Panama

Financial and actuarial valuation of the *Caja de Seguro Social* (CSS)

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Acronyms

- CSS Caja de Seguro Social Social Security Institute of Panama
- EM CSS health programme
- GAP General Average Premium
- GDP Gross Domestic Product
- IVM CSS pension programme
- PAYG Pay-as-you-go (pension scheme)
- RP CSS workman's compensation programme
- UNDP United Nations Development Programme

Executive summary

The calculations of this valuation of the CSS have been conducted within the ILO social budget model based on a mutually consistent demographic, economic and labour market scenario. Other than for the 1998 valuation no alternative scenarios were developed.

This scenario tries to reflect a realistic view on the possible future socio-economic development of Panama. The population projection is in line with the assumptions of the Panamanian government and the most recent UN population prospects¹, which all expect that Panama, within the next 50 years, will add about 50 per cent to its present population. The assumptions on GDP were developed in taking into account past per capita growth, which was in the order of 2.3 per cent p.a. over the past 50 years. For the period 2000 to 2050 it was assumed that long-term average per capita growth could be in the order of 2.7 per cent p.a., this comparatively positive bias mainly being induced by an assumed actual realisation of higher future labour productivity growth. The total number of employed as well as the number of contributors to the CSS is projected to almost double between 2000 and 2050. Women's participation in the labour market will increase significantly; by the end of the projection period almost no differences between male and female employment levels are assumed to exist anymore. Unemployment will decline from present double-digit rates to almost full employment some time after the middle of the projection period. Under these conditions, Panama has the potential to improve clearly its relative income position in relation to its neighbouring and other possibly competing countries.

Without doubt, the scenario has a "positive" rather than a "pessimistic" bias on future development. This approach was deliberately taken, mainly for reasons to outweigh possible suggestions insinuating that the evaluation results for the CSS might, right from the onset, be the outcome of a "too pessimistic" view on Panama's future development potential. Instead, it ensures that any reform conclusions drawn from this report are on the "safe side" in the sense that they will not be based on an over-dramatizing analysis of the financial future of the CSS.

By and large, the results of this valuation confirm the 1998 results except that we now see the need to start socio-financial reform measures earlier than it was foreseen three years ago. At that time, it was expected that the pension program of the CSS would run into structural deficits somewhere between 2010 and 2015 – allowing for a number of years to pass before reform measures would need to be actually implemented. The present valuation indicates that such reforms might have to be implemented earlier, as the structural deficit of the CSS is now expected to occur by around 2005, already. The core reasons are that an unforeseen increase in the number of invalidity pensions in payment was experienced in the last three years and that average awarded old-age pensions have been higher than expected. These two reasons are the main explanation for the worsened IVM program's medium-term financial situation. In addition, the present worldwide economic slow down was not modelled in the previous valuation. It is a characteristic of long-term financial and actuarial valuations that short-term events do have a lasting impact on financial systems. Such occurrences cannot be ignored; their implications have to be accounted for prudently. After all, it is a sequence of short-term events that shapes long-run development.

1. The social budget of Panama

For 1990, total revenue of the social protection sector of Panama is estimated at around 965 million Balboas; until 2000 the amount doubled and reached 1,921 million Balboas. Total expenditure was estimated at around 869 million Balboas (1990), and at 1,806 million Balboas in 2000. The balance (= difference between revenue and expenditure) was positive over the 1990s.

¹ United Nations: World Population Prospects. The 2000 Revision (New York, 2000). See http://www.un.org/esa/population/unpop.htm

Total revenue amounted to 18.2 per cent of GDP in 1990 and 19.2 per cent in 2000. Contributions and tax revenue each took in all years an almost equal share of around 45 per cent in financing Panama's social expenditure. Capital income covered around 10 per cent of total revenue. Total spending amounted to 16.3 per cent of GDP in 1990, reached 20.7 per cent in 1998 and fell back to 18.1 per cent in 2000.in percentage of GDP, old age absorbed 5.7 per cent in 1990 and 6.1 per cent in 2000, followed by health with 5.1 per cent and 5.6 per cent in 1990 and 2000, respectively, and education with 4.1 per cent and 4.5 per cent. Housing plays only a minor role in the social budget of Panama.

Over the long run overall revenue is expected to decrease from present levels to less than 16 per cent of GDP (15.6 per cent in 2020); it will remain at that low level over around one decade and then start to increase again, however only slightly. By 2050 total revenue in percentage of GDP is projected to reach 17.1 per cent.



Chart 1. Social revenue ratio¹⁾ 1990 to 2050

¹⁾ Total revenue allocated to social protection in percentage of GDP.

Source: Database and results of calculations with the ILO social budget model.

The development of social spending in relation to GDP is over the full projection period influenced by the following broad trends:

- (1) as a direct consequence of the declining relative number of children the spending ratio on education is to change from 4.5 per cent of GDP in 2000 to 2.6 per cent in 2050;
- (2) relative spending on health is expected to increase continuously, especially as per-capita-spending on health will increase "structurally" because of the expected increase of older patients in relation to younger ones. All in all, health expenditure is estimated to reach a level of 7 to 8 per cent of GDP in 2050 (2000: 5.6 per cent);
- (3) relative spending on old age, disability and survivors is expected to increase significantly to more than 10 per cent of GDP in 2050 (2000: 6.1 per cent);
- (4) housing and labour and social security spending will remain at relatively low levels.



Chart 2. Social expenditure ratio¹ 1990 to 2050

¹⁾ Total social expenditure in percentage of GDP.

Source: Database and results of calculations with the ILO social budget model.

As a consequence of cyclical developments the overall balance of Panama's social protection system is turning negative in the immediate future; it will recover in 2003 and 2004, but then turn into a growing structural long-term deficit. This is unavoidable at given benefit levels, contribution and tax rates and the assumed demographic and labour market developments. However, the expected deficit remains at a bearable level until the late 2020s, i.e. in the order of -1 per cent to -2 per cent of GDP, and only then increases up to a peak level of over -5 per cent of GDP by the end of 2050^2 .



Chart 3. Balance¹⁾ of the social budget 1990 to 2050

¹⁾ Total revenue of the social budget less total expenditure of the social budget. The balance is equivalent to the change in the monetary reserves of the system.

2020

2025

2030

2035

2040

2045

2050

Source: Database and results of calculations with the ILO social budget model.

2005

2010

2015

-5.0% -6.0%

1990

1995

2000

² The deficit of the social budget is in all projected years estimated slightly higher than the balance ("resultado del ejercicio") of the CSS because investments into tangible assets are regarded current expenditure in the social budget whereas they are not included when calculating the "*resultado del ejercicio*".

Worldwide, countries spend between around 5 per cent and 30 per cent of GDP on social programmes. Under this perspective Panama rather spends a medium share than "too much" of its economic resources on social protection. Moreover, the foreseen rise in the social expenditure ratio is in itself no source of major concern. If one disregards of education³ the total social expenditure ratio was in 2000 at about 13.6 per cent and is expected to grow to 20 per cent of GDP by 2050. Compared to Europe Panama reaches in 2000 just half of the European level⁴ and shall lag behind in 2050 when Europe will have increased to average levels of social expenditure ratio of close to 30 per cent and over projected under the assumption of unchanged legislation.

Under the economic assumptions of this valuation Panama will in 2050 have reached 50 per cent of the per capita income level of the EU^5 . Using the European social expenditure ratio as a benchmark Panama has room for expanding its social expenditure ratio gradually by 5 to 7 per cent-points until 2050 even *beyond the level projected in this report* without negatively affecting its economic performance. The expansion is advised to take place for the functions housing, health and education. Furthermore, implementing an "employment service" should be considered a priority, as the labour market problems will grow fast in the years ahead. In cooperation among employers and employees it would basically support **h**e growing labour force, especially its younger strata, in efficient training and job placement. Taking all measures together, *the social expenditure ratio would increase by around 6.5 per cent-points of GDP by the end of the projection period*. Of course, under social policy as well as financing aspects, such expansionary steps are only being advised if accompanied by expanding coverage of the population.

With respect to future expansion, increased *public* spending on old age cannot be identified as a policy goal as it is bound to reach a level of over 10 per cent of GDP by 2050, which compares well to the expected European situation. All in all, from an international comparator perspective, Panama has no need to expand further its pension expenditure in relation to GDP.

2. The Caja de Seguridad Social (CSS)

All four programs of the CSS have been separately valuated for the report. Special attention was given to the pensions program (IVM) and to the health program (EM).

Pensions

The present contribution rate of 9.5 per cent will be sufficient until 2004 to cover the expenses of the IVM program. As of 2005, the cost-covering rate will be higher than the present legal rate. It will grow from 9.9 per cent of basic salaries in 2005 to 24.1 per cent in 2050. The deficit will be in the order of 9.8 per cent of expenditure over the first two decades after 2001 and then increase to 60.6 per cent in 2050. Reserves will be depleted in 2018; by the end of the projection period, the accumulated debt amounts to 68.6 per cent of GDP.

³ Following the European social budget methodology education is not considered a re-distributive expense of societies (and, thus, not considered part of the social budget) but, instead, an investment into human capital necessary to maintain economic productivity in the long run.

⁴ The level of social expenditure depends very much on the used definition of social expenditure. For the US total social expenditure, including charities and private measures, has been estimated in the order of around 32 per cent. The definition for the EU is set by EUROSTAT, the statistical office of the European Community in Luxembourg. Definitions used by individual member states of the EU might differ from the EUROSTAT definition. For 1998, EUROSTAT estimates the level of social expenditure for the Community in the order of 27.7 per cent of GDP, varying between 30.5 per cent for France (= maximum) and 16.1 per cent for Ireland (= minimum). See: Federal Ministry of Labour and Social Affairs of Germany: *Statistics on Labour and Social Security 2001*. (Bonn, 2001). Tables 9-18 and 9-18A, or http://www.bma.de for information.

⁵ In other words, it will then have reached the position of the "poorer" member states of the EU.



Chart 4. Development of the IVM reserve

Source: Database and results of calculations with the ILO social budget model.

The main reason for this development is the fast deterioration of the system dependency ratio. At present, 11 pensioners are being supported by 100 insured, in 2050 the relation will have changed to 43 : 100.

This trend cannot be counterbalanced by the cost saving effects of the strong no-indexation assumption. Indeed, the system replacement ratio for old-age pensions is, under the given assumptions, bound to fall from 86 per cent in 2000 to 49 per cent in 2050⁶. In case, the valuation of the program had taken into account ad-hoc pension adjustments (as they took place in the past) the financial results would deteriorate accordingly.

The system replacement ratio falls because of a number of coinciding reasons (of which the no-indexation assumption is the strongest). It does not imply a deterioration of individual new pensions (the pension formula was kept unchanged). In the contrary, the pension formula is considered far too generous, at least in an international comparison.

The Panamanian pension formula is generous even from a European welfare state point of view, and even when allowing for the cost-saving no-indexation provision. The present formula resembles features of the generosity of Luxembourg's pension system, the most generous in Europe, which is financed out of a total contribution rate of 24 per cent (while the economy is fully employed and legal coverage of individual wages is broader than in Panama). Therefore, an increase of the contribution rates to the IVM program is inevitable, anyway, even if the pension formula would be made less attractive. Over the medium- and long-term *it is impossible to achieve financial stability of the CSS as long as pensions are calculated on the basis of the present formula while maintaining the legal contribution rate of 9.5 per cent.*

The following table shows that European pension systems, although far less generous than the Panamanian system in their core design (pensionable age, years of service, income replaced), are much more broadly financed in terms of contribution rates levied and state subsidies transferred. One of the main reasons is, of course, that the European systems are since long matured. The more the Panamanian

⁶ The ratios for invalidity pensions and survivors' pensions are following a similar pattern.

system enters maturity the more it will be inevitable to adjust contribution rates upwards. Of course, there are other possible elements of solutions, one of which could be higher (rule-bound) transfers from the state budget to the CSS. However, because of possible adverse re-distributive effects, such a policy is only advised in case of broader coverage of the population by the CSS as well as by the general taxation system. Savings along the lines mentioned in this report could ease the cost increase of the pension system but will not be able to fully counterbalance these as long as benefits and eligibility conditions are kept at meaningful levels.

Country	Contr. rate for individuals (incl. employers contribution)	Pensionable age	Years of service	Replacement rate	1 % contr. buys % replacement	Remarks
	(%)			(%)		
	19.85	60	40	45.00	2.27	Contr. for
France		60	35	25.00	1.26	invalids not
Trance		65	40	45.00	2.27	included
		65	35	45.00	2.27	
	16.00	60	40	77.35	4.83	Plus state
Luvembourg		60	35	68.45	4.28	subsidy
Luxembourg		65	40	77.35	4.83	equivalent to
		65	35	68.45	4.28	8 % contr. rate
	19.30	60	Not	nossible		Plus state
Germany		60	NOL	possible		subsidy
Germany	_	63	40	43.0	2.23	equivalent to
		63	35	37.6	1.95	5 % contr. rate
	19.86	60	40			3.5 % contr.
Belgium		60	35			rate for
Deigium		65	40	53.33	2.69	invalidity
		65	35	46.67	2.35	included
	9.50	57 – 62	40	91.25	9.61	Plus state
Panama			35	85.00	8.95	subsidy equivalent to 0.5 % contr. rate

Table 1.	Pension	replacement	rates in	European	welfare s	states ¹⁾

¹⁾ Data refer to the situation in 1999 / 2000, depending on availability of information.

Source: Bureau international du Travail – Genève: Luxembourg. Évaluation actuarielle et financière du régime général d'assurance pension de Grand-Duché de Luxembourg. Remis au Ministère de la sécurité sociale. Geneva 2001. P. 12, and own calculations.

As more and more insured are to retire, it will be ever more difficult to reject demands on indexation of benefits due to consumer price or real wage increases. If such demands were to be fulfilled while maintaining the present pension formula, the CSS finances would turn into a major burden of general public finances. Any reform measures then to be taken would need to be much more drastic than if such measures were implemented in the near future.

Possible remedial elements of solution within the CSS legal framework are as follows:

- the pension formula could give a considerably lower replacement after 15 years of contribution (for example 45 per cent instead of the present 60 per cent). The "7 best incomes out of last 15 years" rule could be modified or gradually be given up at all;
- (2) the resulting saving effects could be (partially) counterbalanced by the introduction of a legal indexation mechanism (for example through linking benefits in payment to consumer price development);
- (3) legal retirement age could stepwise be increased further while converging retirement ages for men and women;

(4) contribution rates could be increased.

All possible measures are "mainstream" from an international perspective.

Health

International comparison of core health related indicators⁷ reveal that the health system of Panama is malfunctioning and needs many improvements. For example, infant mortality is high in international comparison, and so is maternal mortality. Also health expenditure per capita is very low whereas health expenditure as a percentage share of GDP is relatively high⁸. Necessary improvements cover a potentially wide range of measures. Many are possibly more of an organisational and performance oriented nature and probably not even very costly in comparison to the expected gains. Others are directly linked to the overall low spending driven by the still low general income level of Panama and will, thus, require additional resources.

The actual future development of health expenditure will highly depend on repetitive short-term decisions – which leaves room for numerous options of how to model most adequately future health expenditure (and their financing). If, for would aim at reaching Spain's recent (1998) per capita spending level within the next 20 years then total expenditure on health would have to grow annually by a rate of 10 per cent until 2020.

Of course, in order to finance such increases contribution rates on wages and / or general tax rates would need to be increased accordingly - with impacts on the total economy, including its labour and product markets. Simulating such policy strategies requires an iterative re-formulation of the underlying economic scenarios and also, if such policy strategies were to be assumed successful, the demographic assumptions on infant mortality and on life expectancy would have to be changed to the better – which was not part of this valuation of the CSS. Instead, it was aimed at a "realistic" forecast of the health expenditure of the CSS within the same fixed demographic, economic and labour market frame as underlying the pension valuation.

In terms of current expenditure "health" is the second largest programme of the CSS. Over the 1990s its share in total CSS expenditure gained 2.5 per cent -points weight. Under the status quo assumptions of this valuation the Health programme, as Workman's Compensation and Administration, will loose considerable weight in total current expenditure of the CSS over the projection period. This is due to the over-proportional expansion of the Pensions programme.

⁷ See, for example: OECD Health Data 2000. A comparative analysis of 29 countries (Paris, 2000). (CD-ROM).

⁸ The latter observation is probably owed to the fact that GDP is underestimated, due to Panama's large informal sector.

Programme	1990	1995	2000	2010	2020	2030	2040	2050			
-	%	%	%	%	%	%	%	%			
Pensions	57.3	56.6	52.3	52.0	55.2	61.2	65.4	68.3			
Health ^{*)}	34.8	34.7	37.3	37.6	35.3	30.6	27.5	25.2			
Compensation	4.2	4.4	5.6	5.7	5.2	4.5	4.0	3.6			
Administration	3.8	4.3	4.8	4.8	4.3	3.7	3.2	2.9			
CSS total	100	100	100	100	100	100	100	100			
') Excluding health infrastructure investments. Source: Database and results of calculations with the ILO social budget model.											

Table 2. CSS programs' current expenditure shares

Around half of all operating health expenditure is on wages and related expenses. They are assumed to grow in line with the general average wage and public sector employment. So-called non-personnel costs are growing in parallel to nominal GDP - assuming that the development of GDP cost components reflects the dynamics of the respective EM items. Special attention was given to the future development of the cost component "material and supply, pharmaceuticals" which has been growing fast in the past. For calculating the respective expenditure, a pure "if-then" approach was applied.

As a result of this approach the programme's current expenditure increases by an annual average rate, which is 0.2 per cent-points higher than nominal GDP. The share in GDP increases from 2.9 per cent in 2000 to 3.3 per cent in 2050. Over the same time its structure changes in favour of non-personnel costs. It should be noted that the relative reduction of personnel costs depends also on the implicit assumption that the average income position of medical personnel in Panama's national income distribution does not change over time. Here, the health program faces financial risks.

The EM Program has to pursue a narrow path in order to satisfactorily serve Panama's population with its resources available. Health is one of those social programmes where the never closing gap between "unlimited needs" of the population and limited resources to satisfy these needs is mostly felt. Therefore, the CSS has to spend the available revenue in the most efficient and effective way.

Under the above results not much is left to finance overdue infrastructure investments. Under the provision that a minimum liquidity reserve in the order of 25 per cent of previous year's current health expenditure should be maintained the calculation results show that the CSS could within short time run into a situation not allowing for any substantial further infrastructure financing. The liquid reserve is endangered to fall below the minimum reserve by 2002, already, and remain in that position until 2032; only in 2033 and the subsequent years the amount of the liquid reserve would allow for further investments.



Chart 5. Health program: Liquid reserve and minimum reserve

Source: Database and results of calculations with the ILO social budget model.

Under these conditions infrastructure investments would develop as shown in Chart 6.



Chart 6. Health program: Infrastructure investments

Source: Database and results of calculations with the ILO social budget model.

The reserves situation and consequently the volume of investment are unsatisfactory. A preliminary check of the expenditure structure of the health programme reveals that savings in the order of 1/2 per cent-point of contributions may be possible. These could be channelled into health infrastructure. One has to take into account, however, that health infrastructure investments are normally paralleled by additional personnel costs. Thus, to assume savings as a result of the infrastructure investments in the number or salaries of personnel are unrealistic, the contrary will have to be faced.

All in all, our analysis shows that the health program is under competition for limited resources with the pension program. Panama will have to make its choice to set priorities with respect to the future allocation of the available resources on pensions or on health. However, in both cases more resources will be needed in future.

Workman's compensation and Administration

Due to their low financial weight in comparison with the other programs, Workman's compensation (RP) and Administration are only of minor importance for the financial development of the CSS. In 2000, they made up for slightly over 10 per cent of total current expenditure of the CSS, which is projected to even decline to 6.5 per cent in 2050.

In 2000, around 65 per cent of current expenditure of the Workman's compensation programme were spent on service ("in-kind") related expenditure, 35 per cent on cash benefits. Under the demographic and economic assumptions made, the programme shows no obvious financing problems over the projection period. Under the legal contribution rate of 1.65 per cent the program collects sufficient contributions in order to cover the costs. It is, furthermore, able to invest some current income in the financial markets and, thus, receive considerable shares of capital income.

Under these conditions, the funding ratio is bound to increase to levels that are considered too high. This is reflected by the GAP of 1.1 per cent - which is about 0.5 per cent-points below the legal rate. Thus, the Workman's compensation fund may be considered an indirect source of financing solutions for the other programmes, especially health. One should, however, not expect too much help for solving long-term structural problems of the CSS from such intra-organizational shifts of monies.

The Administration of the CSS forms a separate item in the program's balance. CSS Administrative expenditure is financed out of four main sources: (1) State subsidies, (2) fines and penalties, (3) 10 per cent of the regular contributions to the 's compensation programme and (4) interest payments on fixed term deposits. Obviously, the most reliable incomes are the state subsidy and the share in the contributions to the Workman's compensation programme. Over recent years, also fines and penalties have been a major source of income.

Projecting the expenditure and revenue components of this programme is straightforward. On the revenue side, however, fines, penalties and alcohol taxes assume a peculiar role, as, by their very purpose, they should make themselves unnecessary with time passing. It was simulated, therefore, how total revenue would develop in case fines and penalties and alcohol taxes were zero for the period 2002 to 2050. In this case the programme would start to run deficits in 2002 and continue to do so until 2050. Its reserve would turn negative in 2016. In case the programme would only forgo the alcohol taxes, the system would remain in a surplus over the full projection period if, as assumed, fines and penalties would continue to grow in line with contribution income. If fines and penalties were kept at the 2001 absolute level, while maintaining the (growing) alcohol tax income, then the programme would run into a deficit by 2023, the legal reserve however staying positive over the full projection period.

The above calculations indicate that the administration program is dependent on the continued "existence" of fines and penalties, a situation, which, over the longer term, could introduce elements of undue mistrust in the relations between the CSS staff and its constituents. It is therefore recommended to reconsider the financing principles of the CSS' administration (which would possibly lead to a more general organisational reform of the CSS).

As a preliminary conclusion it has to be stated that the CSS needs an overall reform, at least with respect to its two main programmes, pensions and health. Such a reform can be successfully carried out under the present public structure, as the international experience has shown. If Panama wants to be economically successful over the longer term it will have to combine market with substantial social measures, strengthening the cohesion of the society. For these purposes, more public resources will have to be made available. However, with respect to the question where these additional resources should be spent with priority, a consensus has to be found. In the context of this valuation it is argued that priority should be given to health (including, possibly, the introduction of a new institution taking care of the frail persons of the society, which might be necessary in the context of growing female labour market participation), housing, education and employment whereas pensions might have to pay their share in freeing resources for the required restructuring of Panama's social protection system.

This pattern of cost increases is considered reasonable in the context of Panama's ageing population and the level of protection provided by the IVM scheme. However, the social partners of Panama must carefully address a proper course of action in order to ensure the long-term financial viability of the IVM programme: either increasing the volume of contributions or retargeting the benefit structure. If the outcome is that the present level of benefit protection should be maintained, then contributions must be increased as discussed under section 2.2.4.3, otherwise the annual deficits projected to accumulate will have to be covered by the state.

Introduction

This report updates the actuarial review of the CSS, which was undertaken by the ILO in 1998. Meanwhile, the President of the Republic of Panama had commissioned to the UNDP Resident Representative in Panama the facilitation of a new national agreement on the reform of the social security system. The aim of this commission is a draft law on the reform of social security (i.e., mainly, of the CSS). One prerequisite for the sound formulation of this draft is an updated financial assessment and actuarial valuation of the CSS under status-quo (present legislation) assumptions.

Based on the 1998 Valuación financiera y actuarial integral de la Caja de Seguro Social y elaboración de un modelo de cuentas sociales, (ILO/RP/Panama/R.1), a team consisting of Mr. Wolfgang Scholz, senior economist, and Mr. Florian Léger, actuary, both ILO-SOCFAS, carried out the new valuation. In preparation of the task Mr. Scholz in May 2001 undertook a one-week mission to Panama in order to clarify procedural questions and the data situation with the CSS and UNDP. Mr. Sergio Velasco, social security specialist of the ILO office in San José, accompanied him.

The new valuation is based on the most recent statistical data available. It is understood that the legislation on the CSS has not changed since the last evaluation was undertaken. It was agreed among the CSS, UNDP and the ILO that the results of the report will serve as a technical information base for the intended draft legislation on social security reform. Furthermore, this report intends to provide the Government of Panama, the CSS and the social partners with a comprehensive financial and actuarial analysis of the CSS as a basis for future discussions on possible reform steps. It is hoped that the immediate beneficiaries of the report will be those drafting the reform legislation for the CSS, the Planning Department of the CSS and those working on the ILO Decent Work Initiative. Also, so it is expected, other quantitative social protection planners, decision makers in the Government or working for the social partners or the media may use the findings of this report as a source to facilitate public discussion. Over longer terms, sound medium- to long-term planning in Panama's social sector will benefit the total population, including those not or, at present, only insufficiently covered by the social protection system.

As it was the case in the previous report, the work done made use of the ILO social budget model, which in the meanwhile was methodologically improved and updated. All calculations were undertaken at ILO headquarters in Geneva. Mr. Velasco, ILO San José, contributed efficiently to the success of the valuation by functioning as a link between the ILO team in Geneva and the CSS. Many thanks go to Mr. Even Chi Pardo, director of the planning department of the CSS, and his staff for untiring supply of information. It was especially Mr. Pastor Gonzales who was responsible for the timely delivery of data compilation to be done by the CSS.

During the final stage of the report Ms. Anne Richter, student of economics at the University of Kiel, Germany, supported the ILO team. While on an internship at ILO headquarters she effectively contributed to the final editing of this report by checking text, tables and graphs for mutual consistency and pointing at insufficiencies. However, responsibility for the contents of the report remains with ILO-SOCFAS.

The original version of this report was written in English. Under the supervision of Mr. Sergio Velasco ILO San José undertook the translation into Spanish.

1. Long-term demographic and economic projections

This chapter explains the demographic and economic framework of assumptions underlying the financial and actuarial evaluation of the CSS.

The long-term financial development of social protection systems depends on many variables. In financial and actuarial evaluations like this only the most important ones can be taken into account, among which, most prominently, is the population development, the general economic development and the labour market development. A typical characteristic of long-term projections is that the underlying assumptions on the future development of core variables, such as real GDP or labour productivity, follow past observed trends; often, system parameters, such as fertility or mortality rates or labour market participation rates, are assumed constant. Sometimes, it is advisable to assume these variables / parameters to follow patterns different from past observations. All such design elements have been incorporated in the long-term assumptions underlying the calculations on Panama's social protection system. It should be noted that, because of their "trend-nature", these assumptions are by construction not able to reflect the impact of business cycles (and respective labour market movements) on social protection systems, nor are they designed to reflect potential impacts of structural economic breaks. One should be aware of the fact hat the long-term behaviour of social protection finances may differ considerably in case of assumed cyclical movements from results based on trend-type assumptions, even if average growth rates of, say nominal per capita wages or the number of contributors are identical over the long run⁹.

On this background it should be understood that the purpose of long-term assumptions (as well as the purpose of the results of calculations based on these assumptions) is to compile a consistent framework, a framework, which resembles a certain high degree of plausibility to its addressee. The authors of this report do not claim to "forecast" the future, i.e. to tell its readers which future development Panama's population, economy, labour market has to expect and, thus, which way its social protection system will actually turn. They only claim consistency among assumptions and the resulting financial calculations. With respect to the underlying assumptions consistency means that these assumptions are in line with past observed and foreseeable future trends (if any), definition equations, where applicable, are being met and remaining "internal contradictions" of assumptions on future developments are being reduced to an acceptable minimum (for example, when explicitly or implicitly making use of ceteris paribus clauses). With respect to the social protection system financial calculations, the projection of its different categories of revenues and expenditures, consistency means that the results are fully compatible with the underlying demographic, economic and labour market assumptions. In other words: Once the assumptions have been accepted the social protection system related calculation results can be considered reliable with a high degree of confidence. Some of the results can even be considered relatively "immune" against changes in the assumptions once certain start values have been accepted.

1.1. The demographic, macro-economic and labour market assumptions at a glance

The core variables influencing the results of the financial and actuarial evaluation of Panama's social protection system are summarized in *Table 1.1*. More details are presented in the subsequent *sub-chapters 1.2 to 1.5*.

The size of Panama's population is, at present, estimated at around 2.8 million persons. Over the next 50 years it is expected to grow by a total number of around 1.4 to 1.5 million persons; while, over the first

⁹ See: Wolfgang Scholz and Anne Drouin: Regular adjustment of financial parameters of social protection systems in volatile inflationary environments. In: *International Social Security Review* (Blackwell, Oxford). 1/98, pp. 47-71.

decade, the annual average increase will be 43 thousand persons, this absolute growth rate will decline to 13 thousand persons per year during the last projection decade.

The labour force ("labour supply") will grow, in line with the projected population development, from an estimated number of 1.1 million persons in 2000 to almost 2 million in 2050. A core assumption behind this projection is an assumed strong increase in female labour market participation.

The projected number of employed persons ("labour demand") is a model output resulting from two important economic assumptions, i.e. assumptions on future real GDP growth and on future labour productivity growth (see sub-chapter 1.4, below). In 2000, the number of employed is estimated at almost 980 thousand persons. It will grow, at decade-by-decade gradually declining growth rates, to almost 1.9 million persons in 2050.

Among the employed, dependent employed are of special importance because they serve as a reference variable for the number of contributors to the CSS. Their share in total employment was 67.7 per cent in 2000; it is assumed that this share will only slightly increase over time (68.0 per cent in 2050). Accordingly, the number of dependent employed grows from 662 thousand persons in 2000 to almost 1.3 million in 2050, i.e. by 620 thousand. The increase of the number of contributors is more or less the same.

As a result of these projected labour market developments the unemployment rate, which is at present (2000) estimated at close to 13 per cent, will decline to 4 per cent and below in 2040 and after. In other words, the long-term projection assumes full employment of the Panamanian economy over around the last third of the projection period.

The assumption on future GDP growth is crucial for the future development of the social protection system of Panama as it defines the source for all present and future re-distributive measures and institutions of the country. Here, it is assumed that, over the long run, the Panamanian economy grows at an annual average rate of 3.5 per cent - which is slightly more than 1/2-percentage-point higher than observed over the last two decades (1980 to 2000: 2.9 per cent p.a.).

Given the very long projection period it is reasonable to assume that (increased) GDP growth will be the result of positively acting demand- as well as supply-side factors. Labour productivity growth, especially, cannot reasonably be assumed to remain at low past levels. It is therefore assumed that labour productivity growth rates of slightly over 2 per cent p.a. are consistent with the assumed long-term steady growth path of GDP.

Labour income, the main source of financing social security (the CSS), is estimated at a share of 61 per cent of Domestic income in 2000. It is assumed that this share will gradually grow to 63 per cent in 2050.

Nominal per capita wage development is a result of labour income development and dependent employment development. They will grow, over the projection period, at annual rates between 4 per cent and 4.5 per cent. Given past performance, inflation is assumed very low also in future (2 per cent p.a.); thus, real per capita wages will grow at annual rates slightly over 2 per cent, i.e. broadly in line with labour productivity.

Table 1.1.	The demographic, economic and labour market frame
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	Dimension	1997	1998	1999	2000	2010*)	2020*)	2030*)	2040*)	2050*)
Population	1000 Pers.	2719	2764	2809	2839	3266	3620	3939	4160	4288
Change over previous period	%	1.7	1.7	1.7	1.1	1.4	1.0	0.8	0.5	0.3
Population $>=15$ years of age	1000 Pers.	1707	1743	1779	1815	2226	2593	2924	3152	3285
Change over previous period	%	2.2	2.1	2.1	2.0	2.1	1.5	1.2	0.8	0.4
Share in population	%	62.8	63.1	63.3	63.9	68.1	71.6	74.2	75.8	76.6
Labour force	1000 Pers.	1049	1084	1089	1122	1354	1592	1773	1887	1951
Change over previous period	%	3.8	3.3	0.5	3.0	1.9	1.6	1.1	0.6	0.3
Share in population ≥ 15	%	61.5	62.2	61.2	61.8	60.9	61.4	60.6	59.9	59.4
Men	1000 Pers.	676	694	700	718	860	966	1030	1044	1020
Women	1000 Pers.	374	390	389	404	495	626	743	843	931
Women per 1000 men	Pers.	553	562	556	563	576	648	722	807	913
Number of employed	1000 Pers.	912	936	961	978	1208	1481	1667	1811	1884
Change over previous period	%	5.1	2.7	2.7	1.7	2.1	2.1	1.2	0.8	0.4
Share in labour force	%	86.9	86.4	88.2	87.1	89.2	93.0	94.0	96.0	96.6
of which:										
Dependent employees	1000 Pers.	602	626	642	662	819	1005	1132	1231	1281
Change over previous period	%	3.2	4.1	2.5	3.1	2.1	2.1	1.2	0.8	0.4
Men	1000 Pers.	399	418	426	435	516	607	654	679	673
Women	1000 Pers.	202	209	216	227	302	398	478	552	609
Women per 1000 men	Pers.	506	500	507	522	586	655	731	813	905
Contributors	1000 Pers.	588	595	636	661	806	987	1099	1198	1251
Change over previous period	%		1.2	6.8	3.9	2.0	2.0	1.1	0.9	0.4
Relation to dependent employees	%	97.8	95.1	99.1	99.9	98.4	98.2	97.1	97.3	97.6
Men	1000 Pers.	376	381	411	427	504	595	640	671	677
Women	1000 Pers.	213	214	225	234	302	391	458	526	574
Women per 1000 men	Pers.	566	562	548	548	600	657	716	784	847
Self-employed, owners & family workers	1000 Pers.	310	310	319	316	389	477	535	581	603
Change over previous period	%	9.0	0.0	3.0	-1.1	2.1	2.0	1.2	0.8	0.4
Unemployment rate	%	13.1	13.6	11.8	12.9	10.8	7.0	6.0	4.0	3.4
Men	%	10.4	10.0	8.9	10.5	11.3	7.4	6.5	4.3	3.0
Women	%	18.1	19.9	16.9	17.0	9.8	6.3	5.3	3.6	3.9
GDP (in prices of 1982) 2	Million Balboas	6658	6947	7152	7342	11076	17037	23916	31985	40943
Change over previous period	%	4.5	44	3.0	27	42	44	3.4	29	2.5
GDP deflator	Index	130.0	134.5	133.6	136.3	166.1	202.5	246.9	300.9	366.8
Change over previous period	%	17	3.4	.07	2.0	2.0	2.0	2.0	2.0	2.0
Domestic income	Million Balboas	7321	7828	7953	8327	15380	28959	49765	81473	127665
Change over previous period	%	7.0	6.9	1.6	4.7	6.3	6.5	5.6	5.1	4.6
Labour factor income	Million Balboas	4318	4724	4833	5060	9416	17859	30913	50970	80429
Share in domestic income	%	59.0	60.3	60.8	60.8	61.2	61.7	62.1	62.6	63.0
Sum of wages	Million Balboas	3973	4351	4442	4651	8663	16448	28498	47033	74286
Change over previous period	%	6.1	9.5	2.1	4.7	6.4	6.6	5.7	5.1	4.7
Wages per capita (National Accounts)	Balboas / month	550	579	576	585	882	1364	2099	3185	4831
Change over previous period	%	2.8	5.2	-0.4	1.6	4.2	4.5	4.4	4.3	4.3
Nominal rate of return	%	6.2	6.5	6.3	7,6	6.0	5.0	4.5	4.5	4.5
Labour unit costs	% ¹⁾	3.4	3.4	-0.5	0.6	2.1	2.1	2.1	2.1	2.1
Labour productivity	% ¹⁾	-0.6	1.6	0.3	0.9	2.0	2.3	2.2	2.1	2.1
	- /0									

1) Change over previous shown period. 2) Average GDP growth 1980 - 2000:

Average GDP growth 2000 - 2050:

3.5% Source: Database and results of calculations with the ILO social budget model.

2.9%

1.2. **Expected population development**

In 2000, Panama's population comprised around 2.84 million persons (of which: 50.5 per cent men; 49.5 per cent women = 982 women per 1000 men). Over the decade 1990 to 2000 it grew by half a million persons. The average growth rate was 2 per cent p.a. (which equally applied to the male and female population), decreasing to 1.5 per cent p.a. over the last five years (including a preliminary estimate for 2000). Mainly as a result of internal migration the growth rate of the metropolitan population was higher than in the rural areas.

During these last ten years, life expectancy has gained about 2 years for both males and females, reaching 70 for males and 74 for females in 2000. These improvements in mortality are foreseen to go until 2020 and then it is assumed that mortality rates will stay constant. Therefore, life expectancy will attain 77 for males and 82 for females.

Total fertility rate was in 1990 at a relatively high level of 2.88 children per woman. 10 years later, is has decreased to 2.4. It is assumed that this declining path will slowly decrease to 2.02 in 2020 and thereafter that fertility rate will stay constant until the end of the projection period.

For the purpose of this valuation, it was decided to maintain the same demographic assumptions as used in the 1998 valuation. The reason is that no new official projections have been realised since as regards the period 2000-2020 and that no new statistics required reviewing the assumptions for the period 2020-2050. The 1998 UN population prospects revision moves down the total population projection in 2050 from 4.4 to 4.3 millions which is the figure of the 1998 ILO report (when the previous report was written, only the UN 1996 revision was available) and, also, the latest UN population prospects (2000 revision) did not change this result.

On basis of these assumptions the population will grow to a total of 4.29 million persons in 2050; on average, the annual increase will be 29 thousand persons per year (43 thousand p.a. over the first projection decade, 13 thousand over the last decade). By 2050, in comparison to the estimates for 2000, the gender relation will have switched to 49.3 per cent men and 50.7 per cent women (= 1028 women per 1000 men).

The increase of the population naturally comes from the difference between births and deaths (if migration is considered negligible), which difference can be seen on the following chart which depicts the five-years yearly average of the number of births and deaths as provided by the UN population prospects. Over time, as population ages, there are more and more deaths whereas the number of births, in conjunction with the decrease in fertility rates, slightly decreases. However, the difference is still positive and therefore total population goes on rising but to a smaller and smaller extent.



Chart 1.1. Births and deaths 1995 to 2050

Source: Database and results of calculations with the ILO social budget model.

The so-called potentially active population (defined as the population aged 15 years and older; this part of the population is the reference population for the estimation of the labour force) will grow from a total of 1.82 million in 2000 (of which: 49.3 per cent men; 50.7 per cent women (= 1029 women per 1000 men)) to 3.29 million persons in 2050 (of which: 48.5 per cent men; 51.5 per cent women (= 1061 women per 1000 men)).

The average age of the total population will increase from 25 years and 6 months in 1990 to 39 years and 6 months in 2050. The average age of the potentially active population will grow from 35 years and 10

months in 1990 to 47 years and 2 months in 2050. In both cases, female average age will grow faster than male.

Year	Total population	Men	Women	Population > 15 years	Men	Women					
1990	25 y 6 m	25 y 6 m	25 y 7 m	35 y 10 m	35 y 10 m	35 y 10 m					
2000	27 y 10 m	27 y 7 m	28 y 1 m	37 y 4 m	37 y 1 m	37 y 6 m					
2010	30 y 7 m	30 y 2 m	31 y 0 m	39 y 2 m	38 y 11 m	39 y 6 m					
2020	33 y 6 m	32 y 11 m	34 y 0 m	41 y 6 m	41 y 1 m	42 y 0 m					
2030	36 y 2 m	35 y 8 m	36 y 8 m	43 y 11 m	43 y 5 m	44 y 6 m					
2040	38 y 2 m	37 y 10 m	38 y 7 m	45 y 11 m	45 y 4 m	46 y 5 m					
2050	39 y 6 m	39 y 2 m	40 y 0 m	47 y 2 m	46 y 8 m	47 y 8 m					
2000 to 2050	+ 11 y 9 m	+ 11 y 8 m	+ 11 y 11 m	+ 9 y 10 m	+9 y 7 m	+ 10 y 2 m					
y: = year; m: = month. Source: Database and results of calculations with the ILO social budget model.											

Table 1.2. Average age of population

Panama's population is ageing - which is a natural and unavoidable reflex of the assumed declining fertility rates and increased life expectancy.

The ageing process is important for decisions to be taken in many policy areas. The most prominent ones (in the context of this report) are old age, health and education. Population ageing implies upward pressure on pension and health expenditure whereas expenditure on education will in future have a population-induced declining tendency (in all cases, other factors may counterbalance these tendencies).

Often, the ageing-induced burden of societies is shown by calculating so-called "support ratios"¹⁰. Ageing implies relatively more older persons as well as - simultaneously - relatively less younger persons. Therefore, it seems reasonable to calculate both, old-age and youth support ratios as well as a "total" support ratio. Here, we used the following three definitions:

- a) old-age support ratio: [Number of persons aged 15-59] / [persons aged 60 and over];
- b) youth support ratio: [Number of persons aged 15-59] / [persons aged 0-14];
- c) total support ratio: [Number of persons aged 15-59] / [persons aged 60 and over *and* persons aged 0-14].

The results for Panama are shown in the following chart 1.2.

¹⁰ Alternatively, "dependency ratios" are being used, which are inverse support ratios.

Chart 1.2. Demographic support ratios



Source: Database and results of calculations with the ILO social budget model.

The old-age support ratio will clearly decline over the projection period. In other words, there will be less and less persons in active ages supporting the older population. While, in 1990 there were still around 8 persons in active age per old person this ratio will decline to only around 2.5 active persons per old person in 2050.

Simultaneously, the youth support ratio will increase. It stood at around 1.5 active persons per child in 1990 and will increase to 3 persons per child in 2050. This is a direct reflex of the assumed decline of fertility.

Taken together, the total support ratio will remain more or less stable over the projection horizon, i.e. at levels between 1.5 and 2 active persons per 'dependent', which is a typical result for ageing societies.

The last result is interesting for the following reasons: As long as the actives' per-capita costs of raising children are the same as the costs of supporting the aged the total per capita burden of the actives will practically not change over the projection period. The economic burden of the actives of the Panamanian society will grow only to the extent that aged persons need higher resources than children and youth.

It has to be stressed that these considerations apply only to the Panamanian population as a whole - they are not applicable to the CSS. The system (CSS) related support ratios differs substantially from the above and will be specifically addressed in chapter 2.2.2.1.

Nevertheless, the above indicators are of importance as they show that some of the upcoming financing problems of the CSS may loose part of their seemingly dramatic aspects if approached by intelligent societal reactions.

1.3. Labour supply development

For 1991, the overall labour market participation rate is estimated at 57.4 per cent (men: 77.1 per cent; women: 38.2 per cent). For 1999 it is estimated at 61.2 per cent (men: 79.7 per cent; women: 43.2 per cent), an overall increase of 3.8 per cent-points (men: +2.6 points; women: + 5 points). Still, it is unclear whether this reflects a statistically significant upward trend, as much of the increase took place between 1991 and 1992. Since then, participation stagnates for men. It is only for women that a continued, however slightly volatile, upward trend can be observed.





A more detailed insight into labour market participation is permitted when looking at participation rates by age groups as reflected for the years 1991, 1995 and 1999 in the following Chart 1.4. It reveals certain characteristics for developing countries as, for example, high participation of young people (which points at income poverty in big parts of the population accompanied by an underdeveloped education system) and high participation (especially of men) in the older age groups (which points at old-age poverty and low coverage of the formal retirement transfer system).

At the same time, participation of women in the labour market is still low, when compared to that of men – indicating a high development potential of the country, both economically and socially.

Source: Database and results of calculations with the ILO social budget model.



Chart 1.4. Labour market participation by age groups and sex 1991, 1995 and 1999

Source: Database and results of calculations with the ILO social budget model.

There are a variety of options to project the future development of labour market participation rates. An obvious one is to keep the age specific participation rates for men and women constant over time¹¹. Another is to carry out econometric estimations of parameters linking labour market participation to economic (income) variables¹². A third option is a reference method which was applied here as follows: Real per capita GDP of Panama will in 2050 have reached and surpassed *today's* Western European level and about 75 per cent of *today's* US level)¹³. We assume that such a significant per capita income increase is possible only when accompanied by a societal modernization process which, inter alia, is based on an improved partnership approach of men and women resulting in slightly reduced labour market participation rates for men and significantly improved rates for women (by 2050). Furthermore, such high-income growth is only possible if education is intensified and extensified. Participation rates of young men and women have therefore been reduced in 2050. Finally, it is assumed that higher incomes will more or less automatically induce only very low participation rates in the elder ages. Chart 1.5 reflects the assumed participation rate pattern for men and women as assumed for 2050 as target values. For purposes of the labour supply projection for the years between 2000 and 2050 the rates for single age groups were linearly interpolated.

As a result of these assumptions, given the population projection results, the labour force increases more or less in line with the active population. In 2050 it is assumed to reach a level of around 1.95 million persons (= + 830 thousand persons in comparison to 2000). But, because of the assumed increase of female participation, its gender composition will have changed drastically: While, in 2000, there is an estimated number of 563 women in the labour force per 1000 men there will be 913 women per 1000 men by 2050.

¹¹ This approach was used in the last evaluation undertaken by the ILO for Panama. See: *Oficina Internacional del Trabajo: Panamá – Valuación financiera y actuarial integral de la Caja Seguro Social y elaboración de un modelo de cuentas sociales (Ginebra, 1998).* pp. 3-15.

¹² This approach was not used here, inter alia, because of data and time constraints.

¹³ It is to be noted that the international comparison was not conducted for Purchasing Parity-values and does not rule out exchange rate effects. More information on the GDP development is provided in chapter 1.4.



Chart 1.5. Target labour market participation rates by age groups and sex in 2050

Source: Database and results of calculations with the ILO social budget model.

The average age of the labour force will increase from 36 years and 2 months (in 2000) to 41 years and 8 months in 2050, i.e. by 5 1/2 years (men: + 5 years 2 months; women: +6 years 1 month). This is mainly a result of the impacts of the reduced participation rates at young ages, of higher assumed participation rates for women, especially in the higher age groups (up to retirement age) and *zero*-participation for all age groups of 70 years and above.

1.4. The economic scenario

Panama has gone through different growth phases over the last 50 years. Over the period 1950 to 1973 real GDP grew at an annual rate of 6.4 per cent, from 1973 (the year of the first oil price crisis) to 1998 at a rate of 3.2 per cent¹⁴. Average growth over the full period was 4.7 per cent.

Despite some success during the years 1997 and 1998, when the economy grew at rates around 4.5 per cent p.a. Panama's economy is since the mid-1990s hovering around growth rates of less than 3 per cent which are definitely too low to help the country out of its low per capita income and out of the poverty trap.

The government of Panama and international institutions are at present considering possible measures that would have to be undertaken to lift the country onto a sustainable higher growth path. As a precondition, especially the public and private infrastructures have to be drastically improved. The necessary investments could themselves be a source of increased growth. In a recent study for the ILO the financial magnitude of the task was described in some detail¹⁵. Whether the task can be successfully tackled will depend on international aid but also on the readiness of the country to make available the required resources in terms of public finances and qualified investment decisions. Enhanced growth will not be

¹⁴ Source: Angus Maddison: *The World Economy. A Millenial Perspective* (Development Centre Studies. OECD, 2001). Appendix 1.

¹⁵ For an excellent analysis of Panama's past economic development and the magnitude of future investment requirements see: Félix Jiménez: *Crecimiento, política económica y empleo: evolución y perspectivas de la economía panameña* (Draft 2001).

possible by solely relying on the services sector but, in addition, needs a strong manufacturing and construction basis.

The past growth performance was to a great deal influenced by population growth which, over the period 1950 to 1973 increased at an annual average rate of 2.7 per cent and between 1973 and 1998 at a rate of 2.2 per cent.

Per capita GDP growth was (thus) 3.5 per cent p.a. between 1950 and 1973 and only 1.2 per cent p.a. between 1973 and 1998. Average growth over the full period was 2.3 per cent.

On basis of this fundamental information it is assumed, for the purposes of this study, that real per capita GDP growth will be 2.7 per cent, annually, over the projection period ending in 2050. This assumption may be supported by the following considerations:

First, it was assumed that no external shocks¹⁶ would take place in future. The absence of such shocks would probably contribute to a recovery of the societal consensus on future economic, social and other policies and, thus, to an enhanced overall growth performance. At the same time, given the present socio-economic and financial difficulties of the country, which, inter alia, result from the turbulences experienced over the last two to three decades, it is not (yet) reasonable to assume that per capita growth rates could re-bounce to the levels of the period 1950 to 1973. Revisiting these high growth rates seems furthermore unlikely as the advanced economies in the world are now as well embracing significantly lower growth rates than in those years.

As far as the assumed growth rate of 2.7 per cent is higher than the past average rate of 2.3 per cent the projection clearly contains policy target elements. In other words, it assumes rational and coherent economic, financial, social, labour market and other policies, all aiming at steady and high growth. This becomes even more evident when comparing the assumed future growth rate for Panama with the *past* per capita growth rates for Latin America and other parts of the world. For this purpose the per capita GDP growth rates for 25 countries / regions were calculated for the 25 years period 1973 to 1998 and compared with the assumed future rate of +2.7 per cent for Panama. The growth differential to the Panamanian figure is shown in the following Chart 1.6^{17} .

¹⁶ Such external shocks were the oil price crises and the political crisis in the second half of the 1980s as well as the impact of several financial crises, which were not only recorded in the region.

¹⁷ Positive differentials indicate higher growth in Panama than in the respective country.



Chart 1.6. Assumed growth differentials: Panama vs. 25 countries / regions

Source: Database and results of calculations with the ILO social budget model.

The results show that, under the assumption that the comparator countries continue to grow by their respective past rates, Panama will narrow the gap to those, which are ahead at present and widen the gap to those, which are behind at present. Some of the countries, which are ahead, at present, would fall behind until 2050 under the assumptions set (e.g., Mexico, Argentina). Only Singapore, which was included here as it is often taken as a country of reference for successful economic policies of small countries, will continue to outpace Panama as its per capita growth rate is assumed continuously in the order of 5 per cent p.a.

Rank 2000		Relative difference to Panamá	Rank 2050		Relative difference to Panamá
US 487		387%	Singapore	6196	1568%
Singapore	432	332%	US	1307	252%
Western Europe	333	233%	Western Europe	790	113%
Puerto Rico	238	138%	Puerto Rico	785	111%
Trinidad & Tobago	216	116%	Chile	646	74%
Chile	176	76%	Trinidad & Tobago	430	16%
Argentina	160	60%	Uruguay	415	12%
Venezuela	152	52%	Panama	371	-
Uruguay	148	48%	Mexico	221	-41%
Mexico	117	17%	Colombia	218	-41%
Panama	100	-	Argentina	214	-42%
Brazil	96	-4%	Brazil	190	-49%
Colombia	94	-6%	Costa Rica	143	-62%
Costa Rica	93	-7%	Dominican Republic	139	-63%
Ecuador	73	-27%	Paraguay	135	-64%
Peru	62	-38%	Ecuador	122	-67%
Jamaica	60	-40%	Venezuela	108	-71%
Guatemala	58	-42%	Guatemala	64	-83%
Dominican Republic	56	-44%	El Salvador	63	-83%
Paraguay	56	-44%	Honduras	54	-85%
El Salvador	47	-53%	Peru	54	-86%
Bolivia	42	-58%	Bolivia	46	-88%
Cuba	36	-64%	Jamaica	44	-88%
Honduras	35	-65%	Cuba	16	-96%
Nicaragua	24	-76%	Haiti	9	-98%
Haiti	14	-86%	Nicaragua	6	-98%

Table 1.3. Panama's ranking of GDP per capita in an international context

Source: Database and results of calculations with the ILO social budget model.

Under these perspectives per capita GDP growth, together with the expected population trends, determines future overall GDP development.

Here, it is assumed that real GDP grows until 2050 at an annual average rate of 3.5 per cent which is more than one half percentage points higher than observed growth over the period 1980 to 2000 and 1.2 per cent-points less than over the period 1950 to 1998.

All in all, the assumed GDP growth rate resembles features of a slightly optimistic scenario; growth is expected relatively high during the first two decades and then gradually lowering down to average rates of 2.5 per cent p.a.. Details may be taken from Table 1.1 above.

At the same time, labour productivity is expected to grow at an annual average rate of just over 2 per cent. This rate is distinctly higher than over the recent two decades, which may rise doubts at a first glance. But given the fact that the assumed improved long-term growth performance of Panama will have to take place in a world-wide competitive environment it seems economically not sustainable such growth to take place under zero or close-to-zero labour productivity rates, as they were observed in the past. Here, again, the projection contains a policy target element, which, implicitly, assumes that the education and training of the national labour force will be considerably improved over the next few years and be sustained thereafter.

Chart 1.7 summarizes the assumptions on GDP and labour productivity growth.



Chart 1.7. Assumed GDP and labour productivity growth

Source: Database and results of calculations with the ILO social budget model.

With respect to price development it is expected that inflation rates remain at low levels of 2 per cent p.a. – this is in line with past-observed trends.

The definition of Domestic income is given by the following equation:

Domestic income	=	Nominal GDP
	-	Consumption of fixed capital
	-	(Indirect taxes - Subsidies)

In the context of National Accounts domestic income is the outcome of production that can be allocated to the two production factors labour and capital. Accordingly, its two components are capital income ("profits") and labour income. Over the past two decades the share of domestic income in nominal GDP fluctuated between 83 per cent and 85 per cent. This ratio was kept at almost constant levels over the projection period - in 2050 it is assumed to level out at 85 per cent of nominal GDP.

Special attention has to be devoted to the expected future share of labour factor income in domestic income. While slowly increasing over the past two decades this share varied around an average value of 60 per cent (see Chart 1.8). How it will develop in future is difficult to judge. There are reasons supporting a further increase but also a decline seems possible. How it actually develops depends very much on "objective" economic factors (cost structure of production; cyclical behaviour of the economy and inflationary environment; etc.) but also on the bargaining power and bargaining culture of trade unions and employers' associations as well as on the time horizon under which such bargains take place. If workers are reassured by employers that they will always get their fair share in the result of production then they will not try to "squeeze" business each and every time possible; on the other hand, if employers have a more long-term business orientation supported by workers attitudes acknowledging existing constraints of business decisions then they might introduce stability into their investment and profit plans as well as to their hiring, training and remuneration policies. For the purposes of this evaluation it was assumed that the labour income share in domestic income remains practically at the same level as observed over the last two decades. The assumed small annual increases up to 63 per cent (= target in 2050) is owed to the assumed general growth path - bringing Panama closer to the labour income share experience of the present OECD world.



Chart 1.8. Labour income share 1980 to 2000

Source: Database of the ILO social budget model.

The sum of gross wages differs from labour factor income mainly by the amount of employer contributions paid (and other so-called "overheads"). As, in the projections for the CSS, contribution rate stability is assumed, also the share of the sum of wages in labour income is assumed constant over time.

Average wages are then calculated as the sum of wages divided by the average annual number of dependent employees¹⁸. Under this scenario nominal gross per capita wages will grow at average rates between 4 per cent and 4.5 per cent.

1.5. The labour market balance

Assumed future employment, especially the number of contributors, is of core importance for the results of this evaluation as they determine the income of the CSS at the time *and*, equally, "tomorrows" beneficiaries' claims, i.e. future expenditure. As will be explained in this chapter it is not only the sheer absolute number of contributors but also their gender composition and the change of their age structure over time which influences the outcome of the financial evaluation.

Over the 1990s total employment in Panama grew at an annual average rate of 3.5 per cent - which is impressive, given the relatively modest GDP growth rates observed over the same period. Table 1.4 provides an overview of employment development and its structure.

Several observations are of special importance in the context of this report:

First, the number of employed women has grown faster (+ 4.5 per cent p.a.) than the number of men (+ 2.9 per cent p.a.). While, in 1991, 441 women per 1000 men were employed this relation increased to 522 in 2000. In the projection of the gender structure of the labour force this observed past trend is taken into account (see below). On the supply side this trend has been recognized already by increasing the participation rates for women in the long run (see above).

Second, the number of contributors to the CSS has grown faster than the number of dependent employed. In this report, the dependent employed are considered the maximum number of (dependent) contributors to the CSS. In the year 2000 the registered number of active contributors is 661 thousand. The corresponding number of dependent employees is estimated at 662 thousand In other words, it is assumed that the CSS has meanwhile reached full coverage of the dependent employees. With respect to the projected number of contributors it is assumed that it develops fully in line with the number of dependent employed.

Third, the number of dependent employed in private enterprises has grown considerably faster than the number of government employees. This trend will be acknowledged also in future while taking into account that for successful development a significant portion of public services and, thus, public employees will be required also in future. The share of public employees, 17.5 per cent of total employment in 2000, is assumed to be still 17 per cent in 2050, while the share of employee in enterprises will be 46 per cent (44.7 per cent in 2000). The public-private mix of employees is of some importance for the outcome of the financial projections of the CSS as both groups reflect different salary structures and levels (at assumed identical growth rates).

Fourth, the number of self-employed has grown at the same pace as the number of dependent employed. This stable relation is assumed constant also over the long-term projection period. In other words, the CSS is not assumed to gain *additional* contributors from long-term changes in the structure of employment (at given overall employment growth).

Due to relatively high employment growth during the 1990s the unemployment rate could be reduced from its levels of over 15 per cent in the early 1990s to 12 per cent in 1999; because of decelerating economic activity it has slightly increased to 13 per cent, again, in 2000.

¹⁸ Their development will be explained in detail in the subsequent chapter.

However, pressure on the labour market, which is owed to the young age structure of the Panamanian population, will remain high, especially over the next two decades. Chart 1.9 shows the annual net flow into the labour market expected under the assumed population and labour market participation rate developments (as described earlier). Until 2020 average net inflow will be in the order of 15000 persons per year (= total between 2000 and 2020: 313 thousand).



Chart 1.9. Population induced net labour market inflow of job searchers

The assumed GDP and labour productivity growth rates (see above) take account of the requirement to absorb at least these additional job searchers. In fact, under the given growth assumptions, employment will grow by a total of 230 thousand persons between 2000 and 2010 and another 270 thousand between 2010 and 2020. Over 62 per cent of this projected total employment growth of 500 thousand persons will be required to absorb the additional inflow of new job searchers. In fact, Panama is doomed to create jobs in order to keep unemployment under control. In the economic scenario underlying the financial evaluation of the social protection system of Panama it is assumed that the unemployment rate will even fall, i.e. more jobs will be created over the long run than required to just absorb the additional demographic pressure. Thus, the unemployment rate will fall steadily from 11 per cent in 2010 to 31/2 per cent in 2050. As of 2040, Panama will practically have reached full employment.

Source: Database and results of calculations with the ILO social budget model.

	r	-										
Category	Dimen- sion	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1991 - 2000
Total employed	1000	720	782	816	832	867	867	912	936	961	978	258
Change over previous year	%		8.5%	4 4%	2.0%	4 2%	0.1%	5.1%	2.7%	2.7%	1.7%	3.5%
1991 = 100	Index	100	109	113	116	120	120	127	130	134	136	36
By sex												
- men	1000	495	542	560	567	587	588	605	624	638	642	147
Change over previous year	%		9.5%	3.3%	1.2%	3.5%	0.2%	2.9%	3.1%	2.2%	0.7%	2.9%
1991 = 100	Index	100	110	113	115	119	119	122	126	129	130	30
- women	1000	225	239	255	264	280	279	306	312	323	335	110
Change over previous year	%	_	6.4%	6.7%	3.7%	5.7%	-0.2%	9.7%	2.0%	3.6%	3.7%	4 5%
1991 – 100	Index	100	106	113	118	124	124	136	139	144	149	49
By category of contract												
- dependent employees	1000	477	508	546	572	585	583	602	626	642	662	185
Change over previous year	%		6.6%	7 3%	4 7%	2.3%	-0.3%	3.2%	4 1%	2.5%	3.1%	3.7%
1991 = 100	Index	100	107	114	120	123	122	126	131	135	139	39
- of the government	1000	147	153	157	163	161	160	162	166	155	172	24
Change over previous year	%		3.9%	2.4%	4.3%	-1.2%	-0.8%	1.1%	2.8%	-6.6%	10.4%	1.7%
1991 = 100	Index	100	104	106	111	110	109	110	113	106	117	17
- private enterprise	1000	265	292	323	340	354	359	373	396	426	437	172
Change over previous year	%		10.1%	10.7%	5.2%	4.1%	1.4%	3.7%	6.1%	7.7%	2.6%	5.7%
1991 = 100	Index	100	110	122	128	133	135	140	149	161	165	65
- canal commission or defense site	1000	18	13	15	15	17	14	15	11	9	0	-18
Change over previous year	%		-29.3%	16.6%	5.1%	9.9%	-17.5%	5.6%	-22.8%	-18.5%	-100.0%	-100.0%
1991 = 100	Index	100	71	82	87	95	79	83	64	52	0	-100
- domestic services	1000	46	51	51	52	52	49	52	53	51	53	7
Change over previous year	%		9.3%	0.4%	2.7%	-0.9%	-5.4%	6.1%	1.5%	-3.3%	3.7%	1.5%
1991 - 100	Index	100	100	110	113	112	106	112	114	110	114	14
- active insured contributors	1000	418	439	453	500	523	546	588	595	636	661	244
Change over previous year	%		5.2%	3.1%	10.4%	4.6%	4.3%	7.9%	1.2%	6.8%	3.9%	5.2%
1991 - 100	Index	100	105	109	120	125	131	141	143	152	158	58
- self-employed and owners	1000	207	238	236	233	247	250	276	281	294	291	85
Change over previous year	%		15.2%	-0.7%	-1.4%	6.1%	1.3%	10.2%	1.9%	4.7%	-1.0%	3.9%
1991 = 100	Index	100	115	114	113	120	121	134	136	143	141	41
- family workers	1000	37	35	34	27	35	34	34	29	25	24	-12
Change over previous year	%		-3.7%	-4.4%	-18.4%	27.2%	-2.3%	0.4%	-15.7%	-13.7%	-2.2%	-4.4%
1001 - 100	Index	100	06	02	75	06	03	0.4	70	68	67	33

 Table 1.4.
 Employment 1991 to 2000¹⁹

Source: Database of the ILO social budget model.

The number of dependent employed and the number of contributors to the CSS will grow accordingly. In 2000, their number was around 660 thousand whereas in 2050 it is assumed to reach close to 1.3 million. It is important to note that the gender structure of the contributors is assumed to change significantly over time. In 2000, only 35 per cent of all contributors were women; in 2050, the projections assume this share to increase to 46 per cent. While, in 2000 there were around 550 women per 1000 male contributors there will be around 850 per 1000 men in 2050.

The growing number of contributors will, at given contribution rates, steadily increase the revenues of the CSS but, over the longer run, also increase the number of beneficiaries. This is especially true for the pension system and the Workman's compensation department of the CSS. Furthermore, the growing share of contributing women will increase pension expenditure over the long run, not only because women have a higher life expectancy than men but also because they retire earlier and, thus, will positively influence the average period through which pensions are being paid.

¹⁹ Preliminary official estimates of total employment show a reduction in 2000 as compared to 1999 in the order of minus 20 000 persons (minus 16 000 dependent employed). This decline is consistent with decelerating economic activity but conflicting with the number of registered active contributors of the CSS - which show an increase of 25 000 in 2000 compared to 1999. For consistency reasons the overall employment figures (and their structure) were adjusted to the CSS registered active contributors figures. Thus, the labour market data of this report show higher employment for the year 2000 than official figures. The difference amounts to around 36 000 persons.
Details about the present age structure of the contributors in the private and public sector, male and female, and its future development until 2050 as well as the impact on the number and gender structure of pensioners will be described in chapter 2.2.2.1.

The model results for Panama's labour market are summarized in the labour market balance (Table 1.5).

Table 1.5. La	abour	market	balance
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Category	Dimen- sion	2000	2010*)	2020*)	2030*)	2040*)	2050*)
Labour force	1000 Pers.	1122	1354	1592	1773	1887	1951
Change over previous period	%	3.0	1.9	1.6	1.1	0.6	0.3
Share in population ≥ 15	%	61.8	13.9	12.3	12.7	12.2	12.3
Men	1000 Pers.	718	860	966	1030	1044	1020
Share in total	%	64.0	63.5	60.7	58.1	55.3	52.3
Women	1000 Pers.	404	495	626	743	843	931
Share in total	%	36.0	36.5	39.3	41.9	44.7	47.7
Women per 1000 men	Pers.	563	576	648	722	807	913
Number of employed	1000 Pers.	978	1208	1481	1667	1811	1884
Change over previous period	%	1.7	2.1	2.1	1.2	0.8	0.4
Share in labour force	%	87.1	89.2	93.0	94.0	96.0	96.6
of which:							
Dependent employees	1000 Pers.	662	819	1005	1132	1231	1281
Change over previous period	%	3.1	2.1	2.1	1.2	0.8	0.4
Men	1000 Pers.	435	516	607	654	679	673
Share in total	%	65.7	63.1	60.4	57.8	55.1	52.5
Women	1000 Pers.	227	302	398	478	552	609
Share in total	%	34.3	36.9	39.6	42.2	44.9	47.5
Women per 1000 men	Pers.	522	586	655	731	813	905
Contributors	1000 Pers.	661	806	987	1099	1198	1251
Change over previous period	%	3.9	2.0	2.0	1.1	0.9	0.4
Relation to dependent employees	%	99.9	98.4	98.2	97.1	97.3	97.6
Men	1000 Pers.	427	504	595	640	671	677
Women	1000 Pers.	234	302	391	458	526	574
Women per 1000 men	Pers.	548	600	657	716	784	847
Self-employed, owners & family workers	1000 Pers.	316	389	477	535	581	603
Change over previous period	%	-1.1	2.1	2.0	1.2	0.8	0.4
Unemployment rate	%	12.9	10.8	7.0	6.0	4.0	3.4
Men	%	10.5	11.3	7.4	6.5	4.3	3.0
Women	%	17.0	9.8	6.3	5.3	3.6	3.9

*) Per cent changes = 10 year average rates.

Change over previous shown period.

Source: Database and results of calculations with the ILO social budget model.

2. Long-term projection of expenditure and revenue of the CSS

2.1. The CSS database: analysis and common assumptions

The CSS database reflects the demographic and financial situation as of the valuation date of 31 December 2000^{20} . A set of assumptions has been developed to model the future evolvement of the contributors and the beneficiaries under the CSS. These assumptions took into account the latest available statistical information of Autumn 2001.

A comprehensive database as well as a social budget model had been developed in 1998 for the 1997 actuarial valuation²¹. For the purpose of the present valuation, the former database and the model were taken as a platform to start from. All data that needed to be updated for the years until 2000 were provided by the CSS. When considered adequate and still valid, the structural and biometrical assumptions on future developments made for the 1997 valuation were maintained. Some assumptions had to be modified due to methodological progress in the model but also due to the recent demographic and financial developments of the CSS.

Structure of active insured persons

In 2000, 661,269 contributors paid at least one monthly contribution during the past 12-month period. 74 per cent of them were from the private sector (492,337 persons) and 26 per cent from the public sector (168,932 persons). The age structure of the insured in 2000 by sector (public / private), as shown in Chart 2.1, indicates a significantly older population for the public sector with an average age of 40 years as compared to 35 years for the private sector.



Chart 2.1. Number of contributors by sector and age as of 2000

Source: Database of the ILO social budget model.

 ²⁰ In financial projections the "valuation date" indicates the latest date for which "a full" base-data set is available.
 ²¹ See: Oficina Internacional del Trabajo: *Panamá - Valuación financiera y actuarial integral de la Caja Seguro Social y elaboración de un modelo de cuentas sociales* (Ginebra, 1998).

The number of female stood at 234,162 (35 per cent of total) as compared to 427,107 males (65 per cent of total). Nevertheless, the age structure of men and women was relatively similar (except around retirement ages as they differ for males and females), the average age being 36 years for both males and females.



Chart 2.2. Number of contributors by sex as of 2000

Source: Database of the ILO social budget model.

The number of active insured contributing to the CSS develops over the projection period according to the economic and labour market framework described in the previous chapter and, especially, in parallel with the number and age structure of the dependent employees.

Average basic salary

The career patterns for the contributors' salaries mainly vary by sector and sex. Chart 2.3 shows the salary pattern observed for male and female employees in the public as well as in the private sector in 2000. The salaries increase steadily with age until around 50 and then stabilise and even slightly decrease later.

The average base salary in 2000 was of

- 387 Balboas monthly for male private workers,
- 360 Balboas monthly for female private workers,
- 493 monthly Balboas for male public workers, and
- 470 monthly Balboas for female public workers.

In 1997, male average wage were 10.8 per cent higher than those of women in the private sector and 5.1 per cent higher in the public sector. In 2000, the difference remains 7.6 per cent in the private sector and 4.8 per cent in the public sector. Over the three years, i.e. from 1997 to 2000, the total increase of the average wage was 9.0 per cent in the private sector and 2.6 per cent in the public sector.

Average wages in 2000 are 27.4 per cent higher in the public sector than in the private sector, as compared to 35.4 per cent in 1997. This difference can be explained by the higher qualifications public sectors workers do have as well as by the older age structure of the public sector workers, which allows for higher salaries in a seniority career pattern. The narrowing of the difference over the past three years may be explained mainly by the cost savings policy of the government. To some extent it may also be attributed to a higher share of better-qualified employees in the private sector²².



Chart 2.3. Average basic wages by sector and sex in 2000

Source: Database of the ILO social budget model.

CSS average base wages are projected by age and sex until 2050 on the basis of the assumed increases of the national average wage (wages per capita) as discussed under chapter 1.4.

Ceiling on base salaries for pension calculation

According to articles 53-C and 54 of the CSS Organic Law, CSS pensions are calculated in reference to the average of the best past 7 years of the base salaries up to the maximum insurable earnings level of 1,500 Balboas monthly. This level was introduced in 1981 and was since then never adjusted for general wage growth. Hence there has been deterioration in the social security coverage of earnings. It is important that the CSS rectifies this situation in the future through the introduction of a systematic mechanism for the adjustment of its maximum insurable earnings. In order to avoid an unsustainable erosion of the social security coverage of the wages under the CSS, it was assumed in the projection that the above maximum earnings amount will be adjusted regularly in line with general wage development. Otherwise, over the projection period a majority of workers would over the long run have been affected by the fixed 1981 ceiling. A comparison with a non-indexation scenario of the earnings ceiling all over the projection period is presented in section 2.2.4.3.

²² It has to be noted that although most of the inconsistencies encountered during data collection were corrected, one should remain careful when analysing these data as most inconsistencies were found in the desegregation by sex and sector.

Accrued contribution credits on valuation date

Accrued contribution credits refer to the accrued rights of the insured population as of the valuation date of 31 December 2000. Information on the average number of years of contributions payments accumulated under the CSS by insured persons was taken from the 1998 ILO actuarial valuation²³. They were adjusted to account for the fact that the scheme has been maturing in the last three years and that, as a consequence, the average contribution credit has meanwhile increased.

Density of contribution payments

Density of contribution payments made to the CSS is determined on an annual basis and reflects the average number of months of contributions paid to the CSS on an individual record basis during a year. Again, data were taken from the 1998 actuarial valuation²⁴. It revealed that on average males contributed to the CSS for 9.41 months per year while women paid contributions for 9.83 months on average during the period from 1991 to 1995. Over the projection period until 2050, these densities of contribution payments observed in the past are assumed to remain constant by sector, sex and age.

2.2. Pensions

The forecast of the demographic and financial situation of the program IVM up to the year 2050 was conducted under the assumption that the present legislation remains unchanged in the future, especially that the no-indexation of benefits is carried on and the contribution rate of 9.5 per cent of insurable earnings remains unchanged. Only the maximum insurable income of 1,500 Balboas per month is assumed to be indexed in line with average wage developments.

2.2.1. Basic statistics and assumptions

Initial pensions-in-payment at valuation date

There were a total number of 112,467 pensioners as of December 2000. Chart 2.4 presents the desegregation by sex and age group of the different types of pensions in payment. In 2000 a total number of 74,272 old-age pensions were in payment, out of which 39,408 were paid to men and 34,864 received by women. While women count for 35 per cent of the active insured, they count for 47 per cent of beneficiaries of old-age pensions in payment. Indeed, as can be clearly seen in Chart 2.4, even though male pensioners are more numerous in older age groups (from 65-69), female pensioners outnumber them in the younger age groups 55-59 and 60-64 as women retire earlier.

In December 2000, there were 16,957 invalidity pensions in payment, out of which 11,320 were paid to men and 5,637 to women. In total 21,238 survivors pensions were paid in December 2000. The number of spouse-parents pensions in payment stood at 14,975 (14,274 to women and 701 to men). Orphans pensions in payment numbered 6,263.

²³ They were collected in a disaggregated way for the year 1995 by the CSS computer department.

²⁴ Which the CSS computer department for the year 1995 likewise collected.



Chart 2.4. Pensions in payment for men and women as of December 2000

Source: Database of the ILO social budget model.

The average amounts of pensions in payment by type of pensions and age are provided in Chart 2.5. The average benefit in payment is obviously correlated with age (positively and/or negatively). This is mainly the result of the non-indexation of benefits in payment and of the salary scale. Non-indexation affects every pension in payment since long (old-age, survivors and invalidity). For instance, the present average old-age pension in payment, which is 351 Balboas monthly, is 379 Balboas monthly for the age group 60-64, and only 182 Balboas monthly for the age group 95+, exactly 50 per cent less. Young invalids receive less than middle-aged invalids, as the earnings on which their pension is based are smaller (equally, the contribution period is shorter).



Chart 2.5. Pensions in payment by age group as of December 2000

Source: Database of the ILO social budget model.

Biometrics bases

Biometrics bases were established on the basis of the CSS system specific past experience and on projected evolutions. In cases when the available information was considered insufficient and/or unreliable, judgmental methods had to be used for approximation based on the experience and actuarial techniques used by the ILO.

Old-age and invalidity pensions behavioural factors

The CSS entitlement regulations foresee that the full old-age pension is payable earliest at the age 57 for women and at 62 for men, provided the insured person has accumulated the minimum number of 180 months of contribution credits (cf. article 85-A of the Organic Law). However, not all insured persons elect or want to retire immediately at the legal retirement ages established. Thus, the projections account for a gradual pattern of entry into retirement by sex and age. This assumed pattern is based on the most recent past experience observed among new old-age pensioners at the beginning of the projection and assumes over the projection period that retirement will happen closer and closer to retirement age as eligibility conditions will be met and as growing wealth implies a desire of retirement.

The patterns of the invalidity rates were taken from the 1998 actuarial valuation but they were increased to take into account the increase in invalidity pensions in payment experienced over the last three years.

Mortality

Mortality rates were again used from the former valuation. They imply for 1995 a CSS system specific life expectancy at age 60 of 21.9 years for men and 26.6 years for women. When compared to the national mortality table of 1990 under which life expectancy at age 60 is of 18.7 years for men and of 21.6 for women, the CSS-specific mortality rates indicate that the CSS insured population tends to live

longer than it is assumed for the general population. For the future, it is assumed that this difference will narrow.

Adjustment / indexation of pensions and CSS fixed financial parameters

According to article 56-K of the Organic Law, only the minimum pension is to be up-rated under conditions, which allow for some degree of freedom of interpretation. The law says that it should normally be adjusted at least every 3 years, but only if the CSS financial situation permits.

For the purpose of this review, it is assumed that the fixed-benefit amounts, such as the levels of the minimum pension and the individual pensions-in-payment will not be adjusted in the future. With respect to the minimum pension, the reason lies in the strict interpretation of article 56-K, which, according to the results of this valuation, does not permit adjustments. However, as a sensitivity test, a case with indexed pensions was calculated (see chapter 2.2.4). The strict no-indexation assumption differs of course from past practice under the CSS when *ad hoc* indexation adjustments were made on an irregular basis (amounts and time intervals between adjustments not specified by law). This important assumption bears a strong impact on the financial situation of the CSS as revenue grows with general wages whereas pensions, once awarded, remain constant. Furthermore, the purchasing power of pensions in payment will be deteriorating over time as inflation – although assumed low - occurs and workers enjoy a real wage growth in future. Table 2.1 summarizes the past increases of pensions-in-payment and compares it with the minimum and maximum pensions since 1970.

Year	Minimum pension (Balboas monthly)	Maximum pension (Balboas monthly)	Flat increases of pensions-in- payment (Balboas monthly)
1970	50 (since 1962)	500 (since 1962)	10
1975	90	1,000	30
1976	100		10
1981	120	1,500 ^{a)}	20
1983	145		25
1986			20
1994	175		
a) The maxim	um pension is awarded only under	restricted conditions	

 Table 2.1.
 Minimum and maximum pensions, past increases of pensions-in-payment

2.2.2. Pension expenditure 2001-2050

2.2.2.1. Beneficiaries

The projected development of the number of IVM program participants is presented in Table 2.2. It provides the number of active insured as well as the number of pensions in payment. It also calculates the corresponding demographic ratios, that is the number of respective pensions in per cent of the number of actives.

Year	ear Number of insured and pensions paid				Dem	nographic ra	atios	
	Actives	Old-age	Invalidity	Survivors		Old-age (%)	Invalidity (%)	Survivors (%)
2000	661,269	74,272	16,957	21,238		11.2	2.6	3.2
2001	667,930	75,324	18,128	23,983		11.3	2.7	3.6
2002	679,382	77,972	19,305	26,420		11.5	2.8	3.9
2003	695,777	83,598	20,507	27,743		12.0	2.9	4.0
2004	710,714	91,201	21,743	28,798		12.8	3.1	4.1
2005	724,513	98,347	23,020	30,041		13.6	3.2	4.1
2010	805,836	124,336	30,047	36,472		15.4	3.7	4.5
2015	896,917	155,098	38,206	44,076		17.3	4.3	4.9
2020	986,578	194,776	47,503	53,436		19.3	4.8	5.4
2025	1,042,810	246,210	57,457	64,355		23.6	5.5	6.2
2030	1,098,820	307,415	67,289	76,980		28.0	6.1	7.0
2035	1,147,183	370,720	76,581	91,341		32.3	6.7	8.0
2040	1,197,692	428,893	85,265	107,318		35.8	7.1	9.0
2045	1,225,179	483,365	93,360	124,622		39.5	7.6	10.2
2050	1,250,697	535,031	100,624	142,094		42.8	8.0	11.4
The demog	raphic ratios are	calculated as	the number of	f pensions divid	led by the numb	per of actives.		

Table 2.2. Number of insured and pensions and demographic ratios 2000-2050

This projection includes a strong gender dimension as it is explicitly expected that the share of women in the overall number of contributors will grow from the present share of 35 per cent to about 46 per cent in 2050. For two reasons this creates a strong demographic pressure on the scheme: (1) women have a higher life expectancy and (2) they retire earlier than men.

The effects on the contributors' and beneficiaries' side can be clearly seen in charts 2.6 and 2.7, which depict the impact of the maturing and ageing process the scheme will experience over the next five decades. The number of old-age pensioners will significantly increase until 2050. Ageing implies that there will be more and more insured in the age groups 40+ and more and more pensioners. The charts show furthermore that in 2000 the most contributors (public and private) are aged around 25 years, whereas in 2050 most contributors, both male and female, will be aged between 40 and 50 years. In 2000, the CSS has many more male than female contributors (427,107 men vs. 234,162 women) but the number of old-age pensioners does not differ to the same relative extent (39,408 men vs. 34,864 women). Moreover, in 2050 the system will at every age have more women receiving an old-age pension than men (Chart 2.7). The then significant gender difference (218,425 men vs. 316,606 women) is mainly a result of the retirement provisions for women, which, at ages between 57 and 62, allow for earlier retirement than for men. But even beyond this age this trend is continued, as women have a higher life expectancy than men. Therefore, women will count for about 59 per cent of the total number of old-age pension in 2050 in comparison to 47 per cent in 2000.



Chart 2.6. Proportion of actives and beneficiaries by sex and age as of 2000

Source: Database of the ILO social budget model.

The number of invalidity pensions has significantly increased between 1997 and 2000 following the suppression of early and special retirement pensions. The projection takes this recent increase²⁵ into account assuming, however, that the dynamics of the last three years will slow down in the future. It is assumed that up to about 100,000 invalidity pensions may be paid in 2050, compared to 30,000 in 2000.

As many more women will receive old-age pensions in their own rights, the number of survivor pensions will increase at a slower pace than anticipated in the former valuation as widows cannot simultaneously receive an own pension as well as a survivor pension. The projection holds that the number of survivor pensions in payment will grow in line with the other benefits from about 21,000 to about 142,000 in 2050.

²⁵ The projection uses revised invalidity rates as explained in subchapter 2.2.1.



Chart 2.7. Proportion of actives and beneficiaries by sex and age as of 2050

Source: Result of calculations with the ILO social budget model.

Over the projection period, the average age of the active contributors will increase from 36 years in 2000 to 40 years in 2050. At the same time, the average age of the persons receiving old-age pensions will increase from 70 years in 2000 to 72 years in 2050.

Overall, whereas today only 11 old-age pensioners have to be supported by every 100 insured, there will be about 43 in 2050, as depicted on Chart 2.8. Also the demographic ratio of invalidity pensions increases for the reasons discussed above over the projection period from about 2.6 per cent to about 8.0 per cent and the demographic ratio of survivor pensions undergoes a rise from 3.2 per cent in 2000 to 11.4 per cent in 2050.

A comparison of charts 2.9 and 2.10 clearly reveals the assumed increase between 2000 and 2050 of the coverage of the population through the CSS. Over the first two to three decades of the projection period this clearly contributes to then still *relatively* favourable financial results. In other words, if one is more pessimistic with respect to Panama's potential of expanding formal social security, then the financial results would clearly be worse than presented under the status-quo scenario.



Chart 2.8. Ratio of pensioners to actives by pension type

Source: Database and results of calculations with the ILO social budget model.



Chart 2.9. CSS members and total population in 2000

Source: Database of the ILO social budget model.



Chart 2.10. CSS members and total population in 2050

Source: Results of calculations with the ILO social budget model.

2.2.2.2. Average pensions

Table 2.3 lists the projected average pension amounts and the corresponding replacement rates of the system. The replacement rates are measured as the average pension of a year in per cent of the average salary of the same year. The projections clearly show the impact of the non-indexation policy assumed under the status quo scenario.

Year	ar Average pensions (Balboas, annual)		System (% c	replacement of average wag	t rates ge)	
	Old-age	Invalidity	Survivors	Old-age	Invalidity	Survivors
2000	4,206	3,479	1,741	86	71	36
2001	4,229	3,526	1,725	84	70	34
2002	4,255	3,570	1,716	81	68	33
2003	4,297	3,618	1,714	79	66	31
2004	4,357	3,673	1,716	77	65	30
2005	4,421	3,734	1,723	75	63	29
2010	4,824	4,139	1,803	66	56	25
2015	5,546	4,733	1,945	61	52	21
2020	6,599	5,526	2,153	58	49	19
2025	7,932	6,522	2,441	56	46	17
2030	9,519	7,742	2,830	55	44	16
2035	11,378	9,243	3,343	53	43	16
2040	13,555	11,096	3,992	51	42	15
2045	16,216	13,380	4,773	50	41	15
2050	19,536	16,175	5,697	49	40	14
Note: The re	eplacement rate is	the average pe	ension of a year	in per cent of the average wage	of the same ye	ar.

Table 2.3. Projection of average pension and system replacement rates of the IVM

At least three factors have influenced the system replacement rates until 2000, which explain why these rates are high at present. The first factor is the last adjustment of pensions, which, although dating back to 1985, was a meaningful increase of 20 per cent followed by an increase of the minimum pensions in 1994. The second is the maturing of the scheme in terms of an increase in the individual periods of contribution payment, which gives new pensioners on average more credits – and, thus, higher pensions - than previous cohorts. The third factor is the still relatively small size of the present number of pensions in payment, giving a high weight to new pensions based on the latest wage levels.

Under the assumed no-indexation policy the system replacement rates of pensions are projected to decrease significantly as salaries are assumed to grow annually by more than 4 per cent whereas pensions, once in payment, remain constant. Furthermore, the share of new pensions that reflect the latest wage levels in the economy becomes smaller and smaller in comparison to the stock of pensioners. Therefore, the system replacement rate of old-age pensions slowly decreases from 86 per cent in 2000 to 49 per cent by year 2050. The curves of the replacement rates for invalidity and survivor pensions follow the same pattern as can be seen on Chart 2.11.



Chart 2.11. Replacement rates for CSS pensions

Source: Database and results of calculations with the ILO social budget model.

The following Chart 2.12 helps to better understand the development of the system replacement rates. Taken as examples, it reflects the projected evolution of the replacement rates of two groups of old-age pensioners receiving pensions by the CSS. For convenience of comparison, the chart again includes the development of the same system old-age replacement rate as it is presented in Chart 2.11:

(1) the first curve ("pensions as of year 2000") represents the future development of the replacement rate of all pensions in payment in the year 2000. This rate decreases as salaries increase, whereas pensions are not indexed. In 2042, the replacement rate will have deteriorated to 15 per cent. This means that the group of pensioners who at present enjoy on average a pension that amounts to about 86 per cent of the average wage will in 2042 still receive the same pension as in 2000 but which will then represent on average only 15 per cent of the average wage of 2042. After 2042, this group of pensioners is not included further in the modelling as by then the now youngest pensioners of this group will have reached the modelling maximum age of 100 years (57+43);

(2) the second curve ("newly awarded pensions of year") represents the future development of the replacement rate of those pensions that are newly awarded every year in the future. It shows that the replacement rate of new pensions decreases from almost 90 per cent in 2000 to about 76 per cent in 2050. Why the decrease and why is it steady? At first glance, when the scheme enters maturity, one should expect the number of credit years used for the computation of new pensions to converge to average work careers and that, consequently, the replacement rate of new pensions should as well converge to a certain stable level. Indeed, this expectation would be confirmed if individual replacement rates were calculated, i.e. the pensions of the new retirees in relation to their salaries (prior to retirement). But this is not being analysed here. Instead, the average pension of all new retirees in relation to the average wage of all contributors to the scheme is shown in Chart 2.12. This rate depends on the relation between two different types of wages. The first is the "pensionable wage", which consists of the salaries of the 'best' past 7 years; the second is the overall average wage of all contributors. The pensionable wage is typically higher than the average wage of all contributors. However, the more the employed labour force (the contributors) ages the more the "best 7 years"-wage will converge (downwards) to the overall average wage. As a result, by construction of the pension calculation and the calculation of the replacement rate this very rate will decline.



Chart 2.12. Replacement rates of old-age pensions for selected cohorts

Source: Database and results of calculations with the ILO social budget model.

2.2.2.3. PAYG cost rates and the GAP

A different way of showing the expenditure development apart from generating the total of the item is by calculating the future development of the pay-as-you-go (PAYG) cost rate of the scheme. For a given period the PAYG rate is defined as the contribution rate that has to be charged on wages if the contribution revenue were to exactly match the pension benefits. The rate can also be interpreted as the mathematical product of the system demographic ratio and the system average replacements ratio. Then, in the nominator, the average pension amount times the number of pensions gives total pension expenditure and, in the denominator, the average wage times the number of the insured gives the sum of wages. The PAYG cost rate is then calculated as total expenditure (on pensions) divided by the sum of wages (on which contributions are being levied). Table 2.4 presents the projected PAYG cost rate of the scheme for its core benefits.

		PAYG					
Voar	(Excluding administration costs and disregarding other regular income)						
Ieal	Old-age	Invalidity	Survivors				
	%	%	%				
2000	9.6	1.8	10				
2000	3.0 10 3	21	1.0				
2002	10.0	2.1	1.1				
2003	10.0	2.2	1.1				
2004	10.4	2.2	1.0				
2005	10.7	2.2	1.0				
2010	10.7	2.3	1.0				
2015	11.0	2.4	0.9				
2020	12.1	2.6	0.9				
2025	14.0	2.8	1.0				
2030	16.1	3.0	1.1				
2035	18.0	3.2	1.2				
2040	19.3	3.3	1.3				
2045	20.7	3.4	1.4				
2050	22.0	3.6	1.5				
Source: Databas	se and results of calculations with the ILO social bu	udget model.					

Table 2.4. PAYG cost rate of the IVM program 2000 to 2050

The PAYG cost rates are as well depicted in the following Chart 2.13. During the 15 first years of the projection, the total PAYG cost rate increases only slightly as the increase in the demographic ratio is almost offset by the decrease of the replacement ratio. Nevertheless, thereafter, the steep increase of the system demographic ratio starts dominating the decline in the system replacement ratio resulting in an increase of the total PAYG cost rate to over 27 per cent in 2050.



Chart 2.13. PAYG cost rates of CSS pensions

Source: Database and results of calculations with the ILO social budget model.

In the calculations of this valuation also, alternatively, a slightly modified approach was used for calculating the PAYG rate of the IVM budgets. It was assumed that certain income components of the IVM program could be considered as "permanent", for example the annual state subsidy of 20.5 million Balboas or the contributions paid out of 13th monthly salaries. To the amount of these permanent income components pensions need not to be financed out of contributions levied on wages; in other words, such permanent revenue reduces the otherwise necessary contribution rate. This rate is called the *net* PAYG rate. The net PAYG cost rate, is equal to 6.9 per cent of basic wages in 2000, which is below the present contribution rate of 9.5 per cent collected out of basic wages. It is however projected to increase to more than 9.5 per cent after the year 2005 and to eventually reach over 24 per cent by the year 2050.

Finally, the general average premium (GAP) was calculated to obtain the value of a time-invariant constant contribution rate that would guarantee the financial equilibrium of the scheme until the end of the projection period. The GAP is the broadest measure presenting the scheme costs in a single figure. The calculations show that the costs of the scheme could be covered at a rate of around 16.2 per cent of the basic wages, assuming this rate had been implemented at the beginning of 2001.

2.2.3. The IVM budget 2000 to 2050

2.2.3.1. Revenue and expenditure

On basis of the explained assumptions the budget of the IVM follows a simple logic. At a contribution rate of 9.5 per cent, revenue will in 2050 be 10 times higher than in 2000 whereas expenditure will be 32 times higher. Detailed revenue and expenditure tables as projected are recorded in the tables annex.

According to the projections, total income will increase from 522 million Balboas in 2000 to 5,237 million Balboas by the year 2050. Contributions will grow fastest – on average 5.5 per cent p.a. Capital income will vanish over time – as the interest bearing reserves will be depleted by 2018 (see below) – and, thus, their growth rate between 2000 and 2019 is minus 100 per cent, and the financial transfers from the government are, as explained, assumed to be constant over the full projection period, i.e. their growth rate is zero. As a consequence the state subsidy will represent a decreasing proportion of total income declining from 5 per cent in 2000 to less than 1 per cent in 2050. In 2000 regular contributions represented 60 per cent of the total income of the IVM and 3.6 per cent of GDP while they are expected to represent 87 per cent of the IVM income in 2050 while remaining at the former 3.6 per cent-level of GDP.

Current expenditure is projected to increase from 413 million Balboas in 2000 to 13,296 million Balboas in 2050, which in 2000 represents a share of 4.1 per cent of GDP growing to 8.9 per cent of GDP by 2050. Old-age pensions grow fastest – on average 7.3 per cent p.a., funeral grants, which are assumed not to be adjusted over time, grow slowest – on average 4.9 per cent p.a.

As a result of these developments the IVM program runs into a deep financial deficit (Chart 2.14).

Chart 2.14. Annual balance of the IVM program



Source: Database and results of calculations with the ILO social budget model.

The balance is expected to remain positive until 2004 but then starts to turn negative. For a couple of years the reserve will be sufficient to cover the growing deficit but latest in 2018, i.e. 13 years after the first deficit appears, the reserve will be depleted.

It is recalled that these results are based on the assumptions of a constant contribution rate of 9.5 per cent of the basic wages and no indexation of pensions-in-payment, minimum pensions, funeral grants and other benefits. Thus, expenditures are most likely under-estimated as – given past experience – the government might feel obliged to adjust benefits from time to time – which would have a devastating cost driving effect on the IVM program even if the adjustment intervals were assumed to be in the order of one to two decades. At the same time, revenue might be underestimated, as the government is doomed to increase contribution rates or its subsidy in future even if economising reform measures on the expenditure side were carried out (see below).

2.2.3.2. Development of the reserve

Even though the reserve will continue to grow slightly for another few years, it is expected to start declining in 2005 and to be entirely depleted latest in 2018. Chart 2.15 shows the development of the reserve until it is exhausted (the future debt accumulation is not shown). In the base line calculations of this valuation it was assumed that, starting in 2019, a "third party" – normally the government / taxpayer – would cover the annual deficit²⁶. This strong modelling approach has to be kept in mind when interpreting the above deficit development of the IVM program as it *does not contain any financing costs* (interest) of the growing deficit / debt.

Under this restrictive assumption *the total accumulated debt of the IVM attains* 68.9 *per cent of GDP in* 2050. If one eases this assumption, allowing for interest payments on the debt and thus making it economically more meaningful, *then it would increase to 110.6 per cent of GDP*. The annual "third party"-subsidies required in 2019 and later to balance the IVM budget would represent over 1 per cent of GDP in 2019 and increase to 5.4 per cent of GDP in 2050.

²⁶ This assumption was made for technical reasons because otherwise a new expenditure line "Debt financing costs" or "Interest on debt" would have had to be introduced in the CSS budget, which for reasons of the stability of the analytical framework was to be avoided.

The funding ratio, i.e. the reserve at year-end divided by the annual expenditure of the following year, is equal to 3.8 in 2000, which marks an already slight decrease during the last two years. A falling funding ratio is projected until 2018, when it equals 0 and the reserve is depleted. Under the assumption of a "third party" paying the interest on the growing debt the funding ratio will develop to minus 7.7 in 2050 (equivalent to 68.9 per cent of GDP, see above).



Chart 2.15. Development of the IVM reserve

Source: Database and results of calculations with the ILO social budget model.

2.2.4. Sensitivity tests and analyses

The results of the calculations undertaken so far reiterate the need to prepare for measures focused on balancing the finances of the IVM programme. This was a result of the 1998 valuation already, but now preparation for such measures seems to become more urgent. Most of these reforms can be what has been called "parametric". It was not part of the terms of reference for this valuation to develop a broader based reform concept for the pension system of Panama as it was implemented, for example, in a number of Latin American countries or in countries of Eastern Europe. Nevertheless, there are a number of standard options available to social policy makers of Panama that could be applied within the existing legal framework of the CSS. Some of these measures are considered necessary anyway – they should be undertaken in any case, independent of the question of any wider reform steps (to which, by the way, they could be supportive). The following sensitivity tests focus on subjects that might be considered most obvious for reforms. Some of them are cost-saving, others cost-driving. It has to be kept in mind that these sensitivity tests have been deliberately kept simplistic – they are not designed to substitute detailed calculations to be carried out in case of concrete specific changes of legislation. The main goal of these calculations is to provide broad estimates of their financial implications. On basis of these results, further societal discussions might reveal whether they are considered sufficient or whether more "systematic" reforms are being called for.

Four sensitivity tests have been carried out:

- (1) price-indexation of pensions without changes of the pension formula;
- (2) changes of the pension formula combined with price-indexation;

- (3) non-adjustment of the maximum ceiling of insurable earnings;
- (4) stepwise increases of the legal contribution rate.

Their "rational" is being explained in the subsequent respective chapters.

2.2.4.1. Indexation of pensions without changes of the pension formula

The present non-indexation provision of pension legislation has not yet turned into a socio-political problem, as the number of pensioners is still low. With Panama's population ageing this situation will change in future. The relative number of pensioners within the society will grow and thus their "voice" will be more and more heard. Therefore, the government may have to face the risk in future of being exposed to public pressure demanding indexation of pensions in order to maintain their purchasing power over time. This could occur if the traditional price stability in Panama were replaced by an escalating inflationary process.

This chapter addresses the possible costs of providing protection of pensioners' benefits by way of their price-indexation. Such an indexation would allow benefits in payment not to lose their purchasing power²⁷ as a minimum goal a social security scheme should aim at, in conformity with ILO Convention 102.

As, over the projection period, prices are assumed to grow steadily at about 2 per cent-points less than average wages, this indexation costs relatively less than would a "full" indexation on wages. Therefore, replacement ratios of old-age pensions would still decrease over the projection period but to a smaller extent than in case of no indexation. Of course, under price indexation the total PAYG costs are higher than without indexation. Both indicators for the price indexation case are presented in Chart 2.16.



Chart 2.16. PAYG cost and replacement rates for price-indexation of pensions

Source: Database and results of calculations with the ILO social budget model.

²⁷ In a strict sense, this holds only true as long as inflation rates are not volatile.

In comparison to the status quo calculations price indexation would increase costs over the full projection period by 20 per cent, which is reflected by an increase of the GAP from 16.2 per cent to 19.4 per cent. Annual deficits would, as in the status quo scenario, start in 2005 while the reserve, however, would already be depleted in 2014 as compared to 2018 in the status quo scenario. The evolution of the reserve under the status quo and the price indexation scenario is shown in Chart 2.17.

The results indicate that price indexation of pensions – without counterbalancing cost saving measures - would be very difficult to afford. It implies by the end of the projection period a contribution rate at a level of close to 30 per cent. This means that an indexation mechanism, although socially desirable, could only be implemented together with cost-containing measures. One such measure is presented in the following section.



Chart 2.17. Development of IVM positive reserve under status quo and indexation

Source: Database and results of calculations with the ILO social budget model.

2.2.4.2. Change of the accrual rates and indexation of benefits

The previous section showed that indexation is costly and could not be introduced without parallel cost saving measures. Such cost saving measures could focus on changes of the pension formula.

First, as already argued and explained in previous sections of this report as well as in the 1998 valuation, *at the given contribution rate* the accrual rates of the pension formula are far too high – even from a European welfare state perspective²⁸. Over the medium- and long-term *it is impossible to achieve financial stability of the CSS as long as pensions are calculated on the basis of the present formula while maintaining the legal contribution rate of 9.5 per cent.*

Second, the formula is regressive in the margin, i.e. the earlier a person starts to work to accumulate pension credits, the lower will be her/his pension accrual rate for each year s/he has worked additionally. For men, the accrual rate is maximised if they start working (pay contributions to the CSS) at the age of 47 (retiring with 62 after 15 years) whereas women profit most, if they start paying contributions at the age of 42 (retiring with 57 after 15 years). At the same time, once retirement age has been reached, the

²⁸ For a comparison, see Executive summary, table 0.1.

CSS encourages workers to postpone retirement as the pension accrual rate increases the longer a person waits before actually retiring.

Table 2.5 demonstrates these patterns. It is provided for the cases of male and female insured that retire at different ages and with different records of contribution credits. For instance, a male insured that retires at 62 with 15 years of contribution gets 60 per cent of his pensionable salary, i.e. 4 per cent per working year. A female insured that retires at 57 with 20 years of contribution receives 66.25 per cent of her pensionable salary, i.e. 3.3 per cent per working year.

Number of contribution		Men			Wome	en		
vears at retirement	Retirement age			Retirement age				
	62	65	69	57	62	65	69	
15	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
20	3.3	3.4	3.5	3.3	3.5	3.5	3.5	
25	2.9	3.0	3.1	2.9	3.1	3.1	3.2	
30	2.6	2.7	2.8	2.6	2.8	2.8	2.9	
35	2.4	2.5	2.6	2.4	2.5	2.6	2.7	
40	2.3	2.3	2.4	2.3	2.4	2.4	2.5	
Source: Database and results o	Source: Database and results of calculations with the ILO social budget model.							

Table 2.5. Accrual rate per year of contributions at retirement by sex

For simulation purposes, there is a wide range of options as to how to change the accrual rates of the pension formula while maintaining the structure of the formula. International experience shows that annual accrual rates of 2 and over are usually not considered financially viable. Normally, they range somewhere between 1 and below 2. Thus, an option would have been to simulate accrual rates of, for example, 1.5. At the same time the given situation in Panama has to be accepted as a "starting point" based on which sensitivity analysis can be undertaken. It was not considered helpful for the purposes of this report to simulate "overly" drastic changes of the formula. This is why a formula was tested, which allows for 45 per cent replacement of earnings after 15 years of contribution instead of the present 60 per cent without changing the accrual rate of 1.25 applicable after 15 years of contribution. This implies a reduction of new pensions of about 25 per cent but still accrual rates of 3. This formula is still generous as the "15 years" condition was left unchanged. The formula would turn to "normal", if this condition had been changed to, for example, 30 years - implying an accrual rate of 1.5. Also, the costly "7 best years out of 15" rule was left unchanged. An additional scenario would be to gradually expand this limitation over the full working career. All such changes could theoretically be simulated with the ILO social budget model but such simulations are time consuming because they not only affect pensions but also have repercussions on other variables and on assumptions. Given the limited scope of the terms of reference the respective simulations were not undertaken.

In order to counterbalance the 25 per cent savings effect, it was assumed that such a measure would be accompanied by implementing a price-indexation mechanism for pensions in payment (as simulated in the previous chapter).

The fiscal results of such a combined approach would be as follows (Chart 2.18): Overall, the cost of the scheme – as measured through the PAYG rate - would be slightly reduced in comparison to the status quo, as the *system* replacement ratio would be only slightly lower as under the unchanged formula without indexation. In other words, for the system as a whole, the indexation provision would counterbalance the savings effects of the accrual rate reduction, thus leaving the system finances in the same position as without any reform.



Chart 2.18. PAYG rate and replacement rates for amended and status quo pensions

Source: Database and results of calculations with the ILO social budget model.

Chart 2.19 demonstrates that newly awarded pensions would be lower every year in comparison with the old pension formula – due to the reduction of the replacement from 60 per cent to 45 per cent (compare the two bold lines, continuous and dotted). However, under the old formula, once a pension was paid for the first time, there was a non-indexation-induced growing gap between that pension and the new pensions awarded to retiring cohorts in subsequent years (compare bold continuous line, presenting the new pensions awarded under the old formula, with the thin continuous line, presenting the development of pensions newly awarded in 2000). It has to be understood that this gap occurs under the old (present) formula mainly due to the non-indexation provision and not because of differences in earnings careers (which would be perfectly tolerable). Under the new formula, this gap is being reduced (compare the bold dotted line with the thin dotted line). A full reduction of this gap would only be achieved in case of wage indexation – which is not calculated here, as this would right from the beginning be beyond financially acceptable possibilities.



Chart 2.19. Replacement rates for indexed / non-indexed pensions first paid in 2000

Source: Database and results of calculations with the ILO social budget model.

Another question is whether scheme participants would consider such a reform individually advantageous. From a mere financial point of view the answer might depend on two factors, first the reduction of the replacement rate for newly awarded pensions and, second the inflation rate. Obviously, the higher the inflation rate, the more advantageous would such a measure be from an individual point of view as indexation helps to maintain the purchasing power of the pension whereas the purchasing power of a fixed amount might quickly be depleted in case of high inflation rates. Six cases were calculated: First, it was assumed that the present pension formula was changed such that the new initial pension would be 75 per cent and 50 per cent of the pre-reform amount, respectively. Then, these two pension levels were indexed with three different annual inflation rates (2 per cent; 4 per cent; 6 per cent). Their accumulated values (over time) were compared with the accumulated value of the pre-reform pension amount. The period (number of years) was calculated which it would take to equalize the accumulated pre-retirement amount to the accumulated post-retirement amounts. The results are presented in Table 2.6.

New page on	Inflation rate p.a.		
in % of old pension	2%	4%	6%
	Ye	ears	
75	29	15	11
50	65	33	23
¹⁾ See text. Source: Database and results of calculations with th	ne ILO social budget model.		

Table 2.6. Time dimension of pre and post reform pension value equivalence¹⁾

For example, if the present pension formula were changed such that, in the year of retirement, it provides 75 per cent of the pre-reform formula and if the future inflation rate is 2 per cent p.a., then it would take 29 years to equalize the accumulated post-reform value to the accumulated pre-reform value. Under the same conditions, if the inflation rate is 6 per cent, it takes 11 years.

The time dimensions for pensions to catch up to previous levels can be compared to CSS life expectancy at age 60 as presented in section 2.2.1, which in 1995 was 21.9 years for men and 26.6 for women.

The table confirms intuition: the higher inflation the more favourable is indexation for the beneficiaries. A reduction of the accrual rates will not be possible by arguing that it will be counterbalanced by indexation, as inflation has been no concern so far in Panama. The closing of the gap between young and old pensioners (see above) is an advantage of the reform that might only be indirectly felt over the longer run but is probably not at all obvious to a majority of scheme participants.

The budget implications of this scenario are very limited. The GAP would decrease from 16.2 per cent to 15.7 per cent, indicating an overall cost reduction of 3.7 per cent. The first annual deficit would occur two years later than in the status quo, i.e. in 2007 and the reserve would be depleted one year later than under status quo, i.e. in 2019.

This sensitivity test assumes the revised pension formula to be applied from the beginning of the projection period, i.e. as of 2001. However, a transition period could be introduced so that future pensioners could adapt their retirement behaviour. A five years transition period during which the replacement rate would be reduced each year by, for example, 3 per cent (i.e. to 57 per cent the first year, 54 per cent the second, etc. and 45 per cent from the fifth year onward) seems appropriate.



Chart 2.20. Development of reserve under revised accrual rate and status quo



2.2.4.3. Non-adjustment of maximum insurable earnings

The status-quo calculations of this report have been carried out on the assumption that the legally defined maximum amount of pensionable earnings would be annually adjusted in line with general average wage development. In this chapter we discuss the results of a simulation that keeps the maximum pensionable earnings of 1500 Balboas monthly unchanged over the full projection period.

At present, only very few pensions are negatively affected by the maximum insurable earnings restriction as it amounts to about three times the national average wage. However, their number will grow significantly latest in 15 to 20 years from now as, by then, more and more wages earned will attain this ceiling. The effects will be showing on the level of pensions awarded. For the very end of the projection period it was found that a fixed maximum would reduce newly awarded pensions by about 57 per cent in comparison to the status quo. Chart 2.21 depicts the evolution of the replacement ratio (right-hand scale; "normal" (non-bold) lines) of old-age pensions with and without regular adjustment of the ceiling. Around 2030, the two lines start to diverge and in 2050 the average old-age replacement ratio is about 20 per cent-points lower in the fixed-ceiling-case than in the regular-adjustment-case.

The chart also presents the PAYG cost rate of total benefits in payment (left-hand scale; bold lines). The divergence of the bold lines reflects the systematic savings of the scheme through non-adjustment of the ceiling, which are in the same order as the reduction of the replacement rate (as the number of pensioners is assumed unaffected by the decreasing replacement ratio). Thus, over the longer run, a constant ceiling will significantly contribute to a "marginalisation" of the present social security system.

These savings are equivalent to an improvement of the balance (debt), in 2050, by around two fifth of the status quo result.

Given the wide difference between the ceiling and the present average wage an indexation provision for the ceiling is not considered immediately urgent – but its implementation should be envisaged as an obvious element of any future legislative change in the CSS.



Chart 2.21. Adjustment and non-adjustment case of maximum insurable earnings

Source: Results of calculations with the ILO social budget model.

2.2.4.4. Alternative time-patterns of contribution rate adjustments

The status quo calculations as well as the above sensitivity tests have shown that financial stability of the IVM program cannot be achieved at the given legal contribution rate of 9.5 per cent. Cum grano salis, if the contribution rate were to be maintained in the long run, benefits would have to be reduced by around 50 per cent.

In this chapter we look at the other side of the balance, the revenues. Instead of reducing benefits, contributions could be increased in order to match future resource requirements of the program. The focus of this chapter is on developing a time pattern for contribution rate increases such that, while maintaining a certain funding level, they are sufficient to cover the expected benefit payments of the scheme under the status quo calculations as well as under that sensitivity test (chapter 2.2.4.2), which assumes a change of the pension formula combined with indexation.

The reason is to provide policy makers with information on the magnitude of contribution rate changes to be expected in future in case the present volume of the benefit package offered is not reduced or if no other funding sources to finance the package (for example through a higher government subsidy to the IVM program) are found.

At present, the IVM program is operating on a partially funded basis. For the future, it is assumed that the funding level is kept relatively stable between 10 per cent and 15 per cent of GDP. As pension expenditure in relation to GDP increases this exogenous assumption implies a continuous reduction of the funding ratio of the IVM program²⁹.

²⁹ There is no hard or easy actuarial rule to determine the ultimate funding ratios under scaled premium financing schemes. All rules applied are arbitrary to some extent and can only be established in prevailing national contexts. The present funding rule of the IVM program matches these characteristics. However, an ultimate funding ratio of 2 seems to be adequate for a mature social security pension scheme. This would permit the scheme to absorb a major shortfall of contributions for example due to a long-lasting economic recession without being forced to raise the contribution rate during that phase.

Given this assumption, contribution rates were calculated such that they would be sufficient to cover the costs of the program for a certain extended period of years. When turning insufficient, the contribution rate is again increased – again to a level sufficient to cover the program costs for a certain period. This so-called "scaled-premium" approach is nothing but a normal PAYG rate with the exception that the PAYG rate is being fixed annually whereas the scaled premium is fixed for a number of years.

Under the given macro-economic, labour market, demographic and system specific assumptions the premium develops as presented in Table 2.7. The premium rates are presented for successive periods of 10 years each³⁰. This schedule has been determined in order both to maintain the financial equilibrium of the scheme via a substantial reserve and to be clear and potentially acceptable for the public. For comparative reasons Table 2.7 also includes the GAP, which represents that constant level of the contribution rate ensuring financial equilibrium of the IVM program until 2050.

Method of financing	2003 - 2009	2010 - 2019	2020 - 2029	2030 - 2039	2040 – 2050	
-			(%)			
PAYG cost rate (a)	8.9 to 10.5	10.6 to 12.6	13.1 to 17.0	17.5 to 20.8	21.1 to 24.1	
Schedule of contribution rate	11.0	12.0	16.0	20.0	24.0	
GAP	16.2	16.2	16.2	16.2	16.2	
¹⁾ The annual PAYG cost rate is adjusted for annual income other than contributions and capital income. Source: Data base and results of calculations with the ILO social budget model.						

 Table 2.7.
 Schedules of contribution rates by different methods of financing¹⁾

The future contribution rates following different regimes are depicted in the following Chart 2.22.



Chart 2.22. Schedules of contribution rates under different adjustment patterns

Source: Database and results of calculations with the ILO social budget model.

³⁰ For the years 2003-2009 the PAYG rates under the status quo have been assumed, as any change in the contribution rate could not reasonably become effective before 1 January 2003.

Running the scheme on the basis of the GAP does not seem realistic. The immediate implementation of such a high contribution rate would create a magnitude of reserve, which the economy of Panama might not be able to digest, just as a sudden and steep increase in labour cost as well as a reduction in consumption and investment. However, the rate shows the real costs of the scheme and, thus, in comparison to the present legal rate the magnitude of the reform package to be carried out by the society of Panama (either on the benefit side or on the revenue side – or a combination of both – of the program). Moreover, applying the GAP would not absolutely prevent the scheme from any further increase of the contribution rate, for example in case of high inflation or bad performance of / on the financial markets.

It should also be noted that the above levels of the ultimate contribution rate under the calculated schedule are by OECD standards perfectly normal for mature pension schemes. OECD countries, however, are in a process of reforming their pension systems such that contribution rates can be kept over the long run at levels markedly lower than 25 per cent. Under the assumptions of this valuation, Panama could achieve the same goal with by combining a relatively small number of reform measures on the benefit side of the IVM program without overly harming future beneficiaries' expectations.

2.2.4.5. Reserve development scenarios for sensitivity testing

Chart 2.23 shows the development of the IVM reserve in per cent of GDP for the three sensitivity tests. The pension indexation scenario – without changes in the pension formula accrual rates – produces the worst results. Total debt would almost reach 100 per cent of GDP in 2050^{31} . Not surprising, this scenario is worse than the status-quo (base-line) scenario, as it obviously loads costs on top of the present legislation. The second worse is the status quo scenario. The third scenario – the scenario in which a reduction of the present pension formula accrual rates to 45% after 15 years of contribution payment is combined with price-indexation of pensions – produces the financially least worrying results. However, by the end of the projection period, the accumulated debt is still in the order of over 60 per cent of GDP, i.e. similar to the status-quo scenario result.

Applying a schedule of stepwise increasing contribution rates over time (as presented in chapter 2.2.4.4) while leaving the benefit legislation unchanged produces a reserve fluctuating between 10 per cent and 15 per cent of GDP.

³¹ Again, it should be stressed, that this figure is calculated on the assumption that the debt financing costs are being borne by a "third party".



Chart 2.23. Reserve development in percentage of GDP for different sensitivity scenarios

Source: Database and results of calculations with the ILO social budget model.

2.2.5. Actuarial wealth of the IVM program

Calculating the actuarial wealth (deficit / surplus) is a method alternative to the one used so far in this valuation in order to reflect the financial situation of a pension scheme. The calculation of this figure makes much sense for (private) schemes that may have to face termination at a certain date and, thus, constituents want to know whether their respective schemes are financially able to satisfy all rights acquired by scheme members at that very date. For social security schemes like the IVM program of the CSS, which are normally assumed to exist indefinitely, the calculation of the deficit / surplus has an indicative character for the preparation of policy decisions – as has the presentation of ever growing deficits (as provided in chapter 2.2.3.1).

The mathematical reserve for pensions-in-payment of the IVM program is defined in Article 34-A of the Law³². Thus, the actuarial deficit / surplus is calculated by taking the difference between the reserve at 31 December 2000 and the constituent capital for all pensions in payment as of 31 December 2000. The constituent capital is calculated as the present value of all those future pension payments resulting from pensions paid at 31 December 2000. The present value is calculated separately for each age-cohort of the pensioners at 31 December 2000 by multiplying the annual amount of pensions to be paid by age-specific annuity factors. For determining the annuity factors the CSS system specific assumptions on mortality rates and the interest rates of the macro-economic frame have been used for the period 2000 to 2050.

2.2.5.1. The actuarial deficit as of 31 December 2000

As displayed in Table 2.8, the actuarial wealth of the IVM program equals *minus 2,5 billion Balboas*. This deficit is equivalent to minus 59.6 per cent of the constituent capital and to minus 147 per cent of the present legal reserve. This means that the CSS is under-funded with respect to the requirements of article 34-A, confirming the other calculation results of the other chapters of this report. However, as the

³² «Reserva Matemática para pensiones en curso de pago se alimentara con los capitales constitutivos de las pensiones acordadas en el año, que se capitalizaran a una tasa no inferior al cinco por ciento (5 %), imputándose de ellas las mensualidades de las pensiones vigentes, pagadas durante el año.»

legal provision only takes into account *past* pension commitments, the calculated deficit would be considerably higher if future pension obligations were additionally taken account of. It is recalled that the constituent capital, as calculated according to article 34-A, also does not include any indexation of future pensions. These results match those of the former 1998 valuation in which the deficit amounted to 59 per cent of the constituent capitals and 147 per cent of the legal reserve.

Component	Actuarial value (billion Balboas)
Legal reserve of the IVM Program as of 31 December 2000	1.7
Constituent capitals as of 31 December 2000	4.2
Actuarial deficit as of 31 December 2000	2.5

Table 2.8. The actuarial deficit of the IVM Programme as of 31 December 2000

The deficit amounts to 25 per cent of Panama's year 2000 nominal GDP. In other words, under the hypothetical assumption that the deficit were to be covered by a once and for all sump-sum payment, the Panamanian society would have to raise resources equivalent to one quarter of its GDP produced in 2000 – which not only is impossible but also economically nonsense as such a measure would bring the Panamanian economy (at least temporarily) to a standstill.

2.2.5.2. An alternative method

The legally stipulated method of calculating the actuarial wealth only takes into account today's pensions in payment and their probable future development while ignoring the funding of the accrued rights of the currently insured and contributing persons who are entitled to receive a benefit some time in future. For a social security scheme, which does not face the risk of sudden liquidation, the actuarial wealth at a given date can be calculated by subtracting the present value of all future benefits from the present value of all future revenues and the existing reserve at that given date.

Table 2.9 contains the estimates for the present value of both components of the future benefits of the IVM programme, which comprises:

- a) the existing pensions-in-payment at 31 December 2000; and
- b) all benefits awarded in the future for contribution credits earned by the initial population insured at 31 December 2000 and all benefits awarded in the future to future new entrants to the insured population after 31 December 2000 for their contribution credits to be accumulated in the future.

Table 2.9.	Actuarial value of IVM future	pension commitment	as of 31 December 2000

Component	Actuarial value (billion Balboas)
Pensions in payment as of 31 December 2000	4.2
Future pension expenditures to persons insured at 31 December 2001 and to future new entrants	29.7
Total present value of future IVM pension expenditure (a + b)	33.9

These present values of future benefits are now compared to the present values of income to the IVM programme at 31 December 2000 in table 2.10.

Component	Actuarial value (billion Balboas)
Reserve as of 31 Dec 2000	1.7
Future contributions of initial contributors at 31 December 2000 and of future insured	19.1
Total present value of future IVM income (c + d)	20.8

Table 2.10. Assets and actuarial value of future IVM income as of 31 December 2000

The difference between the total present value of all future benefits and the total present value of all future income sources to the IVM is equal to 13.1 billion Balboas. This means, the IVM actuarial deficit calculated by this alternative method is more than five times higher than calculated by the legal definition. Now, it amounts to 130 per cent of Panama's year 2000 nominal GDP. In other words, under the hypothetical assumption that the deficit were to be covered by a once and for all lump-sum payment, the Panamanian society would have to raise resources equivalent to 1.3 times its GDP produced in 2000. Latest this example shows that any idea of covering the actuarial deficit of the IVM program through a once and for all lump-sum payment is beyond any rational analysis.

2.2.6. A comparison with the 1998 valuation

Demographic assumptions

The annual average rate of increase of the number of old-age pensions over the projection period of 50 years reaches 4.0 per cent in the current valuation, which is markedly higher than the increase for the active insured population – which is expected to grow at an average annual rate of 1.3 per cent. The conclusion of the former valuation that the financial situation of the CSS will be highly affected by the relatively growing number of old-age pensioners is not only confirmed in this valuation but gets additional weight.

The results of the 1998 valuation differ from the those presented here as the former assumed constant labour force participation rates of women over the full projection period, whereas the present valuation foresees a raising participation rate for the female population. This results in a higher old-age dependency ratio especially in the second half of the projection period as women retire earlier and have a higher life expectancy (see Chart 2.24 for a comparison).



Chart 2.24. Old-age demographic ratios of the 1998 and 2001 valuations

Source: Database and results of calculations with the ILO social budget model.

Financial results

Other effects are counterbalancing the above cost-push effects of a growing labour participation of women. Especially, the assumed wage development of the present valuation creates a more favourable financial environment for the CSS in the present valuation than in the 1998 one. The growth of wages ensures faster growing funds out of contribution payments, which in connection with the non-indexation policy takes pressure from the IVM balance. Chart 2.25 reflects the difference in the development of the system old-age replacement ratios of the two valuations.



Chart 2.25. System old-age replacement ratios of the 1998 and 2001 valuations

Source: Database and results of calculations with the ILO social budget model.

2.3. Other programmes

2.3.1. Health programme

In terms of current expenditure "health" is the second largest programme of the CSS. Over the 1990s its share in total CSS expenditure gained 2.5 per cent-points in weight whereas the pensions programme lost 5 per cent-points (see Table 2.11). Under the status quo assumptions of this valuation the Health programme, as well as the Workman's compensation programme and administration expenditure will loose considerable weight within total current expenditure of the CSS over the projection period. This is due to the projected over-proportional expansion of the Pensions programme in the wake of ageing of the society. The relative mutual importance of the different social programmes in Panama will be put into a broader context in chapter 3.3.

Programme	1990	1995	2000	2010	2020	2030	2040	2050
Pensions	57.3	56.6	52.3	52.0	55.2	61.2	65.4	68.3
Health ^{*)}	34.8	34.7	37.3	37.6	35.3	30.6	27.5	25.2
Compensation	4.2	4.4	5.6	5.7	5.2	4.5	4.0	3.6
Administration	3.8	4.3	4.8	4.8	4.3	3.7	3.2	2.9
CSS total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
*) Excluding health infra	astructure invest	tments.						

Table 2.11. CSS programmes' current expenditure shares (percentage)

Source: Database and results of calculations with the ILO social budget model.

The reduction of the health programmes' relative weight over time is not to be mistaken as a reduction of its absolute expenditure. In order to understand and adequately interpret the results of the health expenditure projections the following explanations may be helpful.

International comparison of core health-related indicators³³ reveals that the health system of Panama is malfunctioning and needs many improvements (as it is equally the case with the health systems of many of Panama's neighbouring countries). For example, infant mortality is high in international comparison, and so is maternal mortality. Also, health expenditure per capita is very low while health expenditure as a percentage share of GDP is relatively high³⁴.

³³ See, for example: OECD Health Data 2000. A comparative analysis of 29 countries (CD-ROM).

³⁴ The latter observation is probably owed to the fact that GDP is underestimated, due to Panama's large informal sector.

	Health ex	cpenditure	Maternal	Infant	
			Mortality		
Country	% of GDP	per capita US\$	Deat	ths per	
			100000	1000	
			Live births		
	1998	1998	1997	1997	
United States	13.6	4178	8.4	7.2	
Germany	10.6	2769	6.0	4.8	
Switzerland	10.4	3834	3.8	4.8	
Turkey	-	-	52.4	39.5	
Mexico	-	-	46.9	16.4	
France	9.6	2358	-	4.7	
Canada	9.5	1828	5.4	5.5	
Norway	8.9	2951	-	4.1	
Belgium	8.8	2169	-	-	
Netherlands	8.6	2143	7.8	5.0	
Australia	8.5	1696	4.4	5.3	
Sweden	8.4	2146	3.3	3.6	
Italy	8.4	1720	-	-	
Iceland	8.3	2468	-	5.5	
Greece	8.3	957	-	6.4	
Denmark	8.3	2736	-	5.3	
Austria	8.2	2164	2.4	4.7	
New Zealand	8.1	1127	5.2	6.8	
Portugal	7.8	859	5.3	6.4	
Japan	7.6	2283	6.5	3.7	
Czech Republic	7.2	393	2.2	5.9	
Spain	7.1	1044	2.2	5.0	
Finland	6.9	1724	5.1	3.9	
Hungary	6.8	319	20.9	9.9	
United Kingdom	6.7	1607	6.0	5.9	
Poland	6.4	263	5.8	10.2	
Ireland	6.4	1436	-	6.2	
Luxembourg	5.9	-	-	4.2	
Korea	5.0	351	-	-	
Panama	5.0	200	60.0	17.2	
Source: OECD Health Data	a 2000 and database of	the ILO social budget mod	lel.		

Table 2.12. Crude health indicators for Panama in international comparison

Necessary improvements cover a potentially wide range of measures. Many are possibly more of an organisational and performance-oriented nature and probably not very costly in comparison to the expected gains. Others are directly linked to the still low general income level of Panama and will, thus, require additional resources which can be provided either through economic growth or, at given GDP levels, through higher allocation of resources to the health sector or through a combination of both.

The actual future development of health expenditure will highly depend on repetitive political (societal) short-term decisions - which leaves room for numerous options of how to model future health expenditure (and their financing). If, for example, Panama's societal aim is to keep the health expenditure share in GDP constant over time then the projection of health expenditure is linearly dependent on nominal GDP development. If the aim is to lift per capita health expenditure projection is quite simple. If the aim were to reduce infant mortality to Western European levels, one would need a set of reliable hypotheses that would allow a cost estimate for an amelioration of the key figure. A transformation of the necessary measures to be taken (in terms of, for instance, infrastructure, personnel and education) into a financial formula could not possibly be elaborated and tested within the limits set to this valuation.

For illustrating the results of some cursory calculations are being presented. If, for example, Panama would aim at reaching Spain's *recent 1998* per capita spending level within the next 20 years then total expenditure on health would have to grow annually by a rate of 10 per cent until 2020. The total health expenditure share in GDP would *ceteris paribus*, by then, have reached a level of almost 11 per cent. In case the aim were to reach today's per capita spending level of Sweden then the annual average growth rate would have to be 14 per cent and the health expenditure share in GDP would by 2020 turn out to be almost 23 per cent³⁵. Of course, in order to finance such enormous increases contribution rates on wages and / or general tax rates (direct and / or indirect) would need to be increased accordingly - with possibly³⁶ far reaching impacts on labour unit costs and the general price level³⁷, i.e. on the total economy, including its labour and product markets. As a consequence, the investment structure as well as the amount and composition of imported goods and services would (have to) change. In other words, simulating such policy strategies requires a (iterative) re-formulation of the underlying economic scenarios and finally, if such policy strategies were assumed to be successful, the demographic assumptions on infant mortality and on life expectancy could be changed to the better³⁸.

It was not part of the financial and actuarial valuation of the CSS to undertake such a detailed and interdependent and multidisciplinary scenario study³⁹. Instead, it was aimed at a "realistic" forecast of the health expenditure of the CSS (and other social services provided by state institutions; see subsection 2.3.2 below) *within the* same *fixed demographic, economic and labour market frame* as underlying the pension valuation. Of course, this meant implicitly to accept the continuance of many of the inefficiencies and undesired resource limitations inherent to Panama's health system and the CSS' budget, which to overcome must be one of the core policy targets of future social policy in Panama.

Still, also this limited modelling approach left room for a number of specific assumptions making the health projection results meaningful.

Around half of all operating expenditure of the health programme of the CSS is on wages and wagerelated expenses. These expenses are assumed to grow, over the long run, in line with the general average wage of the economy and the number of the employed in the public sector. So-called non-personnel costs

³⁵ To avoid misunderstandings it might be mentioned that reaching the spending level of a benchmark country is not a sensible aim in itself; it is taken here as a simple indicator reflecting the costs of building up a broad and deep health infrastructure that would, in Panama, result in a health status of the population which is presently already enjoyed by the Spaniards and Swedes.

³⁶ Assuming unchanged labour productivity growth.

³⁷ The illustrative calculations are based on the assumption of unchanged increase of real GDP and of unchanged annual increase of the general price level which, as can easily be seen, overstretches the applicability of the *ceteris* paribus clause. ³⁸ A

³⁸ As a reminder it is mentioned here that such revised economic, labour market and demographic assumptions would, in turn, unfold their impacts on the pension part of the CSS.

³⁹ Equally, this was not the purpose of the ILO 1998 valuation of the CSS. See: *Panamá - Valuación financiera y actuarial integral de la Caja Seguro Social y elaboración de un modelo de cuentas sociales. Oficina Internacional del Trabajo, Ginebra 1998* (pp 7-1 to 7-12).
are growing in parallel to nominal GDP - assuming that the cost components driving nominal GDP are appropriate measures for the cost developments of the expenditure components bundled under the respective CSS budget lines.

Special attention was given to modelling future development of the CSS' cost component "material and supply, pharmaceuticals". For the decade 1991 to 1999/2001 average *consumer price elasticity* was calculated for the following four entities:

Elasticity with respect to consumer price development (1990 to 2000), of:

(1)	expenditure on drugs per capita:	2.6 (2050: 2.0);
(2)	expenditure on pharmaceuticals per capita:	3.1 (2050: 2.5);
(3)	expenditure on laboratory equipment per capita:	3.2 (2050: 2.5);
(4)	expenditure on medical and chirurgical instruments per capita:	3.5 (2050: 3.0);

Each of these elasticities was assumed to decline by a total of around 0.5 points until 2050, modelling a linear reduction on a year-to-year basis. If instead the elasticities were left constant over the full projection period this would result in a GAP of around 0.4 per cent-points higher than in the downward adjusted case. In other words, the projections of the above expenditure items have clearly to be marked as results of "if – then" calculations. If one considers the introduction of policy measures to enhance price transparency on the relevant markets and, possibly, a relative decrease of demand for the above goods in parallel to an improving health status of the population it could be concluded that the elasticities decline faster over the long run than here assumed. This, in turn, would dampen the expenditure dynamic of the health programme.

As a result of the above expenditure growth assumptions the programme's current expenditure increases by an annual average rate of 5.8 per cent, i.e. only 0.2 per cent-points faster than nominal GDP. The share in GDP increases from 2.9 per cent in 2000 to 3.3 per cent in 2050. Over the same time its structure changes. While, in 2000, the share of personnel cost in current expenditure (= total expenditure excluding investments in tangible assets) amounts to 51.4 per cent it declines to 49.7 per cent in 2050. Simultaneously, the share of expenses on material, supply and pharmaceuticals⁴⁰ increases from 21.9 per cent in 2000 to 28.1 per cent in 2050. It should be noted that the relative reduction of personnel costs depends not only on the high CPI elasticities of the mentioned material etc. costs but also on the implicit assumption that the average income position of medical personnel in Panama's national income distribution does not change over time. Here, the health programme clearly faces financial risks especially in case the health personnel want future performance improvements to be reflected in salary levels.

2.3.1.1. Reserves and infrastructure investments of the health programme

The CSS cannot serve as a bank accumulating equity – especially not with respect to its health programme. Instead, it has to make use of the available resources continuously in order to serve Panama's population. Health is one of those social programmes where the never closing gap between "unlimited needs" of the population and limited resources to satisfy these needs is felt most strongly. Therefore, the CSS has to spend the available revenue in the most efficient and effective way.

At the assumed per-capita wage, labour market development, rate of return on programme reserves and the above mentioned price elasticities of certain expenditure items the present legal contribution rate of 8.5 per cent is sufficient to finance the current expenditure over the full projection period. However, only little resources are left annually to finance overdue infrastructure investments. Under the provision that a

⁴⁰ This excludes investments.

minimum liquidity reserve in the order of 25 per cent of previous year's current health expenditure should be maintained the calculation results show that the CSS could within short time run into a situation not allowing for any substantial further infrastructure financing. The liquid reserve will fall below the minimum reserve by 2002, already, and remain in that position until 2032. In the period from 2015 to 2020 the programme's income is just sufficient to cover the expenditure. Only in 2033 and the subsequent years the liquid reserve would surpass the minimum reserve and, thus, allow for further investments.



Chart 2.26. Health programme: Liquid reserve and minimum reserve

Source: Database and results of calculations with the ILO social budget model.

Under these conditions infrastructure investments would develop as shown in Chart 2.27.



Chart 2.27. Health programme: Investment expenditure

Source: Database and results of calculations with the ILO social budget model.

It is obvious that this situation is unsatisfactory. A preliminary check of the expenditure *structure* of the health programme reveals that savings in the order of 10 per cent maximum of the current non-personnel costs might be a realistic goal, which would be equivalent to about half a percentage point of contributions. These could be channelled into health infrastructure investment. One has to take into account that health infrastructure investments normally go along with additional personnel costs. Thus, savings in the number or salaries of personnel are neither advisable nor realistic. Yet this should not prevent necessary measures to restructure the CSS' personnel pursuing the goals: on the top level more management should be put in charge that is trained in balancing health service needs with resource availability; on the professional medical and subsidiary levels more client orientation should be introduced, administrative burdens should be lowered. Of course, such a policy would need support through a countrywide modernization strategy of the health administration (communication, statistical reporting, filing, etc.) that could not be financed solely or even mainly out of CSS resources. Further comments on this situation are being made in Chapter 3.3.

2.3.2. The finances of Workman's compensation programme and Administration

Due to their low financial weight the other programmes, Workman's compensation and Administration, are only of minor importance for the future financial development of the CSS. In 2000, they make up for slightly over 10 per cent of total current expenditure of the CSS. Nevertheless, some comments on the projected development of revenue and expenditure of these programmes are considered useful.

Workman's compensation

In 2000, around 65 per cent of current expenditure of the Workman's compensation programme were spent on service ("in-kind") related expenditure, 35 per cent on cash benefits. Under the demographic and economic assumptions made, the programme shows no obvious financing problems over the projection period. Total current expenditure will on average grow by 5.7 per cent annually, of which in-kind services and cash benefits grow by 5.3 per cent and 6.2 per cent, respectively.

Under the legal contribution rate of 1.65 per cent the programme collects sufficient contributions in order to cover the costs. It is, furthermore, able to spend some current income on investment in fixed assets and on financial markets. Capital income was in the past relatively high. Its share in total current income will increase from the year 2000-value 17 per cent over the medium term, then decrease by 4 to 5 per cent-points but, by the end of the projection period, recover again to the current level.

As a result of this constellation the funding ratio, calculated as the legal reserve as a multiple of current expenditure, is bound to increase further, i.e. to levels that are considered too high. This is as well reflected in the programme's GAP of 1.1 per cent, which therefore stands about 0.5 per cent-points below the legal rate. Thus, the Workman's compensation fund may be considered an indirect source of financing solutions for the other programmes, especially for the health programme. One should, however, not expect too much help for solving long-term structural problems of the CSS from such intra-organizational shifts of monies, especially not when the programme's volume that is to be tapped is rather small. Independent of such considerations it seems advisable to reduce the programme's funding ratio over the long run to about one half its present level. To which extent this would have to be done through a combination of reduced contribution rate and selling assets and increasing benefits / services is here being left open deliberately. The details would have to be decided separately and not in the context of this valuation.



Chart 2.28. Workman's compensation programme: funding ratio

Source: Database and results of calculations with the ILO social budget model.

Administration

The Administration of the CSS is financed out of three main sources: (1) State subsidies at a rate of 0.8 per cent of basic salaries, (2) fines and penalties, (3) 10 per cent of the regular contributions to the Workman's compensation programme and (4) interest payments on fixed term deposits. Obviously, the most reliable incomes are the state subsidy and the share in the contributions to the Workman's compensation programme. Over recent years, also fines and penalties have been a major source of income.

Total income of the programme is projected to grow at an annual average rate of 5.8 per cent until 2050, the most dynamic part being interest income (7.6 per cent p.a.), the other revenue items growing at a rate of 5.5 per cent. Total expenditure is growing slightly less dynamic. The average annual rate is 5.5 per cent. In other words, even if interest income would grow 2 per cent-points below the calculated rate the programme would still remain in a solid surplus position. Under the assumed set of assumptions the funding ratio would increase from around 3 in 2000 to over 8 in 2050.

Projecting the revenue components of this programme is straightforward but contains interesting elements, fines and penalties. These, by their very purpose, should make themselves unnecessary with time passing. Also, alcohol taxes (part of the state subsidies) contain a similar "educative/behavioural" element. It was simulated, therefore, how total revenue would develop in case fines and penalties and alcohol taxes were zero for the period 2002 to 2050. In this case, total revenue would grow at a rate of only 4.7 per cent, annually, i.e. 1.1 per cent-points less than in the base scenario. The programme would start to run deficits in 2002 and continue to do so until 2050. The reserve would turn negative in 2016. In case the programme would only forgo the alcohol taxes, the system would remain in a surplus over the full projection period *if*, as assumed, fines and penalties were kept at the 2001 level (in absolute terms, however declining as a relative share of total revenue), while maintaining the (growing) alcohol tax income, then the programme would run into a deficit by 2023, the legal reserve however remaining positive over the full projection period.

While the base scenario of our calculations seems to prove that the programme is solidly financed the above calculations indicate that it is under-financed as long as fines and penalties are not being collected. This situation could, over the longer term, introduce elements of undue mistrust in the relations between the CSS and its constituents. The financing principles of the administration programme should, therefore, be reconsidered.

3. A social budget for Panama

Already as part of the 1998 valuation a preliminary methodology for a social budget of Panama was established. Its size and structure for the past was estimated and projected until 2050. For purposes of this second valuation the methodology was improved, also the statistical information for estimating the social budget for the period 1990 to 2000 was, partially, enlarged. It is now for the first time that a "full" social budget for Panama is available. It comprises the revenue (size and structure by "types") as well as expenditure (size and structure by "functions"). Again, as in the previous report, the social budget was projected over the full horizon of the demographic forecast, i.e. until 2050.

The social budget of Panama, as calculated for **h**is valuation, consists of the following categories of expenditure ("functions"):

- (1) education (educación);
- (2) health (salud);
- (3) labour and social security (trabajo y seguridad social);
- (4) housing (vivienda);
- (5) old age (pensiones).

In its functional classifications Panama's statistical reporting system distinguishes the following types of expenditure⁴¹:

- (1) current expenditure (corrientes);
 - (a) operational expenditure (gastos de operación);
 - (b) current transfers (transferencias corrientes);
 - (c) interest on public debt (intereses deuda pública);
- (2) capital expenditure (de capital);
 - (a) tangible investments (inversión real);
 - (b) financial investments (inversión financiera);
 - (c) capital transfers (transferencias de capital);
 - (d) capital consumption (amortización deuda pública).

This structure is applied to the functions education, health, labour and social security and housing on a standard basis by the Panamanean statistical office. For the purposes of this study, the current accounts of the CSS were classified⁴² according to above information resulting in introducing the additional function

 ⁴¹ Estadística panameña: situación económica, hacienda publica, finanzas públicas, Sección 343 (various volumes).
 ⁴² Each and every budget line of the CSS was classified according to the "functional" and "typical" structure as published in the "Finanzas Públicas", op. cit.

"old age"43. Using the ILO social budget model all expenditures were projected by "types" and "functions".

On the income side the following types of revenue are distinguished:

- (1) employer contributions;
- (2) employee contributions;
- (3) contributions by other persons;
- (4) tax (subsidies);
- (5) other revenue.

For the functions "education", "labour and social security" and "housing" it was assumed that all these expenditures are tax financed. For the functions health and old age the revenue of the CSS was classified according to the above structure, taking into account the legal contribution rates; part of the CSS revenue was allocated to old age, the other to health.

Revenues were projected using the ILO social budget model. As a result of revenue and expenditure projection an overall balance of the social budget, and its future development over time, was calculated.

For the representation of past data the results for 1990 to 1992 as well as for 2001 are partially based on own estimates.

The results of the calculations are presented in absolute (nominal) terms, in percentage of GDP, in percentage of total (= structure in percentage of total expenditure and revenue, respectively) and as change over previous year / period in percentage.

Panama does not have unemployment insurance (employment service). Instead there exists a formally regulated system of indemnity payments to employees that are made redundant. Because of insufficient base information no attempts were made to include the amount of these payments. Methodologically, they would be allocated to the function "employment" (which does not exist in the social budget presented here); revenues could be classified as notional employer contributions.

Finally, it may be mentioned that the above functional classification fully complies with US standards but differs from the statistical conventions of the EU who does not usually classify "education" as (redistributive) social expenditure but rather an investment in human capital. As, under the given methodology, "education" absorbs a significant amount of Panama's spending on social programmes, this methodologically induced difference should be taken into account in comparisons of Panama's social spending with that of countries which follow the European accounting guidelines.

3.1. The social budget 1990 to 2000

3.1.1. Revenue

For 1990, total revenue of the social protection sector of Panama is estimated at around 965 million Balboas; until 2000 the amount doubled and reached 1,895 million Balboas. Total expenditure was estimated at around 869 million Balboas (1990), and at 1,806 million Balboas in 2000. The balance (=

⁴³ The function also includes expenditure on disability and on survivors.

difference between revenue and expenditure) was positive over the 1990s; however, over the first half of the decade the balance hovered around 100 million Balboas, annually, but dropped to an average annual value of slightly over 30 million Balboas over the second half of the decade.

Total revenue amounted to 18.2 per cent of GDP in 1990 and 18.9 per cent in 2000. Contributions and tax revenue each took in all years an almost equal share of around 45 per cent in financing Panama's social expenditure. Capital income (including other income) covers around 10 per cent of total revenue. The relative weights of these income components remained almost unchanged over the decade 1990 to 2000.



Chart 3.1. Social revenue ratio¹) in Panama 1990 to 2000

¹⁾ Total revenue allocated to social protection in percentage of GDP. Source: Data base ILO social budget model.

3.1.2. Expenditure

Total spending on social protection amounted to 16.3 per cent of GDP in 1990, reached 20.7 per cent in 1998 and fell back to 18.1 per cent in 2000. In all years, the highest amount was spent on old age, followed by health and education. Housing plays only a minor role in the social budget of Panama. in percentage of GDP, old age absorbed 5.7 per cent in 1990 and 6.1 per cent in 2000, followed by health with 5.1 per cent and 5.6 per cent in 1990 and 2000, respectively, and education with 4.1 per cent and 4.5 per cent.



Chart 3.2. Social expenditure ratio¹⁾ in Panama 1990 to 2000

¹⁾ Total social expenditure in percentage of GDP. Source: Database of the ILO social budget model.

3.1.3. Balance

The overall balance of the social protection system was in all years positive, thus the system experienced a continued increase of reserves. However, over the first half of the 1990s the annual balance was on average in the order of 1.5 per cent of GDP while the surplus decreased to an annual average value of 0.4 per cent between 1995 and 2000. In other words, since the mid 1990s the increase in the reserves has significantly slowed down.

Chart 3.3. Social expenditure balance 1990 to 2000



Source: Database of the ILO social budget model.

3.2. A long-term scenario until 2050

3.2.1. Revenue

Over the long run overall revenue will decrease from a level of 20 per cent of GDP in 1995 to 16 per cent of GDP in 2020; it will remain at that low level over around one decade and then start to increase again, however only slightly. By 2050 total revenue in percentage of GDP is projected to reach 17.6 per cent.

This development is influenced by the following broad trends:

- (1) tax revenue decreases in relative terms as expenditures financed by taxes are expected to decline as a share of GDP until the late 2020s (see below). Only during the last two decades of the projection period will the tax financed part increase again; this is due to the ageing induced growing costs of the tax financed part of health expenditure;
- (2) as the overall system is expected to run into continuous deficits returns on capital will not be available any more as a noticeable source of income latest in the 2020s;
- (3) at constant contribution rates employer and employee contributions are expected to remain stable in relation to GDP. Only "other contributions", which represent the health contributions paid by the growing number of pensioners are expected to increase as a percentage of GDP, accordingly.



Chart 3.4. Social revenue ratio¹⁾ 1990 to 2050

¹⁾ Total revenue allocated to social protection in percentage of GDP.

Source: Database and results of calculations with the ILO social budget model.

As a consequence the financing structure of the social protection system will change over time. While, in 2000, the capital income share in the overall revenue of the system is estimated at 10 per cent, this share will decline to a negligible level latest by around 2020. As of then the social protection system will be financed at more or less equal shares (50:50) out of taxation and out of contributions (Chart 3.5). For the system as a whole this change in the financing structure may not be regarded especially significant. However, for single components as the CSS the altered revenue composition is of prime importance and has some direct consequences (see chapter 2.2.3.2).



Chart 3.5. Social revenue structure 1990 to 2050

Source: Database and results of calculations with the ILO social budget model.

3.2.2. Expenditure

The development of social spending in relation to GDP is over the full projection period influenced by the following broad trends:

- relative spending on education will continuously decline; this is a direct consequence of the declining relative number of children. The spending ratio is 4.5 per cent in 2000 and will be 2.6 per cent of GDP in 2050;
- (2) relative spending on health is expected to increase continuously; some important reasons have been described in chapter 2.3.1 concerned with the CSS health programme. Other reasons are to be seen in the ageing of the population. It is assumed that per-capita-spending on health will increase "structurally" because of the expected increase of older patients in relation to younger ones noticeable after 2025. All in all, health expenditure is estimated to reach 6 per cent of GDP in 2005 then remain stable over around 1 1/2 decades and then to start increasing steadily to a level of almost 8 per cent of GDP in 2050;
- (3) relative spending on old age, disability and survivors is expected to be stable at 6 per cent of GDP until the middle of the next decade. From then onwards, it will increase significantly to over 10 per cent of GDP in 2050.

Housing and labour and social security spending will remain stable in relation to GDP at relatively low levels.

- All in all, in the future period from 2015 to 2050, spending on
- (1) education will decline by 1 per cent-point of GDP;
- (2) health will increase by 1.9 per cent-points of GDP;
- (3) old age will increase by 4.1 per cent-points of GDP.

Total spending will increase from 2015 to 2050 by 5.4 per cent-points of GDP.



Chart 3.6. Social expenditure ratio¹⁾ 1990 to 2050

¹⁾ Total social expenditure in percentage of GDP.

Source: Database and results of calculations with the ILO social budget model.

This development is reflected in the expected changing structure of the social budget of Panama. Until the end of the 2010s old age and health will absorb equal shares of around 33 per cent to 35 per cent of the total budget. At the same time the share of education declines from almost 25 per cent in 2000 to 19 per cent in 2020. The shares of the remaining "small" functions increase accordingly. Starting in the 2020s the function old age is expected to absorb growing shares of the social budget. By 2050 it will cover 45 per cent of the budget while health is still taking up around 35 per cent. Meanwhile, the share of education will have declined significantly to only 11.4 per cent in 2050. The small functions housing and labour and social security are expected to absorb in all years a constant share of around 9 per cent to 10 per cent of the budget.



Chart 3.7. Social expenditure structure 1990 to 2050

Source: Database and results of calculations with the ILO social budget model.

3.2.3. Balance

As a consequence of the above developments the overall balance of Panama's social protection system is turning negative in the immediate future and is bound to further accumulate deficits, which are continuously growing for the years after 2005. It should be recalled that the turn into a negative balance scheduled for the near future is due to the assumed short-term investment strategy of the health sector of the CSS⁴⁴. In case the assumed investment strategy was not undertaken but, instead, the annual surplus was invested in the financial markets, then the first occurrence of a deficit could be postponed by around one decade.

Over the longer run the deficit position of the system is unavoidable at given benefit levels, contribution and tax rates and the assumed demographic and labour market developments. The expected deficit remains at a "manageable" level, i.e. in the order of -1 per cent to -2 per cent of GDP, until the late 2020s but then increases to a level of over -5 per cent of GDP by the end of 2050⁴⁵.

It should be recalled that this deficit is calculated on the implicit assumption that the financing of the deficit would be cost free for the CSS (which would probably resemble the "real life" case). In other words, it is assumed that the state as a final guarantor of the social protection system would cover the deficit through budget transfers out of tax revenue.

This approach does not show the full costs, which are rationally to be anticipated. If one instead assumed that the CSS would have to take up the resources necessary to cover the deficits at the financial markets with interest payments attached, then compound interest rate effects would lead the 2050 deficit to over 10 per cent of GDP, i.e. doubling the deficit.



Chart 3.8. Balance¹⁾ of the social budget 1990 to 2050 in percentage of GDP

¹⁾ Total revenue of the social budget minus total expenditure of the social budget. The balance shows the change of the monetary reserves of the system in percentage of GDP.

Source: Database and results of calculations with the ILO social budget model.

⁴⁴ See chapter 2.3.1.1.

⁴⁵ The deficit of the social budget is in all projected years estimated slightly higher than the balance ("*resultado del ejercicio*") of the CSS because in the social budget investments into tangible assets are taken account of as current expenditure whereas they are not included when calculating the balance.

Table 3.1.	The social budget of Panama 1990 to 2050
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SOCIAL BUDGET	1990	1995	2000	2010	2020	2030	2040	2050
Revenue				Million Ba	alboas			
Contributions	430	619	867	1'467	2'794	4'858	8'111	12'935
- Employers	246	354	496	836	1'582	2'708	4'463	7'040
- Employees	163	237	334	558	1'056	1'807	2'977	4'693
- Others	20	28	37	73	155	342	671	1'203
Тах	425	725	869	1'461	2'521	4'387	7'435	12'427
Capital income and others	110	243	185	155	76	131	240	395
Total	964	1'587	1'921	3'083	5'391	9'376	15'786	25'757
Expenditure								
Education	217	324	446	723	1'120	1'723	2'593	3'898
Health	268	499	561	1'063	2'043	3'715	6'677	11'445
Labour and social security	65	141	170	286	509	934	1'611	2'655
Housing	16	39	16	36	68	117	191	298
Old age, disability and survivors	303	458	613	1'048	2'160	4'551	8'681	15'284
Total	869	1'461	1'806	3'156	5'899	11'041	19'752	33'580
Balance	96	126	115	-73	-508	-1'665	-3'966	-7'822
Revenue				% of G	DP			
Contributions	8.1	7.8	8.7	8.0	8.1	8.2	8.4	8.6
- Employers	4.6	4.5	5.0	4.5	4.6	4.6	4.6	4.7
- Employees	3.1	3.0	3.3	3.0	3.1	3.1	3.1	3.1
- Others	0.4	0.4	0.4	0.4	0.4	0.6	0.7	0.8
Tax	8.0	9.2	8.7	7.9	7.3	7.4	7.7	8.3
Capital income and others	2.1	3.1	1.9	0.8	0.2	0.2	0.2	0.3
Total	18.2	20.1	19.2	16.8	15.6	15.9	16.4	17.1
Expenditure								
Education	4.1	4.1	4.5	3.9	3.2	2.9	2.7	2.6
Health	5.1	6.3	5.6	5.8	5.9	6.3	6.9	7.6
Labour and social security	1.2	1.8	1.7	1.6	1.5	1.6	1.7	1.8
Housing	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2
Old age, disability and survivors	5.7	5.8	6.1	5.7	6.3	7.7	9.0	10.2
Total	16.3	18.5	18.1	17.2	17.1	18.7	20.5	22.4
Balance	1.8	1.6	1.1	-0.4	-1.5	-2.8	-4.1	-5.2
Revenue				Structure	e in %			
Contributions	44.5	39.0	45.1	47.6	51.8	51.8	51.4	50.2
- Employers	25.5	22.3	25.8	27.1	29.4	28.9	28.3	27.3
- Employees	16.9	14.9	17.4	18.1	19.6	19.3	18.9	18.2
- Others	2.1	1.8	1.9	2.4	2.9	3.7	4.3	4.7
lax	44.1	45.7	45.2	47.4	46.8	46.8	47.1	48.2
Capital income and others	11.4	15.3	9.6	5.0	1.4	1.4	1.5	1.5
l otal	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Expenditure	05.0	00.0	047		40.0	45.0	40.4	
Education	25.0	22.2	24.7	22.9	19.0	15.6	13.1	11.6
Health	30.9	34.2	31.1	33.7	34.6	33.7	33.8	34.1
Labour and social security	7.4	9.6	9.4	9.1	8.6	8.5	8.2	7.9
Housing	1.8	2.7	0.9	1.2	1.2	1.1	1.0	0.9
Old age, disability and survivors	34.8	31.4	33.9	33.2	30.0	41.2	43.9	45.5
l otal	100.0	100.0	100.0	100.0	100.0		100.0	100.0
Contributions		AVg.	annual cr		previous	period in s	% 50	4.0
Employers	-	7.0	7.0	5.4 5.4	0.7	5.7 5.5	D.J 5 1	4.0
	-	7.5	7.0	5.4	0.0	5.5 E E	5.1 E 4	4.7
- Employees	-	1.1	1.1	5.3	0.0	0.0	5.1	4.7
- Others	-	0.9	0.1	7.0	7.0	0.Z	7.0	0.0 5.0
rax Conital income and others	-	11.3	3.1 5 0	0.3 4 7	0.0 0	5./ E C	ວ.4 ຂາ	5.3 E 1
Total	-	105	-⊃.∠ 2 0	-1.7	-0.9 57	0.0 57	0.Z	5.1
rotal Expanditura	-	10.5	3.9	4.0	5.7	5.7	0.5	5.0
		0.0	6.6	4.0	A E	A A	4.0	4.0
Euucalion Health	-	0.J	0.0	4.9	4.5	4.4	4.2	4.Z
Labour and social accurity	-	13.2	∠.4 २०	0.0	0./ 5.0	0.Z	0.0	5.5 E 4
Labour and Social Security	-	10.9	3.Ö	0.4 0 ∕	5.9 6 E	0.3 5 5	0.0 E 0	5.1 4 F
Ald ago, disphility and survivors	-	19.9	-10.0	0.4	0.0 7 F	0.0 77	D.U	4.5
Total	-	0./ 11.0	0.U 4 0	5.5 5 7	(.) 6 E	1.1 6 E	0.7	5.8 E 4
IUIAI	-	11.0	4.3	J.7	0.0	0.0	0.0	5.4

3.3. Panama's social budget: Policy conflicts of future resource allocation

Worldwide, countries spend between around 5 per cent and 30 per cent of GDP on social programmes. Under this perspective Panama rather spends a medium share than "too much" of its economic resources on social protection. Moreover, the foreseen rise in the social expenditure ratio is in itself no source of major concern. If one disregards of education⁴⁶ the total social expenditure ratio was in 2000 at about 13.6 per cent and is expected to grow to 20 per cent of GDP by 2050. Compared to Europe Panama reaches in 2000 just half of the European level⁴⁷ and shall still lag very much behind in 2050 when Europe will have increased to average levels of social expenditure ratio of close to 30 per cent and over projected under the assumption of unchanged legislation. Including education the ratio was 18 per cent in 2000 – which is slightly over half the ratio of the US⁴⁸. Its increase to 22 to 23 per cent in 2050 is not triggering concerns.

Under the economic assumptions of this valuation Panama will by the beginning of the 2040s have reached Europe's year 2000 per capita income level; in 2050, the per capita income level of Panama is expected to reach almost 50 per cent of that same level of the EU. Under these perspectives Panama clearly has room for gradually expanding its social expenditure ratio by 5 to 7 per cent-points until 2050 without negatively affecting its economic performance. Of course, under social policy as well as financing aspects, such expansion is only considered advisable if accompanied by expanding social protection coverage of the population and a clear reversal of the trend towards extension of the informal economic activities harming formal employment.

The question imposes itself in which function the expansion of social expenditure should take place. The two most obvious "candidates" are health and housing.

It is certainly right to state that the health situation of the population can probably be improved considerably by imposing "organisational" measures that are not necessarily costly; but clearly, what Panama is lacking most is sufficient resources in the health sector. The international comparison of spending levels undertaken in chapter 2.3.1 of this report reveals that a spending level of about 7 per cent to 8 per cent of GDP should be sufficient to improve the health situation of the population considerably. This level is reached in the projection of this report quasi-automatically in the 2040s, however mainly due to ageing of the population. It is proposed here to expand the health expenditure share much earlier to that same level, i.e. to reach a level of 7.5 per cent of GDP already by the beginning of the decade after 2010. For the year 2015, on a pure arithmetical basis, this would - compared to the projected amount - imply additional spending on health in the order of 400 million Balboas annually. If, from that basis, one would allow for the built-in cost driving forces as assumed in this valuation, health spending would reach a level of around 9.5 per cent in 2050, which is 1.7 per cent-points of GDP more than projected. In per capitavalues Panama would then spend 3,300 Balboas on health – which, in 1998 prices, amounts to 1,450 Balboas. This value would compare very favourably to the international comparison of chapter 2.3.1,

⁴⁶ Following the European social budget methodology education is not considered a re-distributive expense of societies (and, thus, not considered part of the social budget) but, instead, an investment into human capital necessary to maintain economic productivity in the long run.

⁴⁷ The level of social expenditure depends very much on the used definition of social expenditure. For the US total social expenditure, including charities and private measures, has been estimated in the order of around 32 per cent. The definition for the EU is set by EUROSTAT, the statistical office of the European Community in Luxembourg. Definitions used by individual member states of the EU might differ from the EUROSTAT definition. For 1998, EUROSTAT estimates the level of social expenditure for the Community in the order of 27.7 per cent of GDP, varying between 30.5 per cent for France (= maximum) and 16.1 per cent for Ireland (= minimum). See: Federal Ministry of Labour and Social Affairs of Germany: *Statistics on Labour and Social Security 2001*. (Bonn, 2001). Tables 9-18 and 9-18A, or http://www.bma.de for information.

⁴⁸ The social expenditure ratio for the US, including charity and other private measures, has been estimated (by the EU) in the order of 32 per cent. According to OECD estimates, the social expenditure ratio of the US is 14.3% (1999).

showing that Panama in 2050 would spend per capita (in real terms) as much on health as in 1998, for example, did Italy, Ireland, UK, Australia and Spain. It should be mentioned that additional health financing crucially depends on a more widespread formalisation of the economy. Because, otherwise the relatively few employed in the small formally organised part of the economy would have to bear the costs of the whole population – including the population active in the informal sectors – as these can not for human reasons be excluded from access to health services.

Without going into the details of a highly interrelated issue with impacts on different other social functions: Housing clearly also needs significantly increased national resources in order to help overcome poverty but also in order to improve the health status of the population via providing hygienic housing conditions. Whether expansion of the social housing provisions should be done in kind or in cash or as an intelligent mixture of both has to be decided separately and is not a subject matter of this report. But clearly, in order to overcome the precarious living situation of the growing urban population of Panama, especially in the slum regions, a significant increase of social spending on housing onto a level of 2 per cent of GDP is advisable. This, also, could be reached after 2010 and then maintained over the projection period. In 2050, a spending level of 2 per cent of GDP on housing would then be reached.

Furthermore, "education" requires more resources than projected on grounds of population development. Ageing, which is equivalent to having less children and youth in the education system, should be understood as a chance to improve education per capita not only of the young but also the working age population. It is most obvious that Panama is dependent on a well-educated and well-trained labour force that in its turn requires for its formation an efficient school and university system. It is proposed here, as a first step to continuous improvement, to maintain spending on education in relation to GDP on the level that was reached in 2000. For 2050 this would imply spending on education around *1.5 per cent-points higher than projected* in the precedent long-term valuation.

Finally, it is proposed here to introduce a new programme "employment service" which - in the social budget context - would mean to introduce a new function "employment" to the social budget. Although mentioned here last its implementation should be considered a priority by the government, as the labour market problems will exert growing pressure starting in the immediate future. Detailed descriptions of the mandate and structure of such a service would have to be elaborated elsewhere as this would go beyond the terms of reference of this valuation. The core task to be assigned should be in cooperation among employers and employees to support the growing labour force, especially its younger strata, in efficient training and job placement. An amount of 1.5 per cent of GDP is considered sufficient for fulfilling this task in an economically and socially satisfying manner.

All in all, taking all these measures together, *the social expenditure ratio would increase by around 6.5 per cent-points of GDP by the end of the projection period*. However, whether this increase would be introduced gradually or as part of a major social reform step under societal consensus is here left open.

With respect to future expansion, *public* spending on old age has clearly no priority as it is more or less bound to reach a level of over 10 per cent of GDP by 2050. Given the above demands for more funding on behalf of certain social security programmes economising on the old age function could contribute to societal acceptance of such moves, which would require more openness to re-distribution through the government. For an international comparison Table 3.2, showing the projected pension ratios related to GDP for selected European countries, is included below. For 2050 the European Union projects for its respective member states the following spending ratios:

Country	%)	Difference in %-points compared to 2000
Belgium	12.6	+3.3
Denmark	13.2	+3.0
Germany	14.6	+4.3
Spain	17.7	+8.3
France	15.8 ^{*)}	+3.7
Ireland	9.0	+4.4
Italy	13.9	-0.3
The Netherlands	13.6	+5.7
Austria	15.1	+0.6
Portugal	14.2	+4.4
Finland	16.0	+4.7
Sweden	10.0	+1.0
Panama	10.3	+4.1
⁺) Public pension expenditure in 2050 (% of GDP). *) 2040.		

Table 3.2. Projected pension expenditure ratios in Europe 2050

In terms of the expected spending *level* Panama compares well to Sweden and Ireland; in terms of the expected *dynamics* Panama compares well to most European countries (except Spain, Italy and Austria). It should be taken into account that currently a number of European countries are still in a reform process of their respective public pension systems; after implementation, these countries will in 2050 reach lower public spending levels as indicated in the above table. All in all, from an international comparator perspective, Panama has no need to expand further pension expenditure in relation to GDP.

Clearly, a policy aiming at increasing the social budget ratio of Panama needs additional resources to be allocated to social protection. It is obvious that the unavoidable increase of the old age spending ratio in GDP will have to be financed out of increased contribution rates and / or additional debt funding which would have to be found (see Chapter 2.2.2).

However, additional health and education expenditure should clearly be financed out of taxation. Whether the required additional resources could be made available through more efficient use of tax income at prevailing tax rates or through a reshuffle of spending priorities in the public budgets or through a (gradual) increase of tax rates would have to be decided on the very details of any envisaged expansionary social policy step. Given the present tax income *level* (in percentage of GDP) and *structure* of the central government there is obviously room to increase both direct and indirect tax rates.

The question whether an employment service should be financed out of contributions or taxation needs to be decided when specific steps for its implementation are under consideration. Broadly speaking that decision depends on the degree to which the service is accessible for the population (labour force). The broader the coverage the more financing would have to come out of taxation. The more the employment service were designed to serve (only) specific labour market interests of labour and employers (or subgroups of these) the more it should be financed out of contributions levied on labour income.

Annex 1

Table A.1. CSS (IVM, RP, EM and Administration) total expenditure and revenue 1998-2050

(1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2845	2050
TOTAL CURRENT EXPENDITURE	703238	732'969	790'861	881769	917719	974 924	11052/214	1133'645	1560721	2'188'072	3109197	4'399'404	6'180'71Z	8'480'895	11350 508	14'924'357	19'476'453
Current expenditure (1. + 2.)	703*238	732'969	790/861	884769	917719	974'924	1'052'214	1133'645	1'560'721	2'188'072	3'109'197	4'399'404	6'180712	8'480'895	11'350'508	14'924'357	19'476'453
Operating expenditure	311'994	309'484	345'477	405'192	416953	444 757	472'207	503'555	688788	942782	1275'990	1675772	2'185'670	2'804'475	3573363	4'478'365	5'598'883
Personnel cost	168'540	173423	189'500	224064	236'346	251794	268°16D	286 682	391664	537 024	729090	952577	1238235	1578580	2002'492	2'491'021	3198066
Non-personnel cost	39'853	30/011	43565	47'365	47'289	51/013	53'582	57730	78060	107 702	145296	190937	247700	317/524	402'918	503'883	627'848
Material & furniture	74921	77016	78966	96/332	95/262	101'818	108763	116164	160 229	218911	295703	395 361	523276	684775	885972	1134229	1'440'237
Current transfers	23'693	24'261	26'471	34215	35'006	37'160	39'491	41947	56814	27/114	103 869	134866	174'427	221'464	279'949	347'202	430712
Debt servicing	5146	41666	6'858	3148	3050	2962	2'191	2031	2031	2031	2031	2031	2031	2031	21031	2031	2031
Global designations	41	28	27	68	0	D	D	0	a	0	a	a	0	0	D	0	0
Benefits	391244	423'565	445384	479577	500766	530167	580 1007	630'090	871933	1245290	1'833'206	2723532	3'995'842	5'676'420	7777'145	10:445'992	13'877'570
CSS Benefits	391744	423666	445784	479577	500266	5300167	5807002	530090	B21933	1246290	1833205	2723532	3395042	5525420	7777145	10/4453992	13877570
IVM: Old-age pens	276'312	297'331	309/566	329664	340/095	359/234	397'349	434819	599740	B60121	1265246	1953045	2926218	4'216'139	5813730	7/856/661	10'452'242
IVM: Invalidity page	45708	51958	58379	66931	72016	77538	83465	89836	129949	188955	274316	391577	544'414	739708	998/561	1305355	1700815
IVM: Sunivers' nens	28548	30(160	31/513	34:150	35922	37866	39202	41908	54591	23278	100578	139211	194472	223505	3845599	5341692	728944
RP: Survivors' nans	20346	2291	2291	2349	7474	2605	2731	2976	3762	5054	6925	9576	13377	16820	26'461	36779	50140
DD Dano natiol name inv	3770	3947	4332	4767	5129	5522	ETHE	69093	9265	13469	19537	77 980	38775	5758/	70/415	67971	1211137
BP Pare absolute nerro inv	1018	1'282	1'902	1// 99	1548	1587	1794	1931	2794	4062	5898	B%19	11705	15904	21268	28085	36567
IVM: I de annuities (discontinued)	73	54	48	43	36	79	74	19	4	1002	0	0415		0.000		0	0
FM Seknass subside	080%	4110	4995	4500	5045	5045	EVER	6995	6042	11100	15 990	20257	08/517	34457	43/860	55191	69063
ENt Motoroity subsidy	10934	11784	11543	12760	12954	14507	15367	16229	22245	30969	42595	56017	79947	94'479	101/218	152630	191591
DD Temporary subsidy	6933	5717	EP19	7000	7977	7830	13.304	8953	120/3	16/367	72,000	28457	251018	45179	57942	71763	87516
PD: Europei acord	33	17	11	- 500	1.002	1000	44	49	57	71	21000	107	191	40110	109	209	262
Pres i oneral grant	701		963	001	1.400	1000	1100	1000	2007	7007	2196	2002	47777	EDIC	77212	120	202 RE34
NAL Family sugal for ald age	5968	5660	5010	8000	EVOS	F960	7598	6904	11959	16,402	24544	37.007	65992	BD/55/	1111005	140057	100507
MAL Family suppl. for bit-age	41447	1011	1000	4720	4900	2000	2000	0.004	9974	10420	24 344	40400	44197	40/200	1025	14900r	199007
TYM. Family suppl. for FM.	646	1044	1021	1730	1.0/0	2013	2 10/	2333	3000	4007	/ 123	10 100	14 137	17,200	23 07 3	33030	44 100
ENL Glasses subsidy	010	C4.5	540	700	720	700	DBA	7071	0704	1/012	1023	21204	2015	2,300	2748	100700	100700
19M: No-pension retuind	44/8	5116	51/8	53/7	5583	5925	6 487	7071	9791	14012	20724	31004	45749	65.301	89712	120789	160799
RP: No-pension rejurid	670	616	646	642	906	BAD	1060	1130	1635	230	5451	4 9 25	0.049	9305	1245/	16422	21 386
IPIN: Education subsidy to surv.	0603000	6000000	6711159	220019	6795774	1000007	19020020	4147280.45	4803803	0000000	20222020	04427092	1000057	Emacyon .	25506550	12	14
Revenues	830 989	663720	3/4 43/	515633	370274	1020407	10/60/2	113/049	1002003	1989233	2 627 030	3 467 232	4 308 637	3 913 336	7 639 302	36/2 201	12213146
Current revenues	660125	691562	/451051	/14/842	770121	817 794	868 775	926109	128,1946	1701153	2448133	3238779	4 203 839	552964/	/ 146 64/	91050705	11429840
Contribution income	608 4/8	635927	668341	659564	/10/224	/53669	800762	853669	1 182765	1642233	2258119	2969645	3940778	5111994	6610151	83/5/19	10582534
Regular contribucions (ER & EE)	634744	554701	5/6207	5/6391	610187	64/648	666759	/31160	1013170	1403920	1920310	2515060	3/266/31	4221744	642292/	6 622 991	85650/2
Contributions from beneficiaries	32559	34661	37 399	40,466	41908	44409	48 685	52968	/3359	104 961	155189	232102	342395	466616	8/1150	903489	1202570
Voluntary contributions	1/498	1 510	1.692	1692	1785	1885	2009	2139	2965	4108	5619	7 368	9614	12353	15868	19964	25062
Contributions on maternity and invalidity benef	1479	1598	1842	1758	1912	2000	2121	2249	3069	4243	5796	7592	9894	126/4	16176	20233	25263
Contributions on XIII month salary	34013	36617	3/466	3/422	394/9	41903	44432	47906	66562	90834	124 244	165818	21258/	2/3148	3501864	441'449	554162
Special regular contributions (V exp.)	4172	5826	31,969	0	14899	15768	16728	17 775	24 595	34091	45 955	61467	80376	103228	132'868	167/217	209933
Special voluntary contributions (V exp.)	13	16	67	33	33	35	37	40	55	76	105	138	180	231	299	376	472
Workmen Compensation premium	51646	55665	57510	55/27/9	59/898	64'135	68/012	72,400	100/281	138919	190014	249134	325081	417652	536'496	674987	847'306
Other revenues	146'536	1481036	185'391	154'319	153'458	154'311	157'316	159'099	155'464	127'313	75'963	99'859	131251	184'164	239'616	308'170	395'136
Financial revenues	131 351	132269	170916	142563	140783	140953	143'094	143885	134383	96078	35997	47.099	62114	94975	124730	163'190	212638
Miscellaneous administration income	15185	15746	14476	11766	12676	13458	14/262	16214	21081	29/236	40076	52761	69/137	69/188	114'885	144960	162/496
Fiscal transfers	44*328	441102	43215	50/694	46'695	48'303	49 981	51'888	63'994	80767	102'934	128'593	161547	201726	253 289	313389	388476
Savings (=Income minus Current expenditure)	147751	150751	183596	35066	52'556	45'483	23'858	3401	-58218	-196839	-482167	-932172	-1822055	-2'585'359	-3710958	-5252092	-7/263/307
 At 31 December of year T 	2059534	2191200	2'392'100	2'427'186	2'479741	2525224	2549082	2562,483	2391096	1726562	-62016	-3734281	-10339616	-21204064	-37350705	-60382010	-92'448'462

Table A.2. CSS expenditure and revenue of the IVM programme 1998 – 2050

(1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	362'817	392759	413'498	445'203	463'570	491'007	538'395	585'861	811'092	1'160'497	1715'834	2'566'213	3785658	5'402'343	7'420'512	9'989'348	13'296'121
Current expenditure (1. + 2.)	362'817	392759	413'498	445'203	463'570	491'007	538'395	585'861	811'092	1'160'497	1715'834	2'566'213	3785658	5'402'343	7'420'512	9'989'348	13'296'121
Benefits	362'817	392759	413'498	445'203	463'570	491'007	538'395	585'861	811'092	1'160'497	1715834	2'566'213	3785'658	5'402'343	7'420'512	9'989'348	13'296'121
IVM: Old-age pens.	276'312	297'331	309'668	329'684	340'095	359234	397'349	434'819	599740	860'121	1285246	1953045	2926218	4218'139	5813730	7836661	10'452'242
IVM: Invalidity pens. ■	45708	51958	58'379	66'931	72'016	77'538	83'465	89'836	129'948	188'955	274'316	391'577	544'414	739708	988'661	1305355	1700'815
IVM: Survivors' pens.	28'648	30'150	31/613	34'150	35'972	37'865	39702	41'808	54'691	73'478	100'678	139211	194'472	273'606	384'689	534'692	728'944
IVM: Life annuities (discontinued)	73	64	58	43	36	29	24	19	4	0	0	0	0	0	0	0	0
IVM: Funeral grant	781	844	853	981	1'490	1539	1′598	1'669	2'087	2'592	3'196	3903	4777	5816	71011	8'285	9'534
IVM: Family suppl. for old-age	5'368	5'650	5'919	6'296	6'495	6860	7'588	8304	11'453	16'426	24'544	37/297	55'882	80'554	111025	149'657	199'607
IVM: Family suppl. for inv.	1'447	1644	1'827	1738	1'870	2013	2'167	2333	3'374	4'907	7'123	10'168	14'137	19'208	25673	33'896	44'165
IVM: No-pension refund	4'478	5'116	5178	5377	5'593	5925	6'497	7071	9791	14012	20724	31'004	45749	65'301	89712	120789	160799
IVM: Education subsidy to surv.	2	3	3	3	3	3	3	4	4	5	6	7	8	10	11	12	14
REVENUES	453'278	467'678	522'332	492 534	497'336	522'154	547'837	575'455	736'947	938'011	1'190'191	1554281	2'021'866	2 591 961	3'323'497	4'176'129	5'237'030
Current revenues	320719	335'371	361'968	352737	371744	394 538	418'352	445'403	617'148	855'154	1'169'691	1533781	2'001'366	2'571'461	3'302'997	4'155'629	5'216'530
Contribution income	320719	335'371	361'968	352737	371744	394'538	418352	445'403	617'148	855'154	1'169'691	1533781	2'001'366	2'571'461	3'302'997	4'155'629	5216'530
Regular contributions (ER & EE)	282'226	292759	305'165	304'808	321/564	341'305	361 906	385'316	533'933	739'855	1011988	1326998	1731/554	2224826	2857840	3'595'663	4'513726
Voluntary contributions	800	800	900	899	948	1'007	1067	1'136	1'575	2'182	2'985	3'914	5'107	6'562	8'428	10'604	13312
Contributions on maternity and invalidity benet	1'479	1/598	1642	1758	1912	2000	2'121	2249	3'069	4243	5796	7'592	9'894	12'674	16'176	20'233	25263
Contributions on XIII month salary	34'013	36'617	37'466	37'422	39'479	41903	44'432	47'306	65'552	90'834	124'244	162'919	212'587	273'148	350'864	441'449	554'162
Special regular contributions (V exp.)	2194	3'589	16760	7'833	7'824	8304	8'805	9375	12'990	18'001	24621	32'286	42'128	54'130	69'531	87'482	109'818
Special voluntary contributions (V exp.)	7	8	35	18	18	19	20	21	29	40	55	72	95	122	157	198	249
Other revenues	112'059	111'806	139'864	119/297	105'091	107'117	108'985	109'552	99'299	62'357	0	0	0	0	0	0	0
Financial revenues	112'059	111/806	139'864	119297	105'091	107'117	108'985	109'552	99'299	62357	0	0	0	0	0	0	0
Fiscal transfers	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500
Savings (=Income minus Current expenditure)	90'461	74'919	108'834	47'331	33766	31'148	9'441	-10'406	-74'145	-222'486	-525'643	-1'011'932	-1763791	-2'810'382	4097015	-5'813'219	-8'059'091
- At 31 December of year T	1'522'115	1596700	1704'500	1751831	1785'596	1816744	1'826'185	1815779	1'581'139	816'979	-1'156'025	-5'144'602	-12'333'938	-24198965	-41 977 589	-67'425'616	-102'991'780
Funding ratio (end of year)	3.9	3.9	3.8	3.8	3.6	3.4	3.1	2.9	1.8	0.7	-0.6	-1.9	-3.0	-4.2	-5.3	-6.4	-7.7
PAYG cost rate	12.21%	12.74%	12.87%	13.88%	13.70%	13.67%	14.13%	14.44%	14.43%	14.90%	16.11%	18.37%	20.77%	23.07%	24.67%	26.39%	27.98%
Adjusted PAYG cost rate	6.84%	7.50%	6.91%	8.22%	8.71%	8.86%	9.44%	9.88%	10.60%	11.54%	13.09%	15.27%	17.55%	19.65%	21.12%	22.68%	24.11%
General average premium as of 31 December 21	16.20%																
First year of negative savings	2005																
First year of negative reserve	2018																

(1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	32'115	33'979	44'400	61'988	551093	58'607	62'060	65'971	88725	120'133	161'641	211'654	275'360	353'139	450'325	566'168	709719
Current expenditure (1. + 2.)	32'115	33'979	44'400	61'988	55'093	58'607	62'060	65'971	88725	120'133	161'641	211'654	275'360	353'139	450'325	566'168	709719
Operating expenditure	18'818	19'611	29'000	45'564	37'622	39'956	42'161	44727	59'179	78753	103746	132 285	167'915	210'086	261'619	320'435	392'601
Personnel cost	9'836	10'412	11/362	18'462	19'476	20749	22'100	23'544	32'286	44'277	60'122	78'557	102'125	130'209	165175	205'477	255'560
Non-personnel cost	1963	1525	2674	6235	4'503	4'917	5'111	5'567	7'480	10'408	13'990	18'474	23'908	30742	38'947	48'805	60743
Material & furniture	5'525	6'114	13'262	17770	11/232	11740	12252	12761	15'620	19'005	22'912	26'629	30'842	35'239	40'065	44678	49'817
Current transfers	1335	1'407	1552	2941	2255	2'394	2'542	2'698	3'637	4907	6'566	8'469	10'884	13740	17276	21/319	26'324
Debt servicing	158	153	151	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Benefits	13/298	14'369	15'399	16'424	17'471	18'651	19'899	21/244	29'546	41'380	57'896	79'369	107'445	143'053	188705	245733	317'118
RP: Survivors' pens.	2235	2'291	2'291	2349	2'474	2'605	2731	2876	3762	5054	6'925	9'576	13'377	18'820	26'461	36779	50'140
RP: Pens. partial perm. inv.	3720	3'947	4'332	4767	5129	5'522	5945	6'398	9255	13'458	19'537	27'889	38775	52'684	70'415	92'971	121'137
RP: Pens. absolute perm. inv.	1218	1'282	1'302	1'439	1′548	1'667	1794	1931	2794	4062	5'898	8'419	11705	15'904	21256	28'065	36'567
RP: Temporary subsidy	5'433	6'217	6818	7000	7'372	7'839	8'335	8863	12'043	16'357	21 996	28'452	36,208	46'179	57'943	71'269	87'615
RP: Funeral grant	22	17	11	27	41	42	44	46	57	71	88	107	131	160	193	228	262
RP: No-pension refund	670	616	646	842	906	975	1'050	1'130	1'635	2377	3'451	4'926	6'849	9'306	12'437	16'422	21/396
REVENUES	54773	59'617	62'808	64'419	66'073	70'579	74758	79'444	109'182	150'907	202'006	266'070	344 288	444'183	573'192	726 565	918'867
Current revenues	46'463	50'072	51'831	51'693	55'016	58'959	62'531	66'570	92'241	127'818	174'866	229'301	299'233	384'470	493'900	621'420	780'088
Contribution income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Workmen Compensation premium	46'463	50'072	51831	51'693	55'016	58'959	62'531	66'570	92/241	127/818	174'866	229'301	299'233	384'470	493'900	621'420	780'088
Regular ER premium	45749	49'355	50'203	50'655	53'969	57'844	61'336	65'303	90'490	125'390	171511	224/899	293'463	377'062	484'344	609'390	764'983
Special ER premium (V exp.)	714	717	1629	1037	1'047	1115	1'195	1'267	1751	2'428	3'355	4'403	5771	7'408	9'556	12'030	15'105
Other revenues	8'310	9'545	10'976	12726	11'057	11'620	12'227	12'874	16'941	23'090	27'140	36769	45 055	59714	79'292	105'145	138779
Financial revenues	7/800	9'000	10'500	12251	10'551	11'078	11653	12262	16'093	21915	25'533	34'662	42305	56'180	74752	99'433	131/609
Miscellaneous administration income	510	545	476	475	506	542	575	612	848	1'175	1'607	2107	2750	3'534	4'539	5711	7'170
Fiscal transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Savings (=Income minus Current expenditure)	22'658	25'638	18'408	2'430	10'980	11973	12'698	13'473	20'458	30774	40'364	54'417	68'929	91/044	122'867	160'397	209'148
- At 31 December of year T	141'157	165'600	192'400	194'830	205'810	217783	230'481	243'955	330765	462'389	653798	896'120	1'219'320	1626953	2'174788	2'898'067	3840807
Funding ratio (end of year)	4.4	4.9	4.3	3.1	3.7	3.7	3.7	3.7	3.7	3.8	4.0	4.2	4.4	4.6	4.8	5.1	5.4
PAYG cost rate	1.04%	1.02%	1.31%	1.82%	1.52%	1.50%	1.50%	1.50%	1.46%	1.42%	1.40%	1.40%	1.39%	1.39%	1.38%	1.38%	1.38%
Adjusted PAYG cost rate	0.78%	0.78%	1.04%	1.56%	1.31%	1.31%	1.32%	1.33%	1.33%	1.33%	1.33%	1.34%	1.35%	1.36%	1.35%	1.35%	1.35%
General average premium as of 31 December 2000	1.136%																

Table A.4. CSS expenditure and revenue of the EM programme 1998-2050

(1'000 Balboas)		1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	275	5'416	273'668	295'121	332'311	352'030	375'235	399'643	426'405	586'497	806'495	1'096'489	1'445'981	1'893'395	2'438'086	3'117'218	3'919'246	4'913'607
Current expenditure (1. + 2.)	275	5'416	273'668	295'121	332'311	352'030	375'235	399'643	426'405	586'497	806'495	1'096'489	1'445'981	1'893'395	2'438'086	3'117'218	3'919'246	4'913'607
Operating expenditure	260	0'287	257'230	278'634	314'361	332'305	354726	377'931	403'421	555'202	763'082	1'037'012	1'367'931	1791'455	2'307'061	2'949'291	3708'335	4'649'276
Personnel cost	135	5'481	140'348	151'623	176'457	186'136	198'314	211215	225'028	308'568	423'176	574'602	750'805	976'028	1'244'456	1578616	1963810	2'442'445
Non-personnel cost	33	3'906	24'306	36'135	34'391	35'966	38'619	40'810	43786	59'660	82261	111'470	146'390	190'403	243'954	310'072	387'620	483'514
Material & supply, pharmaceuticals	68	8'471	69'988	64'550	76'164	81/546	87'483	93'823	100'581	141'156	195704	267726	362'844	485'616	641746	837 049	1079672	1'379'406
Current transfers	18	8'373	18'978	20'498	25'276	26'651	28372	30'203	32'150	43'943	60'066	81'339	106'017	137'533	175'030	221679	275'358	342'036
Debt servicing	4	4'056	3'611	5828	2073	2005	1'937	1'881	1'875	1'875	1875	1'875	1'875	1875	1'875	1875	1'875	1875
Benefits	15	5'129	16'437	16'487	17'950	19725	20'510	21713	22'984	31'295	43'413	59'477	78'050	101'940	131'025	167'927	210'911	264'331
CSS Benefits	15	5'129	16'437	16'487	17'950	19725	20'510	21713	22'984	31/295	43'413	59'477	78'050	101'940	131'025	167 927	210'911	264'331
EM: Sickness subsidy	<u> </u>	4'289	4'110	4395	4'500	5045	5245	5'556	5'885	8'042	11'196	15'389	20'252	26'517	34'157	43'860	55'181	69'263
EM: Maternity subsidy	10	0'324	11784	11'543	12750	13'954	14'507	15'367	16'278	22'245	30'968	42'565	56'017	73'347	94'479	121'318	152'630	191'581
EM: Glasses subsidy	6 . 10	516	543	548	700	726	758	790	821	1'008	1'249	1'523	1782	2075	2388	2749	3'099	3'488
REVENUES	294	4'603	304'815	337'017	347'262	359'908	378'424	401'884	427'851	585 218	806'313	1'106'759	1'478'971	1'973'434	2'597'947	3'381'369	4'314'774	5'486'359
Current revenues	287	7759	300 555	326'374	321721	338'479	359'121	382'411	408'256	565'617	787'079	1'088'429	1'455'865	1'939'412	2'540'533	3'307'154	4'220'090	5'366'005
Contribution income	287	7759	300'555	326'374	321721	338'479	359'121	382'411	408'256	565'617	787'079	1088'429	1'455'865	1939/412	2'540'533	3'307'154	4'220'090	5'366'005
Regular contributions (ER & EE)	252	2'518	261'942	273'042	273'584	288'623	306/343	324/833	345'845	479'237	664'065	908'322	1'191'062	1'554'177	1996918	2'565'087	3227328	4'051'346
Contributions from beneficiaries	32	2'559	34'661	37'399	40'266	41'928	44'409	48'695	52'988	73'359	104'961	155'189	232'102	342'395	488'616	671'150	903'489	1'202'570
Voluntary contributions		698	710	792	793	837	888	942	1'003	1'390	1926	2'634	3'454	4'507	5792	7'439	9'360	11750
Special regular contributions (V exp.)	1	1'978	3236	15'109	7'061	7'075	7'464	7923	8'401	11'604	16'091	22'234	29'181	38'248	49'098	63'337	79735	100'115
Special voluntary contributions (V exp.)		6	7	32	16	16	17	18	19	26	36	50	65	85	109	141	178	223
Other revenues	9	9710	9'941	18'486	25'541	21'429	19'303	19'474	19'595	19'601	19'233	18'331	23'106	34'022	57'414	74'215	94'684	120'354
Financial revenues	7	7'645	7'623	16094	23'183	18948	16671	16'671	16'603	15'456	13'465	10'354	12'437	19'809	38795	49'978	63756	81028
Miscellaneous administration income	2	2'066	2318	2392	2358	2'481	2632	2'803	2'992	4'145	5768	7'977	10'670	14213	18619	24'237	30'928	39'326
Fiscal transfers	-2	2'867	-5'682	-7'843	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Savings (=Income minus Current expenditure)	19	9'187	31'147	41'896	14'951	7'878	3'189	2241	1'446	-1'279	-182	10'271	32'990	80'039	159'861	264'151	395'528	572752
USE of Savings (INVESTMENT expenditure)	8	8'812	17'178	13277	30'326	45'844	3'181	3'373	3'576	4788	6'407	8'484	10'801	13673	114'914	206/593	326'509	482'361
BALANCE	10	0'375	13'969	28620	-15'376	-37'966	8	-1'131	-2'129	-6'067	-6'589	1787	22'189	66'366	44'948	57'558	69'020	90'392
- At 31 December of year T	293	3'942	313'800	364'100	368'128	364962	357 201	348726	339711	289'955	244 299	237 971	310'534	550'316	1066913	1958294	3290750	5'177'601
Liquid reserves end of year				135'000	119'624	81658	81'666	80'534	78'405	55'340	21632	12'672	74741	310'426	711'020	972'196	1'289'927	1695211
Minimum reserve (25% of total exp.)				68'417	73780	83'078	88,008	93'809	99'911	137'628	189'088	259'429	342'040	449'980	579'533	744'335	936'053	1'174'426
Funding ratio (end of year)		1.1	1.1	1.1	1.0	1.0	0.9	0.8	0.7	0.5	0.3	0.2	0.2	0.3	0.4	0.6	0.8	1.0
PAYG cost rate	9.	.27%	8.88%	9.19%	10.32%	10.37%	10.41%	10.46%	10.48%	10.40%	10.32%	10.26%	10.32%	10.36%	10.38%	10.33%	10.32%	10.31%
Adjusted PAYG cost rate	7.	.68%	7.34%	7.89%	8.74%	8.89%	8.97%	9.00%	9.02%	9.05%	9.01%	8.92%	8.80%	8.65%	8.48%	8.30%	8.15%	8.00%

 Table A.5. CSS expenditure and revenue of the Administration programme 1998-2050

(1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	32'890	32'563	37'843	45'267	47'026	50'076	52'115	55'408	74'407	100'947	135'233	175'556	226'299	287'328	362'452	449'595	557'007
Current expenditure (1. + 2.)	32'890	32'563	37'843	45'267	47'026	50'076	52'115	55'408	74'407	100'947	135'233	175'556	226'299	287'328	362'452	449'595	557'007
Operating expenditure	32'890	32'563	37'843	45'267	47'026	50'076	52'115	55'408	74'407	100'947	135 233	175'556	226'299	287'328	362'452	449'595	557'007
Personnel cost	23'224	22'664	26'614	29'145	30734	32730	34846	37'110	50'800	69'571	94'366	123'214	160'081	204'015	258701	321734	400'050
Non-personnel cost	3783	4'181	4755	6740	6820	7'478	7'660	8377	10'920	15'032	19'837	26'073	33'389	42'828	53'899	67'457	83'591
Material & furniture	925	913	1'145	2398	2'483	2'596	2709	2'821	3'453	4'202	5'066	5'888	6819	7791	8'858	9878	11014
Current transfers	3'985	3876	4'421	5'997	6'100	6'413	6746	7'100	9234	12'141	15'964	20'381	26'010	32'693	40'994	50'525	62351
Debt servicing	932	902	880	919	889	858	154	0	0	0	0	0	0	0	0	0	0
Global designations	41	28	27	68	0	0	0	0	0	0	0	0	0	0	0	0	0
Benefits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REVENUES	48'336	51'610	51'997	47765	46'958	49'249	51'592	54'295	71'155	94'002	128'074	167'909	219'068	281'445	361'494	454796	570'891
Current revenues	5'183	5'584	5'678	4723	4'882	5'175	5'481	5'830	8'039	11'101	15'148	19'832	25'848	33'183	42'596	53'567	67218
Contribution income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Workmen Compensation premium	5'183	5'584	5'678	4723	4882	5'175	5'481	5'830	8039	11'101	15'148	19832	25'848	33'183	42'596	53'567	67218
Regular ER premium	5'083	5'484	5578	4623	4782	5'075	5381	5730	7'939	11'001	15'048	19732	25748	33'083	42'496	53'467	67'118
Special ER premium (V exp.)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Other revenues	16'457	16743	15761	17715	15'881	16'271	16'629	17'078	19'622	22'634	30'492	39'984	52'173	67'036	86'109	108'341	136'003
Financial revenues	3848	3'860	4'458	8'347	6'192	5'987	5725	5'468	3'534	341	0	0	0	0	0	0	0
Miscellaneous administration income	12610	12'883	11/303	9368	9689	10'284	10905	111510	16'088	22293	30'492	39'984	52'173	67/036	86'109	108/341	136'003
Fiscal transfers	26'695	29'284	30'558	25'327	26'195	27'803	29'481	31'388	43'494	60'267	82'434	108'093	141'047	181 226	232789	292'889	367'670
Savings (=Income minus Current expenditure)	15'446	19'047	14'154	2'498	-68	-826	-523	-1'112	-3252	-6'945	-7'158	-7647	-7'232	-5'882	-959	5'202	13'884
- At 31 December of year T	102/321	115'100	131'100	133'598	133'531	132704	132'181	131'069	119'202	92'402	56'100	18871	-18'489	-51'481	-67'317	-54'209	-3273

General average premium as of 31 December 2000 0.13%

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 Table A.6. CSS expenditure and revenue of the IVM programme for the indexation case 1998-2050

<u>(</u> 1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	362'817	392759	413'498	445'203	470'683	498 591	544'971	599'130	913'336	1'349'511	2'024'340	3'047'734	4'520'259	6'499'141	9'012'059	12'227'057	16'358'366
Current expenditure (1. + 2.)	362'817	392759	413'498	445'203	470'683	498 591	544'971	599'130	913'336	1'349'511	2'024'340	3'047'734	4'520'259	6'499'141	9'012'059	12'227'057	16'358'366
Operating expenditure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benefits	362'817	392759	413'498	445'203	470'683	498 591	544'971	599'130	913'336	1'349'511	2'024'340	3'047'734	4 520 259	6'499'141	9'012'059	12'227'057	16'358'366
IVM: Old-age pens.	276312	297'331	309'668	329'684	345'265	362'978	398'045	439736	676'568	999'841	1'510'154	2'302793	3'463'181	5028532	7'000'099	9511432	12746'109
IVM: Invalidity pens.	45708	51 958	58379	66'931	73396	80'420	87 977	96'112	147'153	221799	329'294	477'183	671'000	919777	1'237'431	1642042	2'149'064
IVM: Survivors' pens.	28'648	30'150	31/613	34'150	36'310	38'577	40'852	43'464	59751	84'120	119842	170'651	243'094	346'519	492719	693'131	956'559
IVM: Life annuities (discontinued)	73	64	58	43	36	29	24	19	4	0	0	0	0	0	0	0	0
IVM: Funeral grant	781	844	853	981	1'493	1546	1'607	1673	2'086	2'593	3'196	3'901	4775	5814	7'011	8285	9'534
IVM: Family suppl. for old-age	5'368	5'650	5919	6'296	6'594	6'932	7'601	8398	12'920	19'094	28'840	43'977	66'137	96'030	133'681	181'641	243'413
IVM: Family suppl. for inv.	1'447	1'644	1827	1738	1906	2'088	2'285	2'496	3'821	5759	8'551	12'391	17'424	23'884	32'132	42'639	55'805
IVM: No-pension refund	4'478	5'116	5'178	5377	5679	6'016	6'577	7231	11'028	16'299	24'457	36'831	54'639	78'575	108'975	147'875	197'868
IVM: Education subsidy to surv. 🍼	2	3	3	3	3	3	3	4	4	5	6	7	8	10	11	12	14
REVENUES	453'278	467'678	522'332	492'429	497'959	523'695	550'389	577'471	719'987	875'621	1'190'140	1554215	2'021'780	2'591'850	3'323'355	4'175'950	5'236'805
Current revenues	320719	335'371	361'968	352'633	372'374	396'474	421'662	448'418	617'260	855'121	1'169'640	1533715	2'001'280	2'571'350	3'302'855	4'155'450	5'216'305
Contribution income	320719	335'371	361 968	352'633	372'374	396'474	421'662	448'418	617'260	855'121	1'169'640	1533715	2'001'280	2571350	3'302'855	4'155'450	5'216'305
Regular contributions (ER & EE)	282226	292759	305'165	304715	322'126	343'004	364'800	387 954	534'054	739'858	1011988	1'326'998	1731554	2224826	2857840	3'595'663	4513726
Contributions from beneficiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Voluntary contributions	800	800	900	899	950	1012	1076	1'144	1575	2'182	2'985	3'914	5'107	6'562	8'428	10'604	13312
Contributions on maternity and invalidity benef	1'479	1'598	1642	1758	1912	2'000	2'121	2249	3'069	4243	5796	7'592	9'894	12674	16'176	20/233	25'263
Contributions on XIII month salary	34'013	36'617	37'466	37'411	39'548	42'111	44787	47'630	65'567	90'834	124'244	162'919	212'587	273'148	350'864	441'449	554'162
Special regular contributions (V exp.)	2'194	3'589	16760	7'833	7821	8'328	8'857	9'420	12'967	17964	24/571	32'219	42'042	54019	69'388	87/303	109'593
Special voluntary contributions (V exp.)	7	8	35	18	18	19	20	21	29	40	55	72	95	122	157	198	249
Workmen Compensation premium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other revenues	112'059	111'806	139'864	119'297	105'085	106721	108'227	108 552	82'226	0	0	0	0	0	0	0	0
Financial revenues	112'059	111'806	139'864	119'297	105'085	106721	108'227	108'552	82'226	0	0	0	0	0	0	0	0
Miscellaneous administration income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fiscal transfers	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500
Savings (=Income minus Current expenditure)	90'461	74'919	108'834	47'226	27'277	25'104	5'418	-21'660	-193'349	473'890	-834'199	-1'493'520	-2'498'479	-3'907'291	-5'688'704	-8'051'107	-11'121'562
- At 31 December of year T	1'522'115	1'596700	1704'500	1751726	1779003	1804107	1'809'525	1787865	1'177'334	-5661055	-3'920762	-9'944'866	-20/263/609	-36'839791	-61'530'683	-96'810'359	-145'961'035
Funding ratio (end of year)	3.9	3.9	3.8	3.7	3.6	3.3	3.0	2.7	1.2	-0.4	-1.8	-3.0	-4.2	-5.3	-6.4	-7.5	-8.9
PAYG cost rate	12.21%	12.74%	12.87%	13.88%	13.88%	13.81%	14.19%	14.67%	16.25%	17.33%	19.00%	21.82%	24.80%	27.75%	29.96%	32.30%	34.43%
Adjusted PAYG cost rate	6.84%	7.50%	6.91%	8.22%	8.87%	9.00%	9.51%	10.09%	12.18%	13.65%	15.61%	18.27%	21.05%	23.72%	25.72%	27.82%	29.71%
General average premium as of 31 December 20	19.35%																
First year of negative savings	2005																
First year of negative reserve	2014																

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Table A.7. CSS (IVM, RP, EM and Administration) expenditure and revenue 1998-2050 in percentage of GDP

		1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE		7.5%	7.7%	7.9%	8.5%	8.3%	8.3%	8.4%	8.5%	8.5%	8.6%	9.0%	9.7%	10.5%	11.2%	11.8%	12.4%	13.0%
Current expenditure (1. + 2.)		7.5%	7.7%	7.9%	8.5%	8.3%	8.3%	8.4%	8.5%	8.5%	8.6%	9.0%	9.7%	10.5%	11.2%	11.8%	12.4%	13.0%
Operating expenditure		3.3%	3.2%	3.5%	3.9%	3.8%	3.8%	3.8%	3.8%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%
Personnel cost		1.8%	1.8%	1.9%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Non-personnel cost		0.4%	0.3%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Material & furniture		0.8%	0.8%	0.8%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	1.0%
Current transfers		0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Debt servicing		0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Global designations		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Benefits		4.2%	4.4%	4.5%	4.6%	4.5%	4.5%	4.6%	4.7%	4.7%	4.9%	5.3%	6.0%	6.8%	7.5%	8.1%	8.7%	9.2%
IVM: Old-age pens.		3.0%	3.1%	3.1%	3.2%	3.1%	3.1%	3.2%	3.3%	3.3%	3.4%	3.7%	4.3%	5.0%	5.6%	6.0%	6.5%	7.0%
lVM: Invalidity pens.	100	0.5%	0.5%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.8%	0.9%	0.9%	1.0%	1.0%	1.1%	1.1%
IVM: Survivors' pens.		0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.5%
RP: Survivors' pens.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RP: Pens. partial perm. inv.	<u>_</u>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: Pens. absolute perm. inv.	. . .	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Life annuities (discontinued)	٦	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EM: Sickness subsidy		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EM: Maternity subsidy	<u> </u>	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: Temporary subsidy	. . .	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: Funeral grant	•	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Funeral grant		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Family suppl. for old-age	•	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
IVM: Family suppl. for inv.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EM: Glasses subsidy	•	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: No-pension refund	1	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: No-pension refund	•	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Education subsidy to surv.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REVENUES		9.1%	9.2%	9.7%	8.8%	8.8%	8.7%	8.6%	8.5%	8.2%	7.9%	7.6%	7.7%	7.7%	7.8%	7.9%	8.0%	8.1%
Current revenues		7.1%	7.2%	7.5%	6.8%	7.0%	6.9%	6.9%	6.9%	7.0%	7.0%	7.1%	7.2%	7.2%	7.3%	7.4%	7.5%	7.6%
Contribution income		6.5%	6.7%	6.9%	6.3%	6.4%	6.4%	6.4%	6.4%	6.4%	6.5%	6.5%	6.6%	6.7%	6.8%	6.9%	7.0%	7.0%
Workmen Compensation premium		0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Other revenues		1.6%	1.5%	1.9%	1.5%	1.4%	1.3%	1.3%	1.2%	0.8%	0.5%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%
Financial revenues		1.4%	1.4%	1.7%	1.4%	1.3%	1.2%	1.1%	1.1%	0.7%	0.4%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Miscellaneous administration income		0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Fiscal transfers		0.5%	0.5%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Savings (=Income minus Current expenditure)	C.	1.6%	1.6%	1.8%	0.3%	0.5%	0.4%	0.2%	0.0%	-0.3%	-0.8%	-1.4%	-2.1%	-2.7%	-3.4%	-3.9%	-4.4%	-4.8%
- At 31 December of ye	ear T	22.0%	22.9%	23.9%	23.2%	22.5%	21.5%	20.3%	19.1%	13.0%	6.8%	-0.2%	-8.3%	-17.5%	-28.1%	-38.8%	-50.2%	-61.6%

Table A 8	CSS expenditure and	revenue of the IVM	programme 1998	- 2050 in percenta	
Table A.o.	coo expenditure and	revenue or the rviv	programme 1990	- zusu ili percenta	Ige of GDF

		1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE		3.9%	4.1%	4.1%	4.3%	4.2%	4.2%	4.3%	4.4%	4.4%	4.6%	5.0%	5.7%	6.4%	7.1%	7.7%	8.3%	8.9%
Current expenditure (1. + 2.)		3.9%	4.1%	4.1%	4.3%	4.2%	4.2%	4.3%	4.4%	4.4%	4.6%	5.0%	5.7%	6.4%	7.1%	7.7%	8.3%	8.9%
Operating expenditure		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Old-age pens.		3.0%	3.1%	3.1%	3.2%	3.1%	3.1%	3.2%	3.3%	3.3%	3.4%	3.7%	4.3%	5.0%	5.6%	6.0%	6.5%	7.0%
IVM: Invalidity pens. 🎈		0.5%	0.5%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.8%	0.9%	0.9%	1.0%	1.0%	1.1%	1.1%
IVM: Survivors' pens.		0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.5%
IVM: Life annuities (discontinued)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Funeral grant		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: Family suppl. for old-age		0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
IVM: Family suppl. for inv.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IVM: No-pension refund		0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
IVM: Education subsidy to surv.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REVENUES		4.9%	4.9%	5.2%	4.7%	4.5%	4.4%	4.4%	4.3%	4.0%	3.7%	3.4%	3.4%	3.4%	3.4%	3.5%	3.5%	3.5%
Current revenues		3.4%	3.5%	3.6%	3.4%	3.4%	3.4%	3.3%	3.3%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.5%	3.5%
Contribution income		3.4%	3.5%	3.6%	3.4%	3.4%	3.4%	3.3%	3.3%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.5%	3.5%
Workmen Compensation premium		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other revenues		1.2%	1.2%	1.4%	1.1%	1.0%	0.9%	0.9%	0.8%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Financial revenues		1.2%	1.2%	1.4%	1.1%	1.0%	0.9%	0.9%	0.8%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Miscellaneous administration income		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fiscal transfers		0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Savings (=Income minus Current expenditure)		1.0%	0.8%	1.1%	0.5%	0.3%	0.3%	0.1%	-0.1%	-0.4%	-0.9%	-1.5%	-2.2%	-3.0%	-3.7%	4.3%	4.8%	-5.4%
- At 31 December of year T	ſ	16.3%	16.7%	17.0%	16.7%	16.2%	15.4%	14.6%	13.6%	8.6%	3.2%	-3.4%	-11.4%	-20.9%	-32.0%	-43.6%	-56.1%	-68.6%

	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	0.3%	0.4%	0.4%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Current expenditure (1. + 2.)	0.3%	0.4%	0.4%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Operating expenditure	0.2%	0.2%	0.3%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Personnel cost	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Non-personnel cost	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Material & furniture	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Current transfers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Debt servicing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Global designations	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Benefits	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
RP: Survivors' pens.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RP: Pens. partial perm. inv.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: Pens. absolute perm. inv.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RP: Temporary subsidy	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RP: Funeral grant	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RP: No-pension refund	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REVENUES	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Current revenues	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Contribution income	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Workmen Compensation premium	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Other revenues	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Financial revenues	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Miscellaneous administration income	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fiscal transfers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Savings (=Income minus Current expenditure)	0.2%	0.3%	0.2%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
- At 31 December of year T	1.5%	1.7%	1.9%	1.9%	1.9%	1.9%	1.8%	1.8%	1.8%	1.8%	1.9%	2.0%	2.1%	2.2%	2.3%	2.4%	2.6%

 Table A.9. CSS expenditure and revenue of the RP programme 1998-2050 in percentage of GDP

Table A.10.	CSS expenditure and revenue of	the EM programme	1998-2050 in percentage of GDP

	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	2.9%	2.9%	2.9%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.3%	3.3%
Current expenditure (1. + 2.)	2.9%	2.9%	2.9%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.3%	3.3%
Operating expenditure	2.8%	2.7%	2.8%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.1%	3.1%	3.1%	3.1%
Personnel cost	1.4%	1.5%	1.5%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.6%	1.6%	1.6%	1.6%
Non-personnel cost	0.4%	0.3%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Material & supply, pharmaceuticals	0.7%	0.7%	0.6%	0.7%	0.7%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.9%	0.9%	0.9%
Current transfers	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Debt servicing	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Global designations	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Benefits	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
EM: Sickness subsidy	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EM: Maternity subsidy	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
EM: Glasses subsidy	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REVENUES	3.2%	3.2%	3.4%	3.3%	3.3%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.3%	3.3%	3.4%	3.5%	3.6%	3.7%
Current revenues	3.1%	3.1%	3.3%	3.1%	3.1%	3.1%	3.0%	3.1%	3.1%	3.1%	3.2%	3.2%	3.3%	3.4%	3.4%	3.5%	3.6%
Contribution income	3.1%	3.1%	3.3%	3.1%	3.1%	3.1%	3.0%	3.1%	3.1%	3.1%	3.2%	3.2%	3.3%	3.4%	3.4%	3.5%	3.6%
Workmen Compensation premium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other revenues	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Financial revenues	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Miscellaneous administration income	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fiscal transfers	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Savings (=Income minus Current expenditur	0.2%	0.3%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.3%	0.3%	0.4%
- At 31 December of	3.1%	3.3%	3.6%	3.5%	3.3%	3.0%	2.8%	2.5%	1.6%	1.0%	0.7%	0.7%	0.9%	1.4%	2.0%	2.7%	3.4%

	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	0.4%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Operating expenditure	0.4%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Personnel cost	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Non-personnel cost	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Material & furniture	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Current transfers	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Debt servicing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Global designations	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Benefits	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REVENUES	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Current revenues	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Contribution income	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Workmen Compensation premium	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other revenues	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Financial revenues	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Miscellaneous administration income	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Fiscal transfers	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Savings (=Income minus Current expenditure)	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
- At 31 December of year T	1.1%	1.2%	1.3%	1.3%	1.2%	1.1%	1.1%	1.0%	0.6%	0.4%	0.2%	0.0%	0.0%	-0.1%	-0.1%	0.0%	0.0%

Table A.11. CSS expenditure and revenue of the Administration programme 1998-2050 in percentage of GDP

Annex 2

Two technical scenarios

This annex contains sensitivity analyses, which could not be carried out in the main report. More concretely, two additional scenarios address possible amendments in the IVM provisions with a view of keeping the scheme at reasonable cost levels. The first scenario changes some parameters of the pension formula aiming at making it less generous. The second one combines the first with a moderate increase of retirement age for men and women⁴⁹. Under both scenarios the IVM runs into financial imbalances, which, however, are lower than the deficits as calculated in the report. The results underline the need for stepwise moderate future increases of the contribution rate in order to avoid more radical reforms.

The scenarios

The two scenarios presented in this annex are broader than standard sensitivity tests but they are of a technical nature and, thus, do not represent a full new analysis. Both link up with the same general population, economic and labour force frameworks as underlying the main report. The results of the main report are hereafter called "status-quo". All graphs refer to numerical results documented in tables at the end of the annex.

The following table A.2.1 provides and overview of the changes studied in the scenarios.

	Scenario 1	Scenario 2	Transition period				
Number of years of contribution required to retire	Increas 15 (= status-	se from quo) to 20 (*)	No transition;				
Pension formula	"60% +	1.5"(**)	implemented at the				
Number of years for pensionable salary	Increase from 7 (=	Increase from 7 (= status-quo) to 12					
Retirement age	No change	Males 63 / Females 60 (***))				
Additional sensitivity test	s under both scenarios						
Rate of return on the reserve		+/-1%					
Contribution rate		+ 1%					
(*) Contributors with less th between 15 and 20" / 2 (**) Instead of "60% + 1 25" (:	an 20 and at least 15 years 0)*60%. = status-guo)	are awarded a reduced pension	at the amount of ("number				

Table A.2.1.The scenario assumptions

(***) The increase of retirement age is not analysed as a concrete scenario, including the definition of ules for a necessary transition period, but rather as a sensitivity test. This implies, for example, disregarding possible impacts on labour force, economy and the behaviour of the younger covered population. The scenario only reflects the impact of the assumed new pensionable age on retirement behaviour of older covered workers (from 57 to 60 for women and 62 to 63 for men).

⁴⁹ Both scenarios disregard any indexation of pensions in payment, which, as stated in the report, is regarded politically and socially unsustainable in the long run.

Scenario 1

Status-quo demography is maintained in this scenario. Because of the explicit technical character of the scenario calculations we neglect the mistake such introduced by the implicit assumption that the changes in the pension formula don't affect the retirement behaviour of CSS contributors (which, in reality, they would). Graph A.2.1 compares the pension amounts under status-quo and under scenario 1 pension formula as a percentage of pensionable salary. It has to be taken into account that the underlying salary is in scenario 1 calculated on basis of the best 12 out of past 20 years instead of 7 best out of past 15 years.



Graph A.2.1. Relative pension amounts under status-quo and scenario 1 pension formulae by years of credit

Under the new formula newly awarded pensions are lower. The following graph A.2.2 depicts the evolution of the replacement ratios under scenario 1 and compares it to the status-quo.

Graph A.2.2. Development of the replacement ratio under status-quo and scenario 1



The IVM budget under scenario 1 is presented in table A.2.2.

Table A.2.2.	CSS expenditure and revenue for the IVM programme, 1998 - 2050; Scenario 1
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(1'000 Balboas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	362'817	392759	413'498	445'203	460'901	485'309	527'862	569701	758'685	1'049'328	1'518'446	2'246'287	3'298'008	4'696'071	6'442771	8'669'801	11'538'158
Current expenditure	362'817	392759	413'498	445'203	460'901	485'309	527'862	569701	758'685	1'049'328	1 518 446	2'246'287	3'298'008	4 696 071	6'442771	8'669'801	11'538'158
Benefits	362'817	392759	413'498	445'203	460'901	485'309	527'862	569701	758'685	1'049'328	1 518 446	2'246'287	3'298'008	4'696'071	6'442'771	8'669'801	11'538'158
IVM: Old-age pens.	276'312	297'331	309'668	329'684	338'345	3551101	389'288	422'255	559'848	775'575	1'134732	1708106	2'551'216	3673743	5'060'434	6820236	9094831
IVM: Invalidity pens.	45708	51'958	58'379	66'931	71'322	76'387	81/690	87'274	120'958	169'950	241'320	339'824	468'565	633'401	844'488	1'114'290	1'452'610
IVM: Survivors' pens.	28'648	30'150	31613	34'150	35'830	37'628	39'334	41'274	52793	69'312	92'918	125'869	172703	239740	334'377	462'975	630/241
IVM: Life annuities (discontinued)	73	64	58	43	36	29	24	19	4	0	0	0	0	0	0	0	0
IVM: Funeral grant	781	844	853	981	1'490	1539	1'598	1'669	2087	2'592	3'196	3'903	4777	5816	71011	8'285	9534
IVM: Family suppl. for old-age	5'368	5'650	5919	6'296	6'461	6781	7'434	8'064	10'691	14811	21670	32620	48721	70'158	96'639	130'247	173'685
IVM: Family suppl. for inv.	1'447	1644	1827	1738	1852	1984	2'121	2266	3141	4'413	6'266	8824	12'167	16'448	21929	28'935	37720
IVM: No-pension refund	4'478	5'116	5178	5377	5'561	5856	6'370	6875	9157	12'668	18'336	27134	39'850	56756	77'882	104'821	139'525
IVM: Education subsidy to surv.	2	3	3	3	3	3	3	4	4	5	6	7	8	10	-11	12	14
REVENUES	453'278	467'678	522'332	492'534	497'336	522'315	548'348	576'629	748'131	977'528	1'242'026	1554281	2'021'866	2 591 961	3'323'497	4'176'129	5'237'030
Current revenues	320719	335'371	361'968	352737	371744	394 538	418'352	445'403	617'148	855'154	1'169'691	1533781	2'001'366	2 571 461	3'302'997	4'155'629	5'216'530
Contribution income	320719	335'371	361 968	352737	371744	394/538	418'352	445'403	617148	855'154	1'169'691	1533781	2'001'366	2'571'461	3302997	4'155'629	5216'530
Regular contributions (ER & EE)	282'226	292759	305165	304'808	321/564	341'305	361 906	385'316	533933	739'855	1011988	1326998	1731554	2224826	2857840	3'595'663	4513726
Voluntary contributions	800	800	900	899	948	1007	1'067	1'136	1575	2'182	2'985	3914	5'107	6'562	8'428	10'604	13312
Contributions on maternity and invalidity benefits	1'479	1'598	1'642	1758	1912	2000	2'121	2249	3'069	4'243	5796	7'592	9'894	12674	16'176	20'233	25263
Contributions on XIII month salary	34'013	36'617	37'466	37'422	39'479	41'903	44'432	47/306	65'552	90'834	124'244	162'919	212'587	273'148	350'864	441'449	554'162
Special regular contributions (V exp.)	2'194	3'589	16760	7'833	7824	8304	8'805	9375	12'990	18'001	24621	32'286	42'128	54'130	69'531	87'482	109'818
Special voluntary contributions (V exp.)	7	8	35	18	18	19	20	21	29	40	55	72	95	122	157	198	249
Other revenues	112'059	111'806	139'864	119'297	105'091	107'277	109'497	110726	110'483	101'874	51'835	0	0	0	0	0	0
Financial revenues	112/059	111'806	139'864	119'297	105'091	107/277	109'497	110726	110'483	101'874	51 835	0	0	0	0	0	0
Fiscal transfers	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500
Savings (=Income minus Current expenditure)	90'461	74'919	108'834	47'331	36'435	37'006	20'486	6'928	-10'554	-71799	-276'420	-692'006	-1'276'142	-2'104'110	-3'119'274	4'493'672	-6'301'129
- At 31 December of year T	1'522'115	1596700	1704'500	1751831	1788266	1825272	1845758	1852686	1831162	1626'407	760'509	-1831267	-6'937'684	-15729'049	-29184702	-48752'267	-76'449'204
Funding ratio (end of year)	3.88	3.86	3.83	3.80	3.68	3.46	3.24	3.06	2.27	1.44	0.46 -	0.75 -	1.95	• 3.14 -	4.26 -	5.31	
PAYG cost rate	12.21%	12.74%	12.87%	13.88%	13.62%	13.51%	13.86%	14.05%	13.50%	13.47%	14.25%	16.08%	18.09%	20.05%	21.42%	22.91%	24.28%
Adjusted PAYG cost rate	6.81%	7.37%	6.63%	8.22%	8.56%	8.60%	9.03%	9.35%	9.66%	10.30%	11.76%	13.81%	15.59%	17.31%	18.52%	19.82%	21.03%
General average premium as of 31 December 2000	14.26%	- 2011-10-10-10-10-10-10-10-10-10-10-10-10-		0.000.0000							The same in a desire		- 10 - 10 - 19 - 19 - 19 - 19 - 19 - 19				
First year of negative savings	2007																

Table A.2.3 presents the main financial indicators of scenario 1, including the results of two different developments of the rate of return of the reserve and the result of an increase of one percent of the contribution rate.

			Concerct oursers in more in the
	First year of negative savings	First year of negative reserve	General average premium GAP as of 31 December 2000
Status-quo	2005	2018	16.20%
Scenario 1	2007	2022	14.26%
Scenario 1 and rate of return of the reserve + 1% p.a.	2014	2024	13.58%
Scenario 1 and rate of return of the reserve - 1% p.a.	2004	2021	14.91%
Scenario 1 and contribution rate +1% to 10.5%	2020	2028	14.26%

Table A.2.3.	Main financial	indicators	for	scenario	1
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Graph A.2.3 presents the development of the reserve under scenario 1 for the different tests.

Graph A.2.3. Development of the IVM reserve under scenario 1



Scenario 2

Scenario 2 analyses, on top of scenario 1, an increase of the retirement age of one year for men and of three years for women. Again, scenario 2 is calculated in a pure technic al way. This means that the effects of retirement age increases were calculated on the basis of "all else kept constant" (especially general population, labour force and economic frameworks). Also, CSS coverage of the employees is the same as in the status-quo for all ages *except* at ages affected by the new retirement age (i.e for female employees between 57 and 60 and for male employees at the age of 62). As a consequence CSS coverage of employees is in this scenario slightly higher than in the status-quo. Implicitly this assumes higher formal (covered) employment and the implementation of other, adequate policy measures (life-long learning, adequate work places for an elder work force, etc.).

Of course, all necessary model adjustments were undertaken in order to calculate correctly the immediate effects on the CSS budget.

Graphs A.2.4 to 7 reflect the above considerations. Graph A.2.4 presents the development of the number of CSS insured under status-quo (which is the same under scenario 1) and under scenario 2. The small difference exclusively comes from the number of insured who stay longer in employment because of the increase of retirement age. The difference grows over time as the number of insured in these age brackets grows with the maturing of the scheme.





The difference between status-quo and scenario 2 in the number of insured and as a consequence in the number of old-age pensioners is also visualised for the year 2050 in graphs A.2.5 (for men) and A.2.6 (for women) which present the respective numbers of insured and pensioners by age.

Graph A.2.5. Male insured and old-age pensioners under status-quo and scenario 2 in 2050





Graph A.2.6. Female insured and old-age pensioners under status-quo and scenario 2 in 2050

Graph A.2.7 depicts the development of the number of CSS old-age pensioners under status-quo and under scenario 2. Again, the difference is exclusively due to the difference in retirement age; it is inverse to graph A.2.4.





The number of invalidity and survivor's pensions react marginally and are thus not shown.

As for scenario 1, under scenario 2 the new pension formula implies that newly awarded pensions are lower and graph A.2.8 depicts the evolution of the replacement ratios under status-quo and scenario 2.


Graph A.2.8. Development of the replacement ratio under status-quo and scenario 2

The IVM budget under scenario 2 is presented in table A.2.4.

(1'000 Balhoas)	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
TOTAL CURRENT EXPENDITURE	362'817	392759	413'498	445'203	449778	464'830	496718	530'214	677'699	936'893	1363783	2'032'764	3'017'781	4'359'509	6'035'771	8'125'949	10'825'031
Current expenditure	362'817	392759	413'498	445'203	449778	464 830	496718	530'214	677'699	936'893	1363783	2'032'764	31017781	4'359'509	6'035'771	8'125'949	10'825'031
Benefits	362'817	392759	413'498	445'203	449778	464'830	496718	530'214	677'699	936'893	1363783	2'032'764	3'017'781	4'359'509	6'035'771	8'125'949	10'825'031
IVM: Old-age pens.	276'312	297/331	309'668	329'684	327/581	335'290	359'173	384'098	481'167	665'911	983'296	1'498'201	2'274'459	3'339'121	4652984	6'274'171	8377210
IVM: Invalidity pens.	45708	51958	58'379	66'931	71322	76'387	81/690	87'274	121/327	170'829	242'872	342'323	472'321	638733	851687	1123759	1'464'990
IVM: Survivors' pens.	28'648	30'150	31613	34'150	35'815	37'595	39'271	41'169	52'604	69114	92'883	126'306	174'085	242'819	340'168	472'500	644'387
IVM: Life annuities (discontinued)	73	64	58	43	36	29	24	19	4	0	0	0	0	0	0	0	0
IVM: Funeral grant	781	844	853	981	1'487	1'531	1582	1652	2076	2574	3'175	3'876	4748	5788	6'990	8'265	9'511
IVM: Family suppl. for old-age	5'368	5'650	5919	6'296	6256	6'403	6859	7335	9'189	12717	18778	28'611	43'436	63767	88'858	119'818	159'980
IVM: Family suppl. for inv.	1'447	1644	1827	1738	1852	1984	2'121	2'266	3'151	4'436	6'307	8'889	12'265	16'586	22'116	29'181	38'041
IVM: No-pension refund	4'478	5'116	5'178	5377	5'426	5'608	5'993	6'398	8'177	11'307	16'465	24/551	36'460	52'684	72'958	98242	130'898
IVM: Education subsidy to surv.	2	3	3	3	3	3	3	4	4	5	6	7	8	10	11	12	14
REVENUES	453'278	467'678	522'332	492 534	497'336	522'982	550'284	583'134	784'696	1'065'671	1'391'699	1753'326	2'114737	2'682'018	3'444'646	4'340'093	5'454'147
Current revenues	320719	335'371	361'968	352737	371744	394 538	418'352	447'988	627'810	872797	1'198'809	1'579'088	2'067'481	2'661'518	3'424'146	4'319'593	5'433'647
Contribution income	320719	335371	361 968	352737	371744	394/538	418352	447'988	627/810	872797	1'198'809	1'579'088	2'067'481	2'661'518	3'424'146	4'319'593	5'433'647
Regular contributions (ER & EE)	282'226	292759	305'165	304/808	321/564	341/305	361 906	387/563	543'203	755'196	1'037'307	1366392	1789'040	2'303'130	2'963'177	3738227	4702'506
Voluntary contributions	800	800	900	899	948	1'007	1'067	1'143	1602	2'227	3'059	4'030	5'276	6792	8739	11'025	13'869
Contributions on maternity and invalidity benefits	1'479	1'598	1'642	1758	1912	2'000	2'121	2'249	3'069	4'243	5796	7'592	9'894	12'674	16'176	20'233	25263
Contributions on XIII month salary	34'013	36'617	37'466	37'422	39'479	41 903	44'432	47'582	66'690	92717	127/353	167755	219'645	282761	363797	458'952	577'339
Special regular contributions (V exp.)	2'194	3'589	16760	7833	7824	8'304	8'805	9'429	13'216	18'374	25'237	33'244	43'527	56'035	72'094	90'950	114'411
Special voluntary contributions (V exp.)	7	8	35	18	18	19	20	21	29	41	57	75	98	126	163	206	259
Other revenues	112'059	111'806	139'864	119'297	105'091	107'944	111'433	114'646	136'385	172'374	172'390	153738	26756	0	0	0	0
Financial revenues	112'059	111/806	139864	119/297	105/091	107'944	111'433	114'646	136'385	172'374	172'390	153738	26756	0	0	0	0
Fiscal transfers	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500	20'500
Savings (=Income minus Current expenditure)	90'461	74'919	108'834	47'331	47 557	58'152	53'566	52'920	106'997	128778	27'917	-279'439	-903'044	-1'677'491	-2'591'125	3785'856	5'370'885
 At 31 December of year T 	1'522'115	1'596'700	1704'500	1751831	1799388	1857540	1911'106	1964'026	2'380'493	3'002'191	3'476'453	2795'983	-308'334	-7'121'934	-18'171'380	-34'584'649	-58'087'464
Funding ratio (end of year)	3.88	3.86	3.83	3.89	3.87	3.74	3.60	3.51	3.31	2.98	2.36	1.27 -	0.09 -	1.53 -	2.83 -	4.02	-
PAYG cost rate	12.21%	12.74%	12.87%	13.88%	13.29%	12.94%	13.04%	13.00%	11.85%	11.79%	12.49%	14.13%	16.02%	17.98%	19.35%	20.65%	21.87%
Adjusted PAYG cost rate	6.81%	7.37%	6.63%	8.22%	8.28%	8.09%	8.28%	8.37%	7.87%	8.09%	9.28%	11.19%	13.67%	15.52%	16.72%	17.86%	18.93%
General average premium as of 31 December 2000	12.72%	17 - 2010 - 2014			6-00 - 00 - 00 - 00 - 00 - 00 - 00 - 00	1. A 1. OPA					10.000			- (r. 6 % 6*);			
First year of negative savings	2021																
First year of negative reserve	2030																

Table A.2.5 presents the main financial indicators of scenario 2, including the results of two different developments of the rate of return of the reserve and the result of an increase of one percent of the contribution rate.

	First year of negative savings	First year of negative reserve	General average premium GAP as of 31 December 2000
Status-quo	2005	2018	16.20%
Scenario 2	2021	2030	12.72%
Scenario 2 and rate of return of the reserve + 1% p.a.	2023	2032	12.09%
Scenario 2 and rate of return of the reserve - 1% p.a.	2020	2029	13.32%
Scenario 2 and contribution rate + 1% to 10.5%	2026	2036	12.72%

Table A.2.5.	Main financial	indicators f	or scenario 2
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Graph A.2.9 presents the development of the reserve of scenario 2 for the different tests.

Graph A.2.9. Development of the IVM reserve under scenario 2



Comparison of status-quo with scenario 1 and 2

This paragraph briefly compares the three projections.

Graph A.2.10 shows the evolution of the replacement ratios under the three projections and "merges" graphs A.2.2 and A.2.8. The reason why after some time the replacement ratio under scenario 2 becomes higher than under scenario 1 is simply explained by the higher number of credited years of the new retirees due to their higher retirement age.

Graph A.2.10. Replacement ratio under status-quo, scenario 1 and scenario 2



Graph A.2.11 depicts the evolution of the IVM reserve under the three projections and is as well taken from graphs A.2.3 and A.2.9.



Graph A.2.11. Development of the IVM reserve under status-quo, scenario 1 and scenario 2

Finally, graph A.2.12 summarizes all three projections by comparing the respective General Average Premiums (GAPs) and the Pay-as-you-go (PAYG) cost rates.



Graph A.2.12. PAYG cost rates and GAP of the IVM program under status-quo, scenario 1 and scenario 2

Table A.2.6. Values of Graph A.2.1

Years	Old pension formula (1.25%)	New pension formula (1.5%)
15	60.00%	45.00%
16	61.25%	48.00%
17	62.50%	51.00%
18	63.75%	54.00%
19	65.00%	57.00%
20	66.25%	60.00%
21	67.50%	61.50%
22	68.75%	63.00%
23	70.00%	64.50%
24	71.25%	66.00%
25	72.50%	67.50%
26	73.75%	69.00%
27	75.00%	70.50%
28	76.25%	72.00%
29	77.50%	73.50%
30	78.75%	75.00%
31	80.00%	76.50%
32	81.25%	78.00%
33	82.50%	79.50%
34	83.75%	81.00%
35	85.00%	82.50%
36	86.25%	84.00%
37	87.50%	85.50%
38	88.75%	87.00%
39	90.00%	88.50%
40	91.25%	90.00%

Table A.2.7.	Values of	Graph A.2.2
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	Replacement ratio	Replacement ratio
Year	Status quo	scenario 1
	Total	Total
2000	86.4%	86.4%
2001	83.7%	83.5%
2002	81.0%	80.6%
2003	78.7%	77.8%
2004	76.6%	75.1%
2005	74.5%	72.4%
2006	72.5%	69.8%
2007	70.5%	67.4%
2008	68.7%	65.2%
2009	67.2%	63.2%
2010	65.7%	61.3%
2011	64.4%	59.7%
2012	63.3%	58.2%
2013	62.3%	56.9%
2014	61.4%	55.7%
2015	60.7%	54.7%
2016	60.0%	53.8%
2017	59.5%	53.1%
2018	58.9%	52.4%
2019	58.5%	51.8%
2020	58.1%	51.3%
2021	57.7%	50.8%
2022	57.3%	50.4%
2023	57.0%	49.9%
2024	56.6%	49.6%
2025	56.3%	49.2%
2026	55.9%	48.8%
2027	55.5%	48.5%
2028	55.2%	48.1%
2029	54.8%	47.8%
2030	54.5%	47.5%
2031	54.2%	47.3%
2032	53.9%	47.0%
2033	53.6%	46.7%
2034	53.3%	46.4%
2035	52.9%	46.1%
2036	52.6%	45.8%
2037	52.3%	45.5%
2038	51.9%	45.2%
2039	51.6%	44.9%
2040	51.3%	44.6%
2041	51.0%	44.4%
2042	50.7%	44.1%
2043	50.4%	43.8%
2044	50.1%	43.6%
2045	49.9%	43.4%
2046	49.6%	43.2%
2047	49.4% 40.0%	43.U%
∠048 2040	49.2% 40.0%	42.8%
2049	49.U%	42.1%
2000	40.970	42.370

Years	Scenario 1	Decrease of 1% in the	Increase of 1% in the	Increase of 1% in the
		return rate of the reserve	return rate of the reserve	contribution rate
1990	1'197'579	1'197'579	1'197'579	1'197'579
1991	1'081'086	1'081'086	1'081'086	1'081'086
1992	1'121'755	1'121'755	1'121'755	1'121'755
1993	1'136'154	1'136'154	1'136'154	1'136'154
1994	1'171'771	1'171'771	1'171'771	1'171'771
1995	1'329'006	1'329'006	1'329'006	1'329'006
1996	1'366'591	1'366'591	1'366'591	1'366'591
1997	1'433'584	1'433'584	1'433'584	1'433'584
1998	1'522'115	1'522'115	1'522'115	1'522'115
1999	1'596'700	1'596'700	1'596'700	1'596'700
2000	1'704'500	1'704'500	1'704'500	1'704'500
2001	1'751'831	1'734'786	1'768'876	1'787'950
2002	1'788'266	1'752'850	1'824'022	1'865'481
2003	1'825'272	1'770'203	1'881'413	1'948'439
2004	1'845'758	1'769'684	1'924'081	2'020'127
2005	1'852'686	1'754'352	1'954'949	2'084'164
2006	1'853'417	1'731'640	1'981'364	2'148'510
2007	1'851'583	1'705'184	2'007'019	2'217'455
2008	1'847'980	1'675'747	2'032'811	2'292'473
2009	1'841'715	1'642'393	2'057'962	2'373'395
2010	1'831'162	1'603'458	2'080'961	2'459'376
2011	1'814'077	1'556'679	2'099'671	2'548'988
2012	1'788'226	1'499'820	2'111'949	2'640'886
2013	1'750'769	1'430'064	2'115'032	2'733'204
2014	1'698'206	1'343'961	2'105'471	2'823'498
2015	1626407	1/237/471	2079 158	2'908'773
2016	1530000	1105358	2030703	2'984'830
2017	1403756	942'586	1954802	3'047'771
2018	1241666	743'405	1'845'317	3'093'015
2019	1030929	102/127	1 695 246	3115299
2020	112'520	193137	1400000	2062/994
2021	-15'163	-104 137	702'727	2 902 004
2022	-536'822	-1'155'160	318'623	2'560'602
2020	-1'139'261	-1'757'599	-264'701	2'238'360
2024	-1'831'267	-2'449'605	-956'707	1'818'899
2020	-2'621'154	-3'239'492	-1'746'595	1'289'514
2027	-3'517'008	-4'135'346	-2'642'449	637'118
2028	-4'527'488	-5'145'827	-3'652'929	-152'564
2029	-5'661'542	-6'279'880	-4'786'983	-1'087'137
2030	-6'937'684	-7'556'022	-6'063'125	-2'153'651
2031	-8'364'727	-8'983'065	-7'490'168	-3'360'369
2032	-9'950'153	-10'568'491	-9'075'593	-4'714'191
2033	-11'701'131	-12'319'470	-10'826'572	-6'221'666
2034	-13'624'940	-14'243'278	-12'750'380	-7'889'405
2035	-15'729'049	-16'347'388	-14'854'490	-9'724'169
2036	-18'018'855	-18'637'193	-17'144'296	-11'730'597
2037	-20'499'574	-21'117'912	-19'625'015	-13'913'109
2038	-23'178'842	-23'797'180	-22'304'282	-16'278'521
2039	-26'065'428	-26'683'767	-25'190'869	-18'834'778
2040	-29'184'702	-29'803'041	-28'310'143	-21'608'071
2041	-32'549'271	-33'167'609	-31'674'711	-24'610'316
2042	-36'173'094	-36'791'432	-35'298'535	-27'854'743
2043	-40'070'936	-40'689'274	-39'196'377	-31'355'355
2044	-44'258'594	-44'876'933	-43'384'035	-35'127'158
2045	-48'752'267	-49'370'605	-47'877'708	-39'185'526
2046	-53'569'148	-54'187'486	-52'694'589	-43'546'797
2047	-58'727'847	-59'346'185	-57'853'287	-48'228'690
2048	-64'247'537	-64'865'875	-63'372'978	-53'249'424
2049	-70'148'075	-70'766'413	-69'273'516	-58'627'817
2050	-76'449'204	-77'067'542	-75'574'644	-64'382'497

Table A.2.8. Values of Graph A.2.3

	Number of CSS insured under	Number of CSS insured under
Years	Status quo & Scenario 1	Scenario 2
2000	661'269	661'269
2001	668'116	668'116
2002	678'230	678'230
2003	692'451	692'451
2004	705'274	705'274
2005	719'752	723'814
2006	735'449	742'708
2007	752'357	762'203
2008	769'972	781'450
2009	788'147	800'805
2010	805'659	819'277
2011	823'271	837'745
2012	841'101	856'433
2013	859'320	875'538
2014	877'925	895'104
2015	896'913	915'121
2016	915'723	935'011
2017	935'084	955'539
2018	954'836	976'517
2019	974'977	997'945
2020	986'578	1'010'879
2021	997'705	1'023'324
2022	1'008'881	1'035'803
2023	1'020'106	1'048'291
2024	1'031'407	1'060'830
2025	1'042'810	1'073'450
2026	1'054'335	1'086'166
2027	1'065'994	1'098'989
2028	1'077'852	1'111'980
2029	1'089'992	1'125'219
2030	1'098'820	1'135'107
2031	1'107'894	1'145'163
2032	1'117'234	1'155'396
2033	1'126'872	1'165'833
2034	1'136'846	1'176'531
2035	1'147'183	1'187'544
2036	1'157'898	1'198'933
2037	1'168'985	1'210'734
2038	1'180'356	1'222'888
2039	1'191'859	1'235'262
2040	1'197'692	1'242'058
2041	1'203'394	1'248'742
2042	1'208'993	1'255'316
2043	1'214'491	1'261'756
2044	1'219'888	1'268'076
2045	1'225'179	1'274'270
2046	1'230'358	1'280'328
2047	1'235'424	1'286'244
2048	1'240'442	1'292'078
2049	1'245'510	1'297'924
2050	1'250'697	1'303'844

Table A.2.9. Values of Graph A.2.4

Table A.2.10. Values of Graph A.2.5

- de	insured ret age 63	insured ret age 62	pensioner ret age 63	pensioner ret age 62
17	3664	3664	0	0
18	5029	5029	0	0
19	6395	6395	Û	0
20	7780	7760	0	0
21	9125	91.25	0	0
22	10/01	10491	0	ő
22	14.027	44.077	0	0
23	11077	11077	0	
24	11064	11004	U	U
25	12251	12251	0	0
26	12838	12838	0	0
Z7	13425	13425	0	0
28	14108	14108	U	0
28	14792	14792	п	0
30	15475	15475	n	ñ
34	10413	16460		ő
21	10100	10100	0	
32	16841	16841	U	0
33	16891	16891	0	0
34	16921	16921	0	0
35	16961	16961	0	0
36	17001	17001	0	0
37	17041	17041	0.	0
00	17054	17154	0	0
38	11204	11204		U O
39	17467	17467	Ц	U
40	17680	17680	0	0
11	17893	17893	0	0
42	18108	18106	0	0
43	17999	17999	0	0
14	17897	17803	п	ñ
	11002	11002	0	0
3	11/05	11765	0	0
15	17678	17678	0	0
7	17571	17571	Ū	0
B	17630	17630	U	0
19	17689	17689	0	0
in l	17748	17748	П	0
	17807	17807	0	õ
S	17007	47007		Č.
2	11867	11867	u	<u> </u>
53	17058	17058	0	0
54	16248	16248	0	0
55	15439	15439	0	0
58	14630	14630	0	0
57	13821	13821	n	0
50	12142	12142	0	n n
5.0	10243	10243	0	0
28	12000	1,2000	U	0
60	12080	12088	0	0
31	11510	11 51 0	0	0
32	11248	5681	0	3971
33	5546	2801	3826	9103
54	2732	1380	8743	10801
5	1345	679	10424	11457
	640	224	110424	41672
-	002	334	11040	11575
27	326	165	11147	11425
βB	160	81	11 042	11198
59	79	40	10792	10887
0			10488	10543
1	×	× - -	10143	10178
5	10 C	10	9776	6910
5			0170	0010
4		12	9451	9490
4			91.21	9153
5			8759	8791
6	(A)	(A)	8385	8418
7	(A)	10 A	81 21	8152
8		12 C	7634	7664
9			74.20	7148
0	10	i i i i i i i i i i i i i i i i i i i	8677	6201
0			00/1	6001
51		3	6044	6066
52	8	8	5524	5545
33	12	2	4932	4950
34		14. I	4358	4375
5	-	-	3611	3825
5			3385	3319
T			2810	1961
er in	12	13	2030	2001
0		•	2380	2400
59	0.	12	1981	1990
30	13	19	1614	1621
91	62 	<u></u>	1297	1303
32			1025	1030
12	10	10	910	91.6
5			610	004
14			626	829
15	×		473	475
		100 C	350	352
10			254	265
36)7			2.34	
97 98 98	÷.	3	181	182
35 37 38 39			181	182

Table A.2.11. Values of Graph A.2.6

Age insured ret age 60 insured ret age 57 pensioner ret age 60 pensioner ret age 57

	contractions are investigated as the last set as being the formation to be	standing and a standard sector in the standard sector and the standard sector and the standard sector and the st	and the second	
17	2758	2758	0	0
40	-	20000		
1B	36/36	36/38	U	U U
10	E121	E121	n	1
10/	0121	0121		0
20	6302	6302	0	0
24	7400	7400	Ô.	0
- 21	/ 463	7483	0	U
.22	8664	B664	0	0
	0.474	D.1714		2
23	94/1	9471	U	U U
74	-100019	107729		п
- 29	10210	10270	0	u u
25	11085	11085	п	Π
			1	
25	11892	11892	0	0
27	12099	10000	0	0
- 41	12000	12000	0	0
28	13012	13012	0	0
	10000	10000		
29	13325	13325	U.	U U
30	13538	13539	п	0
~~	10000	10000	, e	~
- 31	13961	13951	0	0
77	0.47670	147077		
- 52	14203	14,203	0	0
33	14764	14764	0	n i
00	14104	14104		0
34	15264	16264	0	0
25	15705	45205		
- 20	10100	101.62		u
36	16265	16265	0	0
	10000	100000	-	
57	16765	16765	U	U.
38	16805	16905	п	п
	100000	100000		0
39	16845	16845	0	0
	10004	10004	0	0
40	16664	16634	u u	u
41	16924	16924	0	0
12	10001	1000.1		2
42	16264	102904	U	U.
13	16090	16090	P	n
42	10300	10000	0	u
44	16995	16995	0	0
15	17011	17044	0	n
45	1/011	1/011	U	U
46	17027	17027	0	ñ
40	TT OLET	TTOET	0	0
47	17043	17043	0	0
20	10000	10000		
40	102009	100903	u u	u
65	16934	16934	п	0
	10004	10004		-
50	16880	16880	0	0
E1	10000	10070		
<01	100.20	100.20		0
52	16771	16771	0	0
	100000	10111		
53	16338	16338	u	U U
54	16905	15905	0	n
-14	10000	13303		
55	15472	15472	0	0
ET.	10000	100000		
00	10039	10033	0	
57	14727	7438	n	4096
	11110	0000		4000
58	14412	36/6	0	9697
CD	12001	3101	Ŭ.	12420
- 20	14001	0.01		12420
80	8960	895	3955	1352B
		772		478770
61	3423	441	9450	1.3920
52	1684	217	11778	139/R
02	1004	411	10.42	10040
63	828	107	12707	13751
P4	100	CD	12070	10,000
04	400	DE	12300	13432
65	199	26	12890	13143
	200	20	100.10	10000
- 00	96	13	12642	12//2
87	48	6	12928	12304
LF	40		12320	12134
68	23	3	11978	12011
		0.20	110000	44557
69	11		11569	1160/
70		20208	11200	11212
7.4			100010	11616
1	-	10-04	10842	10852
72			10527	10637
. 74			inclui	10237
73		-	10252	10262
74			DODA	10004
74		110701	5551	10001
75	-	-	9739	9748
75	8	12223	DACO	0.000
76		1.7.1	5460	9:469
77			9135	9143
22		127.00	0100	0110
7B			B/47	8/96
70		1000	8260	8769
12	•	0.50	U2DU	0400
60	-	10-01	771B	7725
D-3			7174	7101
D1	50		/1/4	(181)
B2			6630	6639
00		100	20076	2000
63	- 2	- : - : -	60/2	60/8
P4		0.00	5471	5070
-				Jana
65			4673	4878
pe		12.54	4904	1200
00		12761	4004	EDC+
B7			3764	3757
		11111		and t
88	•		3235	3239
pg	100	100	27:29	2722
00			61 67	2132
90		0.001	2254	2256
04		1210	1000	1001
91			1832	1834
60	10	10.00	1.457	1,400
242	-		1407	1-03
93		10-01	1153	1154
24			STT	970
84	50	0.50	5/7	8/8
- 96	20 I		642	643
00	8		100	100
56	 C 	- : - : - :	460	460
97		10201	319	319
				0.0412
			212	
96	-	-	209	209
98		-	209	209
96 99			209 79	209 79

Table A.2.12. Values of Graph A.2.7

	Number of old age	Number of old age
Year	pension under	pension under
	Status quo & Scenario 1	Scenario 2
2000	74'272	74'272
2001	75324	74'330
2002	77'972	75'494
2003	83'598	78'980
2004	91'201	84'296
2005	98'347	89737
2006	103'969	93'888
2007	109'007	97'231
2008	113938	100'340
2009	119011	103'615
2010	124336	107'493
2011	129931	111825
2012	135768	116/563
2013	141878	121679
2010	148317	127127
2014	155198	132/867
2010	162244	132'007
2010	162244	145247
2017	177674	140.247
2010	196011	151555
2013	10/776	100071
2020	194770	100001
2021	204032	174102
2022	213021	102400
2023	224113	191244
2024	234927	200534
2025	246210	210,300
2026	257 865	220544
2027	269829	231 204
2028	282097	242216
2029	294643	253527
2030	30/415	265106
2031	320268	2/6953
2032	333062	288.967
2033	345746	301004
2034	358'303	312993
2035	370720	3248/2
2036	382840	336'586
2037	394644	347 969
2038	406259	358'965
2039	417'681	369'650
2040	428'893	380'044
2041	439958	390'186
2042	450'943	400'141
2043	461'855	409'968
2044	472'679	419'683
2045	483'365	429/295
2046	493'915	438'803
2047	504'357	448'241
2048	514'690	457/621
2049	524'924	466'925
2050	535'031	476'161

Table A.2.13. Values of Graph A.2.8

Replacement ratio		Replacement ratio		
Years	Status quo	Scenario 2		
2000	86.37%	86.37%		
2001	83.66%	83.50%		
2002	81.00%	80.58%		
2003	78.68%	77.73%		
2004	76.63%	74.94%		
2005	74.54%	72.14%		
2006	72.47%	69.48%		
2007	70.51%	66.98%		
2008	68.73%	64.73%		
2009	67 16%	62 75%		
2010	65 69%	60.93%		
2011	64 40%	59.34%		
2012	63.27%	57 95%		
2012	62.28%	56 75%		
2013	61 42%	55 71%		
2014	60.67%	53.7170 54.91%		
2010	CO 029/	54.01%		
2010	50 459/	54.05%		
2017	59.45%	53.39%		
2010	50.94%	52.64%		
2019	50.47%	52.36%		
2020	58.06%	51.98%		
2021	57.68%	51.64%		
2022	57.31%	51.34%		
2023	56.96%	51.06%		
2024	56.61%	50.78%		
2025	56.26%	50.51%		
2026	55.91%	50.24%		
2027	55.54%	49.96%		
2028	55.17%	49.66%		
2029	54.81%	49.36%		
2030	54.52%	49.13%		
2031	54.22%	48.89%		
2032	53.91%	48.64%		
2033	53.60%	48.38%		
2034	53.28%	48.11%		
2035	52.95%	47.83%		
2036	52.61%	47.54%		
2037	52.27%	47.24%		
2038	51.93%	46.93%		
2039	51.59%	46.62%		
2040	51.27%	46.32%		
2041	50.96%	46.02%		
2042	50.66%	45.73%		
2043	50.38%	45.46%		
2044	50.11%	45.20%		
2045	49.86%	44.96%		
2046	49.62%	44.74%		
2047	49.41%	44.54%		
2048	49.21%	44.35%		
2049	49.03%	44,18%		
2050	48.85%	44.02%		

Table A.2.14.	Values of Graph A.2.9	

Years	Scenario 2	Decrease of 1% in the	Increase of 1% in the	Increase of 1% in the
		return rate of the reserve	return rate of the reserve	contribution rate
1990	1'197'579	1'197'579	1'197'579	1'197'579
1991	1081086	1'081'086	1081086	1081086
1992	1121755	1'121755	1'121755	1'121755
1993	1'136'154	1'136'154	1'136'154	1'136'154
1994	1171771	1'171771	1'171771	1'171771
1995	1329006	1329006	1'329'006	1329006
1996	1366'591	1366'591	1366/591	1366'591
1997	1'433'584	1'433'584	1'433'584	1/433/584
1998	1522'115	1'522'115	1'522'115	1'522'115
1999	1596700	1596700	1596700	1596700
2000	1704500	1704500	1704/500	1704500
2001	1751831	1734786	1768876	1787950
2002	1799388	1763973	1'835'144	1876603
2003	1857'540	1802360	1913793	1980707
2004	1911106	1834593	1989871	21185476
2005	19641726	1864576	2067/415	2195775
2006	2023/151	1899190	2153/416	2319139
2007	2023131	1943137	2753745	2/10/052
2008	2177153	1998/200	2368875	2'624'168
2000	2/77/100	2063825	2500073	2808848
2005	2273430	2003023	2500400	3013723
2010	2300403	2137 000	20401021	3013723
2011	2430003	2201222	2003320	3/20/ 4/3
2012	2010000	2300333	2372434	2727270
2013	2744030	2304737	01000010	4011254
2014	2073413	2400103	3534043	4011334
2010	24171217	2047 572	3024 443	4233024
2010	27/6/570	2020000	20079402	4000031
2017	3240329	2002903	3 907 042	4912144 5001744
2010	3334300	2730702	4030049	5231744
2013	21470100	2709079	4273343	5000017
2020	3476455	2720409	4 303 003	60510490 6051000
2021	3397595	2040011	4 401 130	6755959
2022	3070443	2014049	4450032	6/20000
2023	3075/2143	2010010	4404371	6/539/015
2024	27050221	1701186	4072027	6/508/135
2025	2733303	1701100	201033	6/599/310
2020	1038786	701386	3572020	6300515
2027	1334553	28782	3085451	6317006
2020	594710	777444	2003131	6037/200
2023	2004710	1706042	1/2/07/0	5500500
2030	1971441	-1700343	1003J40 60935	50000000
2031	2/576/141	-2703730	468076	100000
2032	20211/160	5374703	1972593	3255462
2000	-5351400	-5550070	-1023303	3333402 3750460
2034	7101034	-0043033	-5556566	2230433 QG11/01
2000	9070010	10/20/044	-5014057	501401
2000	10002550	-10300323	-0.002.442	-000010
2037	103333550	-12392139	-0000073	-2.204710
2000	15500050	10070000	-11007101	-4141004 6403060
2039	10471000	-105/0000	-13472370	0103300
2040	-10171300	-19509909	-16063503	-0410309
2041	-209//5/0	-223/01/9	-1008092	10040054
2042	-24009265	-25 407 874	-21901387	-13464521
2043	-27 278550	-20677160	-251/06/3	-16341246
2044	-30798793	-32 197 402	-20090915	-19429360
2045	-34584649	-35983258	-32'4/6'//1	-22762652
2046	-30651762	-40050371	-36543884	-20/355/664
2047	43017319	-44/415/928	-40909/441	-30/225/249
2048	-47 699510	-491098120	-45591633	-34/38/ 998
2049	-52716579	-54115188	-50'608702	-368612/3
2050	-00007/464	-594860/3	-55,87,8587	-43662854

Table A.2.15.	Values of Grap	h A.2.10
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1	Repalcement ratio	Replacement ratio	Replacement ratio
Years	Status quo	Scenario 1	Scenario 2
2000	86.37%	86.37%	86.37%
2001	83.66%	83.50%	83.50%
2002	81.00%	80.58%	80.58%
2003	78.68%	77.78%	77.73%
2004	76.63%	75.07%	74.94%
2005	74.54%	72.38%	72.14%
2006	72.47%	69.81%	69.48%
2007	70.51%	67.38%	66.98%
2008	68.73%	65.16%	64,73%
2009	67 16%	63.17%	62.75%
2010	65.69%	61.32%	60.93%
2011	64 40%	59.66%	59.34%
2012	63.27%	58.18%	57.95%
2012	62.28%	56.87%	56 75%
2013	61 42%	55,72%	55.71%
2014	60.67%	54.71%	54.81%
2015	60.03%	53.84%	54.05%
2010	EQ 15%	53.04%	52 20%
2017	55.4070 E0 0407	50.07 %	50.05%
2010	50.3470 E0.470/	52.3370 E1 700/	52.0470
2019	50.47 %	51.70%	52.30%
2020	50.00%	51.20%	51.90%
2021	57.58%	50.79%	51.64%
2022	57.31%	50.35%	51.34%
2023	56.96%	49.95%	51.06%
2024	55.51%	49.57%	50.78%
2025	55.25%	49.20%	50.51%
2026	55.91%	48.85%	50.24%
2027	55.54%	48.49%	49.96%
2028	55.17%	48.14%	49.66%
2029	54.81%	47.80%	49.36%
2030	54.52%	47.53%	49.13%
2031	54.22%	47.26%	48.89%
2032	53.91%	46.98%	48.64%
2033	53.60%	46.70%	48.38%
2034	53.28%	46.41%	48.11%
2035	52.95%	46.12%	47.83%
2036	52.61%	45.82%	47.54%
2037	52.27%	45.51%	47.24%
2038	51.93%	45.21%	46.93%
2039	51.59%	44.91%	46.62%
2040	51.27%	44.63%	46.32%
2041	50.96%	44.35%	46.02%
2042	50.66%	44.09%	45.73%
2043	50.38%	43.84%	45.46%
2044	50.11%	43.61%	45.20%
2045	49.86%	43.39%	44.96%
2046	49.62%	43.19%	44.74%
2047	49.41%	43.00%	44.54%
2048	49.21%	42.82%	44.35%
2049	49.03%	42.66%	44.18%
2050	48.85%	42.51%	44.02%

Table A.2.16. Values of Graph A.2.11

Years	Status quo	Scenario 1	Scenario 2
1990	1'197'579	1'197'579	1'197'579
1991	1 081 086	1 081 086	1'081'086
1992	1'121755	1121755	1121755
1993	1'136'154	1'136'154	1'136'154
1994	1'171771	1'171771	1'171771
1995	1 329 006	1'329'006	1'329'006
1996	1'366'591	1'366'591	1'366'591
1997	1'433'584	1'433'584	1'433'584
1998	1'522'115	1'522'115	1'522'115
1999	1'596700	1596700	1'596700
2000	1704'500	1704'500	1704'500
2001	1751831	1751831	1751831
2002	1785'596	1788'266	1799388
2003	1816744	1825272	1'857'540
2004	1'826'185	1845758	1911'106
2005	1815779	1852686	1964026
2006	1792'290	1'853'417	2'023'151
2007	1758'262	1 851 583	2'093'631
2008	1713'289	1 847 980	2'177'153
2009	1655284	1841715	2'273'496
2010	1581139	1'831'162	2'380'493
2011	1 486 905	1814077	2'496'003
2012	1'368'502	1788'226	2'618'066
2013	1'221'197	1750769	2744'593
2014	1'039'465	1698/206	2'873'413
2015	816979	1 626 407	3'002'191
2016	545'996	1 530 000	3'127'627
2017	218737	1'403756	3'246'529
2018	-173'578	1 241 666	3'354'986
2019	-630'381	1036929	3'448'536
2020	-1'156'025	760'509	3'476'453
2021	-1759'695	413'529	3'462'401
2022	-2'450'572	-15'163	3'397'585
2023	-3'238'176	-536'822	3'272'143
2024	-4'132'670	-1'139'261	3'075'421
2025	-5'144'602	-1'831'267	2795'983
2026	-6'284'074	-2'621'154	2'421'461
2027	-7'561'015	-3'517'008	1'938786
2028	-8'986'042	-4'527'488	1'334'553
2029	-10'570'146	-5'661'542	594710
2030	-12'333'938	-6'937'684	-308'334
2031	-14'288'285	-8'364727	-1'371'141
2032	-16'442'685	-9'950'153	-2'576'153
2033	-18'806'339	-11701'131	-3'931'460
2034	-21'388'584	-13'624'940	-5'444'444
2035	-24'198'965	-15729'049	-7'121'934
2036	-27'244'924	-18'018'855	-8970319
2037	-30'533'751	-20'499'574	-10'993'550
2038	-34'075'261	-23'178'842	-13'195'058
2039	-37'880'573	-26'065'428	-15'580'256
2040	-41'977'589	-29'184702	-18'171'380
2041	-46'381718	-32'549'271	-20'977'570
2042	-51'109'997	-36'173'094	-24'009'265
2043	-56'180'466	-40070936	-27'278'550
2044	-61'612'397	-44'258'594	-30798793
2045	-67'425'616	-48752'267	-34'584'649
2046	-73'641'162	-53'569'148	-38651762
2047	-80'281726	-58727'847	-43'017'319
2048	-87'370780	-64'247'537	-47'699'510
2049	-94932689	-70'148'075	-52716'579
2050	-102'991'780	-76'449'204	-58'087'464

Years	Status quo	Scenario 1	Scenario 2
2000	6.6%	6.6%	6.6%
2001	8.2%	8.2%	8.2%
2002	8.7%	8.6%	8.3%
2003	8.9%	8.6%	8.1%
2004	9.4%	9.0%	8.3%
2005	9.9%	9.4%	8.4%
2006	10.1%	9.5%	8.3%
2007	10.2%	9.5%	8.2%
2008	10.4%	96%	8.0%
2009	10.5%	96%	7.9%
2010	10.6%	97%	7.9%
2011	10.8%	97%	7.9%
2012	10.9%	9.9%	7.9%
2013	11.1%	10.0%	7.9%
2013	11.3%	10.0%	8.0%
2014	11.5%	10.1%	8.1%
2015	11.5%	10.5%	8.7%
2010	12.0%	10.5%	8.4%
2017	10.3%	11.0%	9.5%
2010	12.370	11.0%	0.5%
2013	12.070	11.0%	0.7 %
2020	13.170	11.0%	9.3%
2021	13.370	12.270	9.0%
2022	13.9%	12.0%	10.0%
2023	14.470	13.1%	10.3%
2024	14.0%	13.5%	10.0%
2025	15.3%	13.0%	11.2%
2026	15.7 %	14.2%	11.6%
2027	16.2%	14.5%	12.1%
2028	16.6%	14.8%	12.6%
2029	17.0%	15.2%	13.1%
2030	17.5%	15.6%	13.7%
2031	18.0%	16.0%	14.2%
2032	18.5%	16.3%	14.5%
2033	18.9%	16.7%	14.9%
2034	19.3%	17.0%	15.2%
2035	19.6%	17.3%	15.5%
2036	20.0%	17.6%	15.8%
2037	20.3%	17.8%	16.1%
2038	20.5%	18.0%	16.3%
2039	20.8%	18.2%	16.5%
2040	21.1%	18.5%	16.7%
2041	21.4%	18.8%	17.0%
2042	21.8%	19.1%	17.2%
2043	22.1%	19.3%	17.4%
2044	22.4%	19.6%	17.6%
2045	22.7%	19.8%	17.9%
2046	23.0%	20.1%	18.1%
2047	23.3%	20.3%	18.3%
2048	23.6%	20.6%	18.5%
2049	23.8%	20.8%	18.7%
2050	24.1%	21.0%	18.9%

Table A.2.17. Values of Graph A.2.12