal we could expect relatively higher percentage of insured people than in the present. In addition the estimates for non-insured people help these speculations. According to the model projections, the percentage of non-insured will decrease from nearly 28,7% in 2005 to 27% in 2050, which actually is not a significant figure taking account, on the one hand, the long-term period until 2050 and on the other hand, the active policy carried out at the present years to involve more and more people in the country's insurance system. Obviously these estimates are influenced by the ageing population process as well as specific labour market regulations, including the policy of raising age of retirement going on in Bulgaria in order to harmonize the national labour legislation with that of the EU member countries and to carry out the common for the Union labour policy.

According to data of the National Insurance Institute the revenue for 2003 is gathered by the following contributors (Figure 11): the biggest share is coming from contributions of employers for workers and employees (73%), followed by personal contribution of workers and employees (19%), contribution of self-employed insured (5%) and the smallest share is coming from principals by auditing (3%).

This structure shows the dominating role of the employers for the time being for the amount of the insurance revenue, which in its own turn suggests the importance of the macroeconomic and business development in Bulgaria for the future increase in the insurance revenue.

Figure 11

Structure of the revenue from insurance contributions, 2003
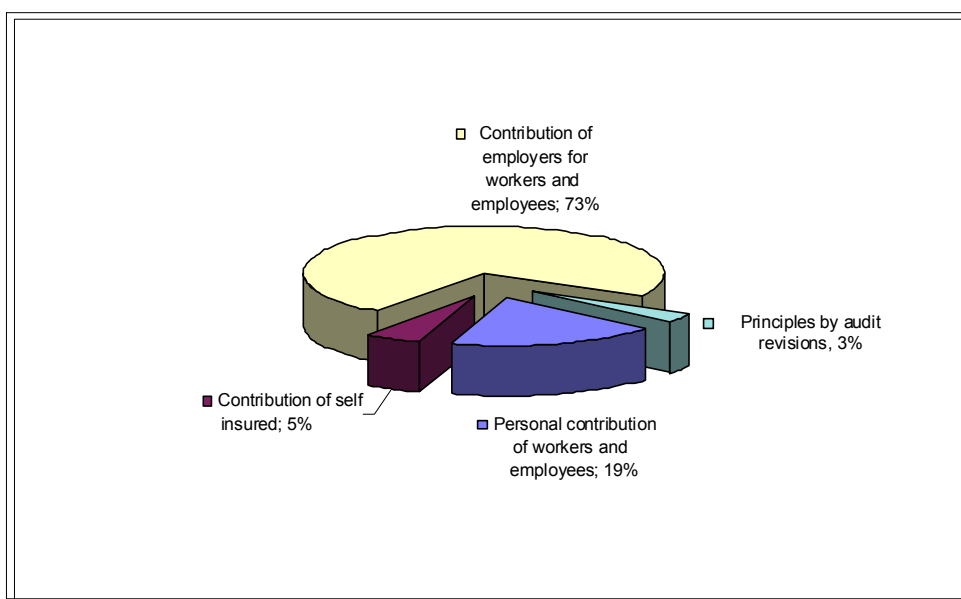
Source: National Insurance Institute, 2003.

3.3. Development of the Macroeconomic Variables

The third and a very important group of variables are connected with the macroeconomic performance in Bulgaria during the projected period. The variables included in this group like GDP, labour productivity, real wage, etc. are the most aggregate indicators for the national economy pre-determining the revenue side of the studied issue – how can we expect to develop the health expenditure in a long-term in Bulgaria. The dynamics of the GDP growth in the future foreseen by us is of utmost importance because of its capacity of an independent variable in the model. As we have already marked, we step on the estimates of I. Angelov until 2030 and try to extrapolate them using our own expert speculations (Table 4). The estimates suggested by I. Angelov are higher in comparison with other similar projections known both in Bulgaria and abroad. They reflect, on the one hand, the low level of the base year GDP, which means that in the following years the dynamics should be shown as faster, and on the other hand, the potential which is expected to perform the country continuing the current stable economic progress, including the

realized full membership in the EU (since 1 January 2007) and utilization of the structural and other funds, as well as a more intensive inflow of FDI in the country, etc. To the end of the projected period however we foresee lower GDP growth rates because for such a long period they seem more reasonable trying to achieve a steady state balanced growth.

The given assumptions are reflected on the dynamics of the GDP growth and GDP per capita growth rates (see Table 4). The process of depopulation in the country causes higher rates of GDP per capita growth in comparison with the total value growth.

Table 4

Bulgaria: Economic variables, 2005-2050

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Real GDP growth, %	4,4	4,3	4,2	4,0	3,9	3,7	3,6	3,5	3,4	3,2
Real GDP growth per capita,%	4,8	4,7	4,6	4,6	4,5	4,4	4,2	4,1	4,0	3,9
Labour productivity growth,%	4,3	3,2	2,5	2,5	2,5	4,0	3,8	3,6	3,4	3,1
GDP deflator, %	2,2	2,0	1,7	1,5	1,3	1,2	1,4	1,6	1,7	1,9
CPI (inflation), average yearly,%	5,4	4,8	4,3	3,7	3,1	2,7	2,6	2,5	2,3	2,2
Real wage growth,%*	6	5	5	4	3	3	3	3	3	3
Average gross monthly wage (BGN)	354	591	933	1 392	1 962	2 625	3 453	4 490	5 770	7 329
Labour cost (BGN)	479	776	1 189	1 720	2 378	3 182	4 186	5 442	6 993	8 882
Labour cost (share of GDP),%**	45	55	63	66	67	65	62	58	53	49

* Concerning the growth of real wage we suggest 3% to be kept for this variable in the period 2030-2050. This is so because we wouldn't like to speculate with over-précised figures for a too long time horizon of projection.
** It is calculated as the average labour cost is multiplied by the number of employed in the country and the result is divided on GDP at current prices.

One of the most discussed macroeconomic relationships is that between the dynamics of the labour productivity and the real wage. Theoretically these two curves should change more or less in parallel as labour productivity should predetermine the real wage increase. It turns out that if we extrapolate the two variables in the case of Bulgaria, they are developing more or less in parallel, as labour productivity is typical over the whole projected period by slower growth rate, which theoretically is a negative tendency. In principle, the higher dynamics of the labour productivity in comparison with that of the real wage growth dynamics is the right economic position ensuring a later increase in the wage level. On the other hand, however, Bulgaria is in the last position between the EU country-members by income level. In the context of our projections that means that the low real average wage observed in the country could not ensure higher level of insurance contribution or could limit spending other health expenditures. Given the current structural changes in the country mainly in favour of labour-consuming branches with low valued added it is likely that the productivity growth will keep its declining tendency. This is why within the following several years we could not expect a change in the dynamics both of the labour productivity and the real wage. (Figure 12). Regarding a farther perspective and taking account the modern technological progress we foresee a more significant increase in the productivity growth rates, which will contribute to reverse the considered relationship.

Figure 12
Projections of labour productivity and real wage growth rates, 2003-2050
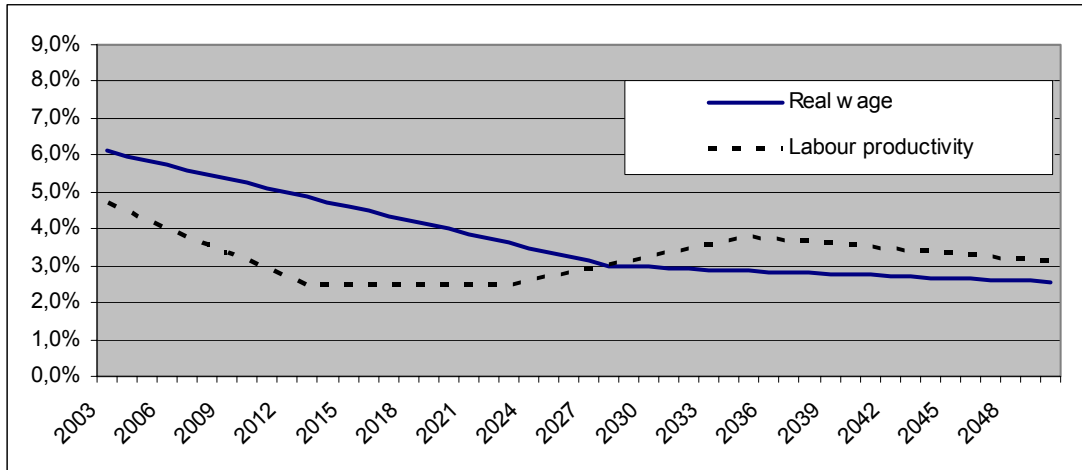
4. Projections and sensitivity analysis to given variables

Some idea about the structure of the Government (public) expenditures in the base 2003 year one can receive from Figure 13. The biggest share of the expenditure is connected with the administration costs (40%), followed by expenditure in hospitals (37%), outpatient health care (14%), and 7% of the total expenditure are capital expenditure. The latter means that the problems of renewal and modernization of the health care system are postponed for the future.

Figure 13

Structure of Government expenditures, 2003
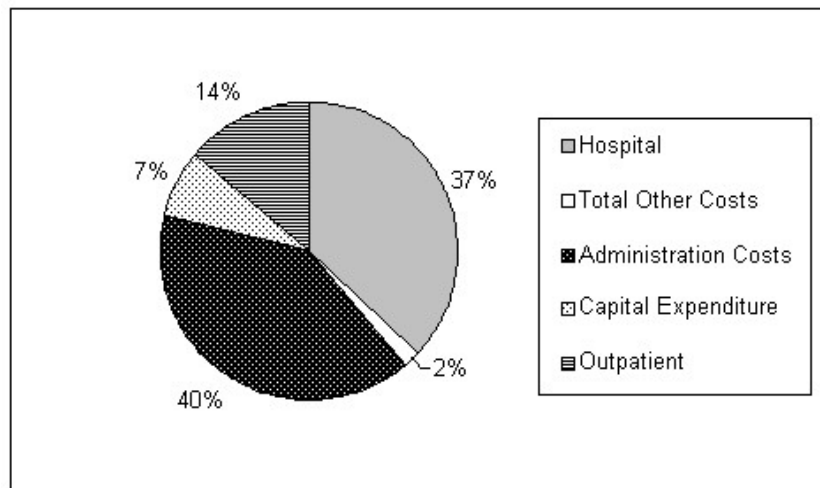
Source: National Centre for Health Information, Sofia, 2003.

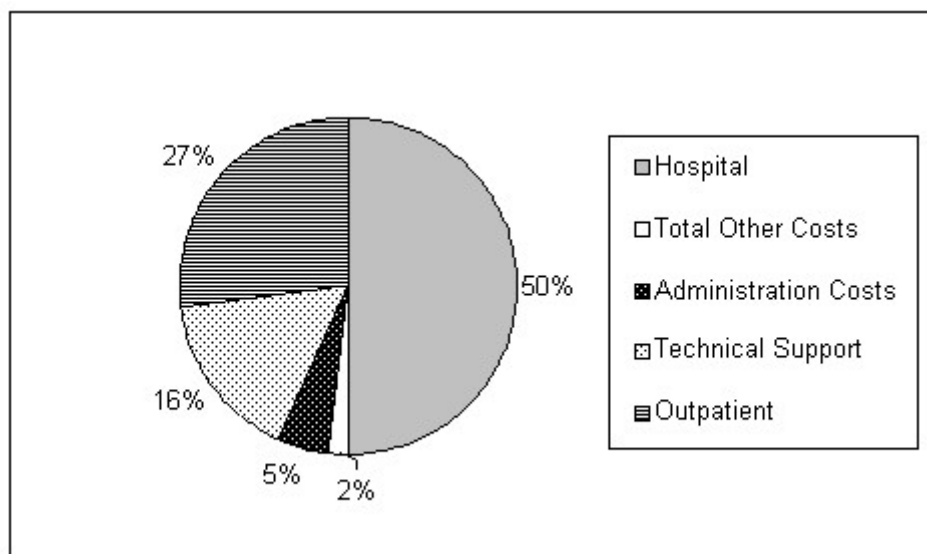Hospital expenditure takes the biggest share in the structure of expenditure of the social security fund (50%), followed by outpatient expenditure (27%), technical support (16%) and only 7% are administrative and other costs (Figure 14).

Structure of expenditure of social security funds, 2003

Source: National Centre for Health Information, Sofia, 2003.

The basic trend revealing the older population the higher health expenditure could be confirmed by the estimates on utilization by age groups obtained by the ILO model and shown in Figure 15. For the children age group 0-4 years a higher utilization of health care services is typical in comparison with the following two children age groups – 5-9 and 10-14 years, i.e. for the children the tendency is decreasing by age. After that the tendency in the utilization of health care services is increasing in a sense the older people the higher health care utilization both in terms of outpatient visits and inpatient admissions. But in this changed direction of the curves we observe distinct four sub-groups – for the young people aged 15-29, followed by people aged 30-44, people aged from 45 to about 79 and those aged 80 and over. It turns out the healthiest are people between 30 and 44 years of age, where the curves are less steep; after that for people aged from 45 to about 79 the curves are steepest, and for people 80 years and over the two considered indicators are almost unchanged. As it is expected the number of outpatient visits per capita is higher than the number of inpatient (hospital) admissions per capita. It is useful to take into account these trends and the outlined ageing population in Bulgaria following our main goal which is to estimate the level and the dynamics of the total health expenditure in the country up to 2050.

Figure 15

Utilization of health care expenditure by age groups, 2003
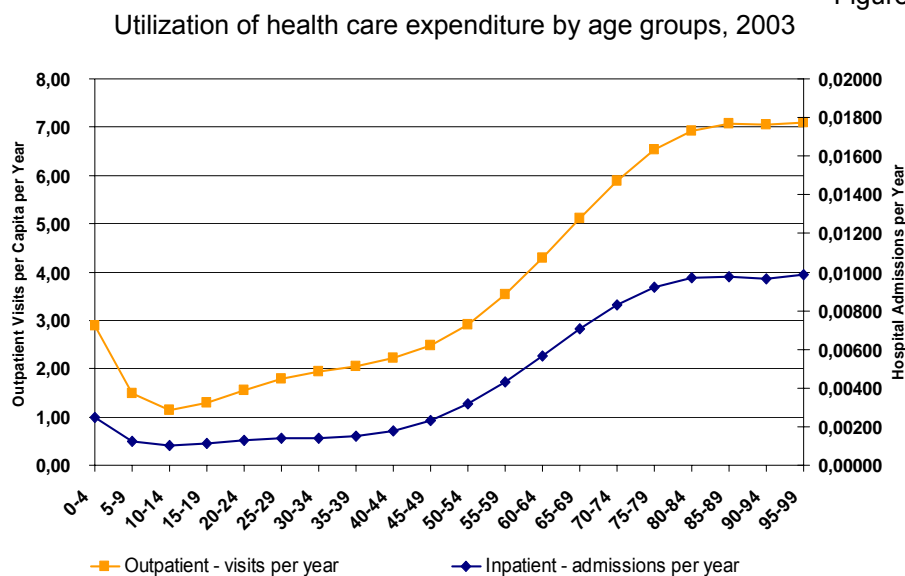
Source: National Centre for Health Information, Sofia, 2004.

We have already considered the variables divided into two groups - variables on the revenues and on the expenditure side. As a result of the ILO model realization we have obtained data for the volume of the total health expenditure by three scenarios. The basic assumptions for the health care expenditure development in the three scenarios are the following:

Scenario I	Health care expenditures increase separatly for wage and non-wage shares
Scenario II	Health care expenditures increase with the same rate as GDP / Capita (EU I)
Scenario III	Health care expenditures increase with the same rate as GDP / Employment (EU II)

The specificity of the three scenarios in the case of Bulgaria implies highest values for the first one (when the health expenditure increase is separated for wage and non-wage shares) and lowest for the second one (when the health expenditure increase is connected with the same rate of per capita GDP). The third scenario (when the health expenditure increase is connected with the same rate as the level of labour productivity) could be considered as intermediary (in a middle position) between the other two. The results from the three scenarios stress once again the role of the very low level of income per capita in this country. The calculated volumes of the total health expenditure influence on the calculated proportion between them and GDP. The total health expenditure as share of GDP by the three scenarios is shown in Figure 15.

The projected variables for the total health revenues and the health finance system balance are presented in Table 5. It turns out that by the three scenarios the total health expenditure is far higher than the total health revenue, which determines health deficit by

all of them. The magnitude of the deficit in 2003 base year is 0,265 BLN and it changes to 17,306 BLN in 2050 by Scenario I, to 4,370 BGN by Scenario II and 8,455 BGN by Scenario III. The first scenario, which was described as requiring the highest health expenditure, is definitely that is leading to the highest health finance deficit. To the end of the projected period the health finance deficit by Scenario I would be the highest.

Table 5

Projections for the total health revenue and health system balance by three scenarios, base year 2003 and 2004-2050 (bln. BGN)

|	2003	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Total Revenue	1,416	1,808	3,004	4,473	6,234	8,790	11,210	14,038	17,408	21,432	26,326
Life expectancy SCENARIO:Middle //Component Scenario I											
TOTAL Health Expenditure	1,682	2,072	3,363	5,211	7,722	10,941	14,852	19,866	26,238	34,118	43,632
Deficit bln. BGN	-0,265	-0,264	-0,360	-0,738	-1,488	-2,150	-3,642	-5,829	-8,828	-12,686	-17,306
Deficit as share of real GDP [%]	-0,8	-0,7	-0,7	-1,0	-1,5	-1,7	-2,3	-2,9	-3,4	-3,8	-4,0
Life expectancy SCENARIO:Middle //Component Scenario II											
TOTAL Health Expenditure	1,682	1,988	2,938	4,213	5,881	7,997	10,601	13,959	18,275	23,766	30,697
Deficit bln. BGN	-0,265	-0,180	0,065	0,259	0,353	0,793	0,609	0,080	-0,867	-2,334	-4,370
Deficit as share of real GDP [%]	-0,8	-0,5	0,1	0,4	0,4	0,6	0,4	0,0	-0,3	-0,7	-1,0
Life expectancy SCENARIO:Middle //Component Scenario III											
TOTAL Health Expenditure	1,682	1,977	2,815	4,000	5,657	7,839	10,644	14,460	19,596	26,333	34,781
Deficit bln. BGN	-0,265	-0,169	0,188	0,473	0,577	0,952	0,566	0,421	-2,189	-4,901	-8,455
Deficit as share of real GDP [%]	-0,8	-0,4	0,3	0,7	0,6	0,8	0,4	-0,2	-0,8	-1,5	-2,0

Figure 15

Dynamics of the real GDP and proportion of the total health expenditure (HE) in GDP by three scenarios, 2003-2050
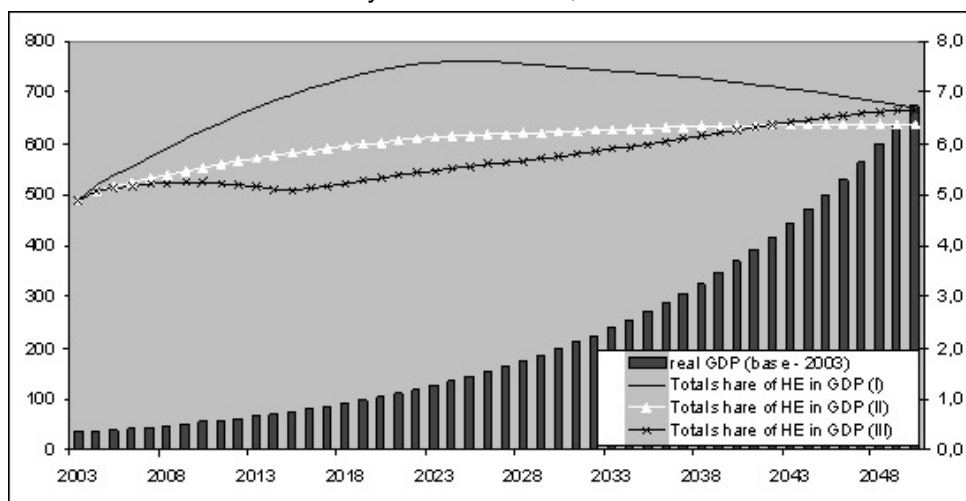
The projected behaviour of the total health expenditure and total public expenditure within the period 2003-2050 in Figure 16 shows almost parallel changes in the two lines. In general this means that no essential changes in the role of the public sector, in particular public health expenditure are envisaged in the model. The difference between the two indicators is about 1% of GDP, which is expected to be found from other sources.

Figure 16

Dynamics of the projected share of total expenditure in GDP and total public expenditure in GDP
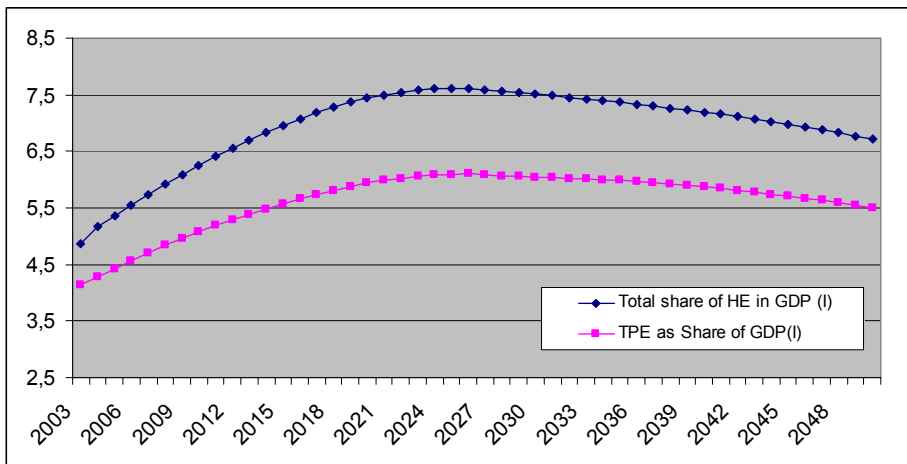
Comparison of the level of total health expenditure and total revenues could be followed in Figure 17. What is disturbing here is not only the clear deficit but its widening gap over time shown by the three scenarios.

Figure 17

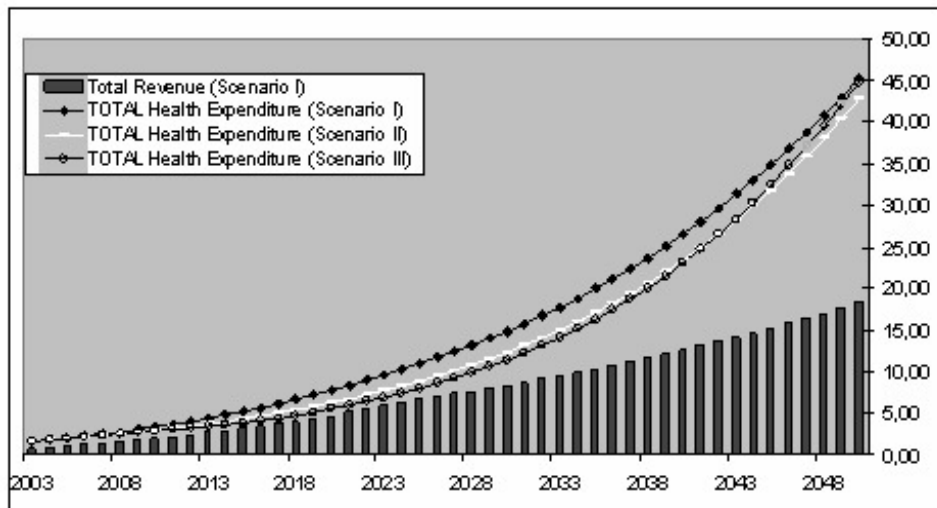Deficit of total health expenditure by three scenarios, 2003-2050

Table 6
Sensitivity test: Projections for the total health expenditure by three variants of life expectancy improvement
each one including the three scenarios of a health care expenditure (HE) increases, 2003-2050

	2003	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Variant I - Fast Life Expectancy Improvement											
Scenario I											
Total health expenditure, bln BGN	1.682	2.072	3.365	5.220	7.752	11.010	14.986	20.099	26.627	34.798	44.747
Total proportion of HE in GDP, %	4.9	5.3	6.2	7.2	8.1	8.8	9.4	9.9	10.2	10.4	10.3
Total revenues in SIF*	1.416	1.808	3.004	4.475	6.241	8.807	11.241	14.088	17.483	21.557	26.527
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.1	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.7	-0.7	-1.0	-1.6	-1.8	-2.3	-2.9	-3.5	-3.9	-4.2
Scenario II											
Total health expenditure, bln BGN	1.682	1.989	2.939	4.216	5.891	8.018	10.639	14.022	18.380	23.949	30.999
Total proportion of HE in GDP, %	4.9	5.0	5.4	5.8	6.1	6.4	6.7	6.9	7.0	7.1	7.2
Total revenues in SIF*	1.416	1.808	3.004	4.475	6.241	8.807	11.241	14.088	17.483	21.557	26.527
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.1	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.5	0.1	0.4	0.4	0.6	0.4	0.0	-0.3	-0.7	-1.0
Scenario III											
Total health expenditure, bln BGN	1.682	1.977	2.817	4.004	5.673	7.875	10.715	14.589	19.834	26.770	35.523
Total proportion of HE in GDP, %	4.9	5.0	5.2	5.5	5.9	6.3	6.7	7.2	7.6	8.0	8.2
Total revenues in SIF*	1.416	1.808	3.004	4.475	6.241	8.807	11.241	14.088	17.483	21.557	26.527
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.1	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.4	0.3	0.6	0.6	0.7	0.3	-0.2	-0.9	-1.6	-2.1
Variant II - Middle Life Expectancy Improvement											
Scenario I											
Total health expenditure, bln BGN	1.682	2.072	3.363	5.211	7.722	10.941	14.852	19.868	26.236	34.118	43.632
Total proportion of HE in GDP, %	4.9	5.3	6.2	7.2	8.0	8.8	9.3	9.7	10.0	10.2	10.1
Total revenues in SIF*	1.416	1.808	3.004	4.473	6.234	8.790	11.210	14.038	17.408	21.432	26.326
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.7	-0.7	-1.0	-1.5	-1.7	-2.3	-2.9	-3.4	-3.8	-4.0
Scenario II											
Total health expenditure, bln BGN	1.682	1.988	2.938	4.213	5.881	7.997	10.601	13.959	18.275	23.766	30.697
Total proportion of HE in GDP, %	4.9	5.0	5.4	5.8	6.1	6.4	6.6	6.8	7.0	7.1	7.1
Total revenues in SIF*	1.416	1.808	3.004	4.473	6.234	8.790	11.210	14.038	17.408	21.432	26.326
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.5	0.1	0.4	0.4	0.6	0.4	0.0	-0.3	-0.7	-1.0
Scenario III											
Total health expenditure, bln BGN	1.682	1.977	2.815	4.000	5.657	7.839	10.644	14.460	19.596	26.333	34.781
Total proportion of HE in GDP, %	4.9	5.0	5.2	5.5	5.9	6.3	6.7	7.1	7.5	7.8	8.0
Total revenues in SIF*	1.416	1.808	3.004	4.473	6.234	8.790	11.210	14.038	17.408	21.432	26.326
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.9	6.7	6.4	6.1
Percent of deficit in GDP (%)	-0.8	-0.4	0.3	0.7	0.6	0.8	0.4	-0.2	-0.8	-1.5	-2.0
Variant III - Slow Life Expectancy Improvement											
Scenario I											
Total health expenditure, bln BGN	1.682	2.072	3.362	5.205	7.690	10.850	14.663	19.521	25.673	33.288	42.422
Total proportion of HE in GDP, %	4.9	5.3	6.2	7.2	8.0	8.7	9.2	9.6	9.8	9.9	9.8
Total revenues in SIF*	1.416	1.808	3.004	4.471	6.226	8.768	11.165	13.961	17.289	21.272	26.111
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.8	6.6	6.3	6.0
Percent of deficit in GDP (%)	-0.8	-0.7	-0.7	-1.0	-1.5	-1.7	-2.2	-2.7	-3.2	-3.6	-3.8
Scenario II											
Total health expenditure, bln BGN	1.682	1.988	2.938	4.212	5.871	7.970	10.546	13.861	18.121	23.542	30.365
Total proportion of HE in GDP, %	4.9	5.0	5.4	5.8	6.1	6.4	6.6	6.8	6.9	7.0	7.0
Total revenues in SIF*	1.416	1.808	3.004	4.471	6.226	8.768	11.165	13.961	17.289	21.272	26.111
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.8	6.6	6.3	6.0
Percent of deficit in GDP (%)	-0.8	-0.5	0.1	0.4	0.4	0.6	0.4	0.0	-0.3	-0.7	-1.0
Scenario III											
Total health expenditure, bln BGN	1.682	1.977	2.815	3.997	5.640	7.791	10.544	14.270	19.271	25.814	33.965
Total proportion of HE in GDP, %	4.9	5.0	5.2	5.5	5.9	6.2	6.6	7.0	7.4	7.7	7.9
Total revenues in SIF*	1.416	1.808	3.004	4.471	6.226	8.768	11.165	13.961	17.289	21.272	26.111
Proportion of the revenues in GDP, %	4.1	4.6	5.6	6.2	6.5	7.0	7.0	6.8	6.6	6.3	6.0
Percent of deficit in GDP (%)	-0.8	-0.4	0.3	0.7	0.6	0.8	0.4	-0.2	-0.8	-1.4	-1.8

* Social Insurance Fund

In order to apply sensitivity tests we use the three already described variants of life expectancy at birth (assuming respectively fast, middle and slow improvement) and calculate the three presented above scenarios. The obtained results are shown in Table **6**.

Judging by the results of the sensitivity test on the expenditure side in the case of the three variants of life expectancy improvement, the general conclusion is: the faster increase in life expectancy at birth would lead to higher health care expenditure and respectively to a higher deficit.

5. Comparison of the main projections of the partner-countries from CEE

The partners from the other CEE countries included in the project AHEAD (Bulgaria, Hungary, Poland and Slovakia) have produced parallel scenarios reflecting the demographic and economic specificity of each one individual country.

Since the basic hypothesis in the ILO model stresses move from GDP level and growth and from the institutional conditions to the variables connected with ageing and the variables on health care expenditure it is interesting what is the assumed growth rates for the four countries in a long term perspective (Table 7).

Table 7

GDP growth rates in 2005 and assumptions for the future change in the four countries, 2005-2050,%

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Bulgaria	4.5	4.7	4.8	4.9	5.0	5.0	4.6	4.2	3.7	3.2
Hungary	5.2	3.1	3.3	3.5	3.4	3.2	3.0	2.9	2.7	2.5
Poland	5.6	4.7	4.1	3.8	3.2	2.9	2.8	2.6	2.5	2.4
Slovakia	6.0	6.2	5.1	3.9	3.0	2.8	2.6	2.4	2.2	2.0

Comparing the growth rates for the four countries shows the higher is the assumed for the future development in Bulgaria. We have our own arguments justifying that but what is more important the GDP growth rates influence on the dynamics of the other related variables in the ILO model.

Another key variable is the composition of the health care expenditure in these countries by sources (Figure 18). This breakdown shows the real situation in 2003 and implies ways for its probable and favourable changes in the future. It turns out Slovakia has the smallest percentage of government expenditure, while the largest share is in Bulgaria, followed by Poland. Slovakia, followed by Hungary is typical of highest share of social contribution, while amongst the compared countries this share is the smallest in Bulgaria. The highest is the percentage of the private sector in Hungary and Poland and the smallest – in Slovakia. The given composition of the health care expenditure outlines Bulgaria as a country with a less developed scheme of gathering funds for health care expenditure. It has already been noted that 2003 for Bulgaria was one of the initial years of health care reform and the presented not enough effective composition of the health care expenditure is explainable.

Figure 18
Breakdown of the health care expenditure in Bulgaria, Estonia, Hungary, Poland
and Slovakia by sources, 2003
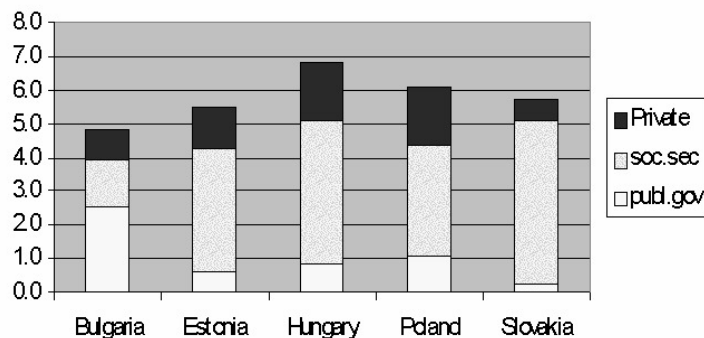
As a result the following projections of total public expenditure as share of GDP are
calculated (Figure 19). Hungary marks the highest share of public health care
expenditure in GDP both at the base and final year of the projections.
Comparatively high increase over the projection period is expected in Poland,
followed by Slovakia. The improvement of this indicator for Bulgaria is outlined as
the slowest, which means that the assumed economic development will be no-t
significant in view of insuring higher relative health care expenditure.

Figure 19
Total public expenditure as share of GDP in 4 CEE countries (Bulgaria, Hungary,
Poland and Slovakia), 2005-2050
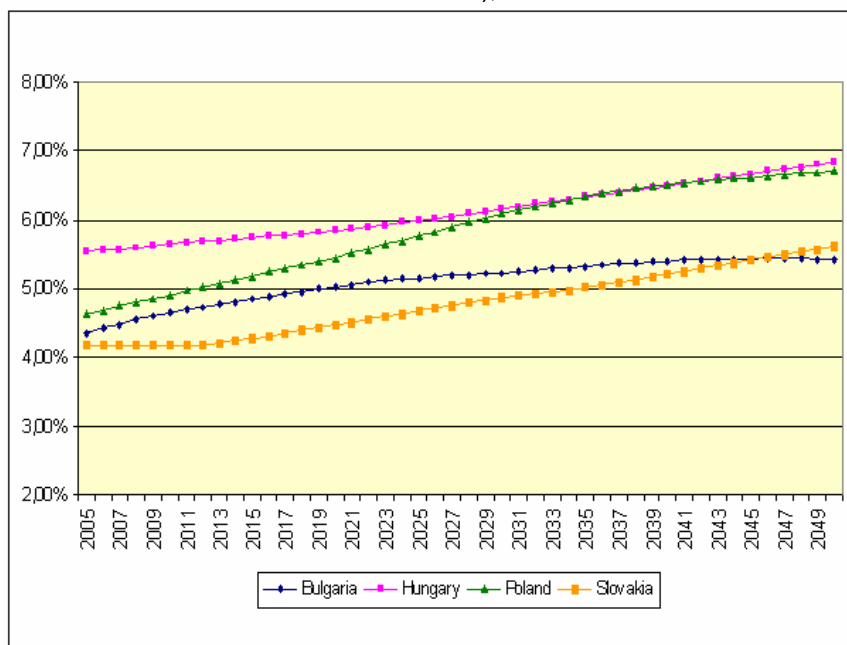
The final result of the developed scenarios has to present the possibility of each one country to meet the health care expenditure with the health care revenues. It is indicative and not surprising that for all the four countries (taking into account their similar demographic and economic situation)[12] deficit of the public health care expenditure is outlined (Figure 20). Depending on the real indicators for the base year in a given country and the included assumptions for the different independent variables' trends in the future, the largest deficit is likely for Slovakia, and the smallest for Poland; that for Bulgaria is close to that of Slovakia and Hungary.

Figure 20
Public health care deficit as share of GDP in four CEE countries (Bulgaria, Hungary, Poland and Slovakia), 2005-2050
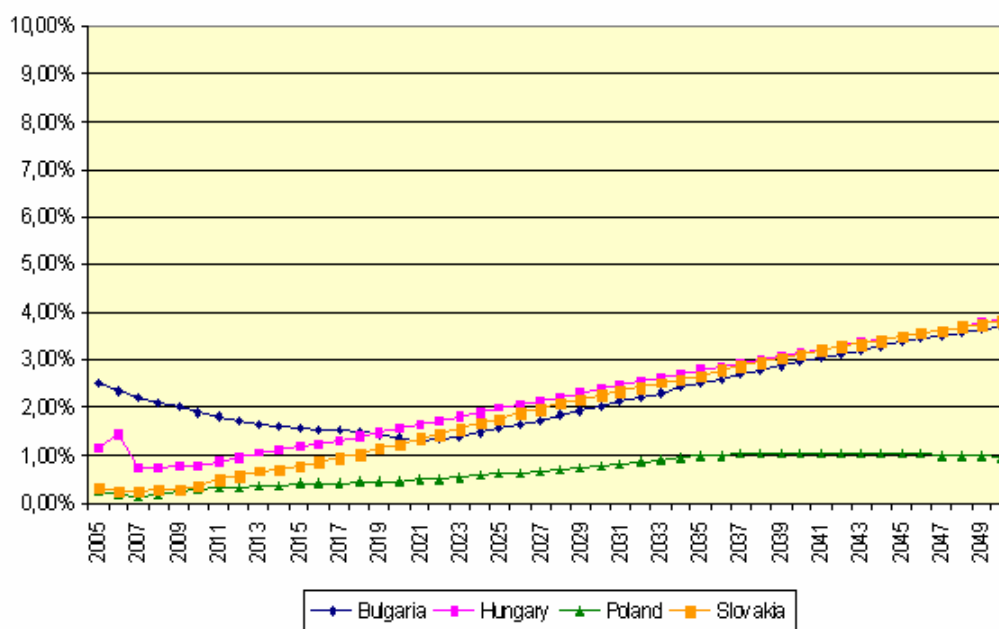
In general, the basic findings for the four countries' are the following:

- It is expected systematic growth of health budget deficit in all the considered countries

- The growth of deficit is caused by trends of components (variables) influencing both expenditure and revenue side. A very limited increase of the revenues and a high dynamic of expenditures growth are observed. As a result a systematic growth of the health budget deficit is outlined

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[12] See Rangelova, R. (2006), Ageing Population in Central and Eastern European Countries. In: ". B: „Ageing Population: Realities and Consequences, Policies and Practices", Centre for the Population Studies at the Bulgarian Academy of Sciences and National Insurance Institute, Sofia, 85-97.

- A strong influence of the rapid demographic changes (depopulation and ageing population) in the compared countries is observed to the detriment of the revenue side but this influence is different for the individual countries and over the time (for example, later increasing of this influence in Bulgaria)

- Sustainability of the health care system financing strong depends on the level and speed of economic development, in particular growth, labour market participation and wages

- Because health care expenditures are strongly connected with health care services utilization and their costs, health budget sustainability is also indirectly depending on the effectiveness of the structural health care reform (included by institutional variables)

Concluding remarks

- The ILO model realization allows to produce different scenarios depending on the authors' assumptions for the future change in the main economic and demographic indicators (in their capacity of independent variables) and thus to count their combined influence on the health care expenditure. However, due to two main restrictions, namely: firstly, the inevitable limitations of every one given model construction and secondly, the rather long period of nearly half a century projection when a wide specter of changes in the economic, social and demographic life could happen, *the obtained results should be interpreted with caution. More important are the tendencies outlined than the figures calculated*. These tendencies give useful implications for the policy makers in the field of health care finance.

In such a long future period different both positive or/and negative phenomena in the Bulgaria's economic development could observe. For example, keeping sustainable economic growth, improving the effectiveness of the health care system, finding the external sources of health care financing and other similar factors would favoured the national health care system budget. On the contrary, eventual hardships could influence detrimentally on the country's economic progress. They could happened in the financial sector as a result of a wrong bank policy (for example, a generous credit policy directed to not too important for the economic revival activities or something like that), giving up from the currency board in Bulgaria without being in a very stable financial position, new fiscal and monetary challenges which the country could face trying to enter the EMU, coming up unfavourable global or regional economic events and so on.

- Bulgaria marked strongly deteriorating demographic and health status indicators in the last 4-5 decades and particularly from the beginning of the 1990s. The most negative consequences are depopulation and a high rate of ageing population. This phase of aging is characterized by low fertility rate, increasing life expectancy, decreasing young dependency ratio and increasing old age dependency ratio. The demographic processes are specific with the so-called lag-effect which predetermines their negative impact for the next several decades. According to the known by us population projections for Bulgaria, even the most optimistic, the depopulation and the ageing population will deepen in the next 4-5 decades of the 21st century.

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- As a final result of the ILO model application an increasing gap between the total health revenue and the total expenditure in Bulgaria is outlined by the three used scenarios. The increasing deficit could be discussed from two sides: total health revenues and total health expenditure. Considering the first side, if we take into account the lower living standard of the Bulgaria's population compared with that of the other EU member countries facing similar bio-demographic problems, even on the base of the assumed by us rather high long-term economic growth rates it is impossible to cumulate the necessary funds to cover the expected expenditure. Considering the expenditure side, it is evident that the process of ageing population demands much higher funds than could be met by the total revenue.

- Speculating on the ILO model specificity related to the obtained results, we should mark that important components of the social and economic activity are not included. Firstly, migration was ignored, but in the four compared CEE countries, in particular Bulgaria it is considerable by scale. Most of these people regularly transfer money to their family and relatives, which even by approximate estimates are a significant amount. People in Bulgaria use this kind of transfer mostly as social assistance, including for health care. Because of the relatively (to the living standard) low health care prices in Bulgaria many migrants prefer to use medical services in the country. We observe also development of the so-called medical tourism in Bulgaria, because many foreigners prefer to use the lower priced but qualified medical services. On the other hand, it is very likely that Bulgaria will need additional work force still in the near future, which is expected to come from immigration in the country. According to projections of the NSI this could happen around 2012. Secondly, public and private health care activity is not clearly distinct in the model (mainly due to the lack of information about the emerging private sector) and thus the real and increasing contribution of the private sector is underestimated.

- Given the present situation in the health care sector in Bulgaria, we have to take into account that the decision to make projections based on 2003 leads to some bias. First of all this was an year with still a very limited funds for health care, secondly, the ongoing reform was (and at present, 2007 is) not yet accepted by the people and not yet implemented into practice because of the great and numerous problems around its nature. One of the aims of the current health care reform is to change the proportion between inpatient and outpatient health care through decreasing the former one. In addition, Bulgaria needs and will need more and more funds, including for investment in order to renovate the buildings, techniques and change the obsolete equipment, qualify the personnel, etc. This implies that the necessary health expenditure could be even much higher that it is projected by the model. Thus the revenues and expenditure gap could hardly get narrow.

Policy implications for Bulgaria

- Considering the effects of population ageing on health status and health services utilization, respectively on health expenditure the most important factor is strongly related to age. High dynamics of ageing population will require for the Bulgaria's society higher health expenditure. In the future health status will

be determined by illnesses and disabilities related in most cases to old age; also civilization diseases will be more frequent among elderly. One of the ageing effects on health care system will be increased demand for health care, rehabilitation and nursing services for those, who face different mobility or other health problems. Given the fact that the costs for health care are strongly increasing not only the current but also the future health care budget deficit will get wider. This fact makes of utmost importance the necessity to create an effectively functioning health care system.

- Within the last over 15 years the health care system in Bulgaria was a subject of mainly political considerations. The problems of health care finance should be considered from professional point of view, giving a real priority of this sector.

- From the revenue side it is important to conduct policy of dynamic growth; to develop employment strategy, and as a result to increase the taxable income (especially wages), including increase in the health insurance premium; giving a priority to health expenditures in public income distribution policy; etc.

- Concerning the wide-scale discussed health premium, there is not much space to increase it in Bulgaria given the low income level of the population. In our view such a burden would be unbearable for the most population within the next several years and will bring to worsen of the people's health care, which in its turn would lead to further increase in health expenditure. Other sources of increasing health revenues are: to encourage and to diverse voluntary health insurance; to look for other finance sources both on national and international level, etc.

- While the health care system in Bulgaria is not effectively organised and respectively the available total health expenditure is inefficiently used; much more money for health care will be needed. This is directly connected with the implemented nowadays health care system, which is widely disapproved by the population. Higher effectiveness in the health care systems presupposes as follows: capacity building, administrative efficiency, professional management of the health care establishments, cost control, effective drug policy, etc.

Discussing the effective health care system we mean that first of all a real priority of the health care sector should be given by the Government. It should develop potential to use the funds more effectively, to prevent corruption in the health care services in order not only to cover the primary needs of population but to develop activities with far-reaching effects like the following:

> elaboration of strategies to improve health status of the population;

> implementation of health information systems that are capable of providing, analysing, evaluating and distributing information necessary for disease surveillance, clinical practice, public health management, public education and policy making in health and health care system finance;

> to develop approaches preventing disease intervention still at an early age and conditions leading to significantly better health in later life;

> ➤ the development in science, technology and clinical practice should result in less costly but equally effective ambulatory treatment of a growing number of conditions that were formerly treated on an impatient basis. The effectiveness of health services will improve by closing the distance between the medical workers and the patients, including the ability to provide primary care through home-based or non-hospital based care.

- The most important precondition to overcome the outline health budget deficit in Bulgaria is to achieve a rapid and stable economic growth. Such a growth will reflect on the income level of the people, allowing to higher their living standard, respectively to increase insurance premium and voluntary health contribution.

In combination with the social and economic policy of the EU this country could achieve further progress in commitments to reduce poverty and spend much more fund for health care.