FINAL REPORT

Executive Team

Prague 2005

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Forward

This report is the final outcome of the Executive Team, which was created by the Czech Government in the autumn of 2004. The task was to prepare professional materials relating to the pension system reform based on the specifications of political parties represented in the Chamber of Deputies of the Parliament of the Czech Republic.

The delegates from the political parties created an Expert Team that has been looking into the issue of pension reform since the spring of 2004 based on an agreement between the heads of political parties. Currently, each political party has appointed one or two representatives for the Working Group who have been closely cooperating with us, i.e. the Executive Team. A mandate of nine months has been established to finish our work, with a final deadline of 30 June 2005. The work has been divided into several phases.

Initially, we worked on the preliminary assumptions necessary for the pension models – i.e. a demographic forecast and a long-term macroeconomic scenario. After several rounds of debate, agreement was reached on these initial assumptions and on the work to be carried out by the Expert Team, which has created equal conditions for the subsequent calculation of the reform proposals.

Prior to actually creating the models, the criteria for assessing the specific reform proposals needed to be determined. Even here, agreement was reached with the Executive Team's proposal. In this proposal, we emphasised the fact that equal attention should be paid to overall financial and social sustainability as well as to the effects on the individual participants in the pension system. In addition, it was agreed with the Expert Team that we would model only the mandatory part of the pension system and not the voluntary components of old-age security.

Following this, the actual work on modelling and analysing the pension system could start. We first concentrated on the existing pension system, and its future outlook if the current legislation were not changed (the baseline scenario or the current system with no policy change) and the possibilities of adjusting various parameters of this system. The first analyses were completed and published before the end of 2004.

Development of a model apparatus necessary for analysing the proposals presented by the political parties was, in many aspects, pioneer work – at least as far as the Czech professional public is concerned. In an extraordinarily short period of only two months, the basic models had been developed and adjusted, which allowed us to make the first round of calculations for the political party proposals at the end of February/beginning of March 2005. The representatives of the political parties were then given the opportunity to make additional adjustments to their proposals. The second round of calculations occurred in mid-April. The third and final round of proposal analysis was completed in mid-May.

From the beginning, we have stressed the importance of making all our activities as transparent and open as possible towards the public. The detailed assumptions of our calculations, the preliminary results, and all other information were made available to the public on our website (www.reformaduchodu.cz). We have presented the results at various workshops and conferences as well as via the media. Detailed information on our activities was distributed each month in the form of a Progress Report. We have communicated with the public by way of our web pages and special email boxes.

An integral part of this Final Report is the attached CD-ROM containing the full version of all documents. The transparency of the whole process, the web pages, and the CD-ROM made it possible for us to offer a printed version of the Final Report that is not merely a duplicate

summary of already processed material but an independent, supporting document that presents the results of nine months of work on the proposals.

The Final Report is an apolitical, professional document presenting the observations, comments and opinions of the Executive Team on the issue of pension reform in the Czech Republic. The Executive Team, not the political party representatives, is responsible for the content of the report. If the Executive Team is not the author of a certain part of the Final Report, this is clearly marked in the text.

The first section of the report contains a structured summary of the specific proposals and outlines the main conclusions that we have reached during the analyses. Section 2 attempts to compare the results of the proposals. In the last part, Section 3, we attempted to get a more universal picture of the results and to extract as much information and knowledge as possible from the various analyses. These, along with some general comments and observations, became the basis for formulating the opinions and recommendations for the pension reform in the Czech Republic.

The report also includes an annex containing the opinions of independent experts. We asked these experts to make a technical and professional assessment of the Executive Team's work. A special annex in the printed version of the Final Report was reserved for the representatives of the political parties (and an unlimited amount of space on the CD-ROM) to provide their comments on the subject. Finally, as already mentioned, there is a CD-ROM attached to the report containing all the relevant documents that have been created during the Executive Team's existence.

Finally, we would like to thank all of those who have made it possible for us to carry out an independent professional analysis of various reform proposals within the Czech pension reform process. This relates in particular to the Czech Government, which, through its resolutions, has made our work as the Executive Team possible. This includes the Ministry of Finance, the Ministry of Labour and Social Affairs and the Czech National Bank, who have allowed some of their expert employees to join the Executive Team. The Executive Team could not have functioned without the friendly approach and comprehensive administrative and technical support of the Office of the Government of the Czech Republic. We are also indebted to the National Property Fund which provided us with office space and technical equipment. We would also like to thank the representatives of the political parties in the Expert Team and the Working Group for their invaluable cooperation. Moreover, we cannot forget the public, whose constructive comments and careful monitoring of our results increased the quality of our work and helped us not to lose faith in the purpose of our task. A special thanks goes to the authors of the demographic forecast, Mr Burcin and Mr Kučera, from the Faculty of Science at Charles University in Prague, whose support and long-term cooperation have substantially increased the quality of our materials. We are especially indebted to the Czech Social Security Authority which has supported us to the maximum extent in providing data resources. We would also like to thank the independent evaluators (Mr Marek, Mr Schneider and Mr Vostatek) and a number of other experts from the academic sphere, central administrative offices and the private sector that we had the opportunity to consult on a regular basis relating to a number of professional circumstances. We are especially grateful for the help we received during the Executive Team's preliminary work from Mr Hochmeister and Mr Lisický. The largest of thanks goes out to my colleagues from the Executive Team who accepted the offer to work on this project, despite it being a step into the unknown with no clear perspective. They have done a wonderful job, and this Final Report could not have been possible without them.

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Executive Summary

Introduction

This Final Report contains the final output and results of the Executive Team. The opinions and comments contained in it are those of the Executive Team, if not stipulated otherwise in the text. During the entire period of its existence, the Executive Team has carried out its activities in an unbiased and professional fashion. This manner of conduct has been carefully preserved during formulation and creation of the Final Report as well. The aim of this report is to contribute to the ongoing debate, to point out certain neglected areas or inaccurate interpretations and to promote a comprehensive discussion on the specific issues at hand. We believe that the reader will understand and welcome this motive. In the interest of creating a constructive debate on pension issues, we ask anyone who reads this report to accept the conclusions and assertions within the context of the report and not to misconstrue, embellish or otherwise undermine the information presented therein.

Chapter 1 : Summary of political parties proposals

The first chapter of the Report summarises the specifications and main results of the different pension reform proposals. A detailed description of the proposals, a description of the macroeconomic and demographic assumptions used[1] and other related documents are included on the CD-ROM, which is an integral part of this Report. The transparency of information, as presented on the web pages and the CD-ROM, allows us to go above and beyond a "narrow" investigation of the specific proposals. Therefore, the additional parts are a step beyond the analyses made by the Executive Team.

Chapter 2 : Comparison of the proposals

Second chapter of the Report is based on detailed analyses that are available on the CD-ROM with the goal of comparing the specific proposals. It clearly demonstrates that there is always a trade-off or *quid pro quo* in a pension system.

Chapter 3 : Conclusions based on the analyses

Another objective of the Final Report is to make a more general comparison of various forms of pension systems (Section 3.1). Certain conclusions presented in Section 3.2 were taken from this comparison and the analyses of the strong and weak points, along with notes relating to the analyses. The Executive Team formed its opinions and views in Section 3.3 based on these notes.

In comparing the various forms of pension systems, we have tried to emphasise the following aspects:

There are differences between the pay-as-you-go (PAYG) and fully funded (FF) pension systems. While the benefits of PAYG depend on demographic development, the benefits of the FF system are given by the conditions on the financial markets, the level and manner of regulation and the administrative costs. The PAYG and FF systems also differ from the standpoint of risk sensitivity. A combination of both methods of financing, though, could lower the overall risks of the pension system.

[1] The macroeconomic framework for the baseline scenario is also summarised in detail in the annex to this Final Report. In other annexes to the Report, there are the comments and opinions of the political parties, the statements of independent evaluators on the Executive Team's work and the government resolutions on the basis of which the entire process of preparing the materials has taken place.

Pension systems are also differentiated by defined contribution (DC) or defined benefit (DB). The DC system seems to be more risky for individuals than the DB system. Uncertainties in the DC system, however, are mostly overrated, whereas in the DB system, they are usually underrated. In its pure form, the DC system adequately accounts for a later retirement age, because the additional premium is fully reflected in a higher pension. With the DB system, this actuarial neutrality cannot be reached in practice. The DB and DC systems also differ in their reaction to life expectancy growth. While the reaction in the DC system is automatic, the reaction in the DB system depends on a political decision, and this usually leads to the creation of intergenerational inequality. The DC and DB systems also differ from the standpoint of the level of income solidarity of the pension system. Through solidarity, the DB system protects the most threatened population groups. However, there is a risk of negative effects on the labour market. On the other hand, the DC system is fully earnings related. It does not complicate the situation on the labour market, however, a part of the population could be exposed to poverty in old age.

An important aspect of the pension system is intergenerational solidarity. In a PAYG DB system, the existence of intergenerational solidarity is normally assumed, though it may not always be true. However in reality, most PAYG DB systems really do contain intergenerational solidarity, because their basic parameters are the subject of a political process. Therefore, when there is a large generation in its productive years, sufficient reserve funds are usually not created that would help finance the pensions of future population-strong pensioners. The return for specific generations from the pension system, therefore, is not stabilised in time. A population-strong generation could be "taxed" even twice during its lifetime with an intergenerational burden – first when it pays the premium which has not been put aside in the reserve funds, partially or at all, and a second time when this generation retires and the system does not have sufficient funds for paying their pension (in economically productive years, it is a weaker generation, and reserve funds do not exist or are insufficient). The system's equilibrium in such a situation is many times reached by reducing the pension rights of the population-strong generation of pensioners.

In fully funded systems, the institutional environment plays an important role. The quality of a fully funded system and the overall diversification of its risks depend on the manner and level of regulation of the industry. Moreover, the effectiveness of an FF system is significantly influenced by administrative costs. In practice, optimistic examples of how to limit administrative costs can be found. On the other hand, however, these costs cannot be reduced below a certain minimal level.

Based on these notions, the Executive Team has formulated several general conclusions:

An ideal pension system does not exist. The advantages of PAYG financing as opposed to FF financing are balanced out by the disadvantages of PAYG in contrast to FF in other areas. Similar limitations exist between the DB and DC pension systems. Therefore, there is no "free ride" and there is always a trade-off of some sort in a pension system and its reform. In addition, a higher pension cannot be assessed without considering the risks that the pension system faces. The current pension system offers relatively high pensions, which over the long run, lacks sufficient resources. In general, today's system is undiversified, vulnerable and risky for citizens as well as the government.

Although an ideal system does not exist, the overall risks may be reduced. With respect to the differences in financing (PAYG vs FF) and the character of pension systems (DC vs DB), it is evident that there is space for diversifying the risks of the pension system. Diversification increases the security of insured persons. This is achieved at the cost of lower, though over time, more stable pension system revenues.

The basic assumption of pension reform is long-term strategic decision-making that must be carried out on a political basis. The political dimension of decision-making should secure the stability of a strategic goal over time. Setting the strategy requires a sufficiently long planning horizon, because the pension system must be sustainable over the long run. Otherwise, citizens do not get the quality and credible information that they need for their own economic decision-making. However, adopting a strategic goal does not mean that the pension system will be rigid. A flexible system against changing internal conditions can be attained by way of appropriate tactics when meeting the strategic goals. The strategic goal must also include the method for resolving the current problems relating to the third pillar of the pension system.

Educating the public is a condition for successfully implementing the reform. This strengthens the credibility of the strategic goals and, as a final outcome, even the long-term standard of living for citizens. An unreliable strategy for the pension system is not any better than the complete absence of strategic goals. The quality of information available to the public is an essential condition, especially for reforms that count on the increasing importance of providing private pension for elderly citizens.

During the work that it has carried out, the Executive Team has been led by certain principles that are important for interpreting the results of the analyses. Emphasis was put on the projection of a pension system over the long-term horizon, a common macroeconomic scenario for all proposals, the assumption of successful economic convergence, and an analysis of the long-term trends in the development of relevant variables.

Pension reform requires a sufficiently long projection horizon. The Executive Team has opted for a projection period of 2100. The pension system projection must fully cover the present generation, which requires a projection period that significantly exceeds the year 2080. A pension reform projection must also test the stability of the pension system across several future generations. Another reason for having a sufficiently long horizon for the projection is the expected unfavourable demographic development. This should culminate around 2050. After this year, the situation should improve slightly and stabilise. It is essential to monitor how the pension system handles this situation over the long run. An insufficient projection period could prevent certain problems from showing up in the analysis.

The macroeconomic scenario used for calculating the pension reform assumes successful real convergence. Macroeconomic assumptions could affect the appearance of pension systems. We assume that labour productivity in the Czech Republic will successfully converge to the European level, however, this cannot be guaranteed for the Czech economy. Overall, macroeconomic assumptions that are more favourable for the PAYG pension system have been accepted. Sensitivity analyses of the existing pension system to a change in the conditions in the macroeconomic scenario and to the various levels of the net migration balance have been carried out. However, not even the relatively significant changes in secondary parameters can change the outcome of the substantial future growth of expenditures for the current system as a result of an ageing population.

Long-term projection techniques were used for the pension system modelling. Long-term projections are important for the pension system that filter out cyclical factors and concentrate only on the long-term trends in the development of relevant variables. The quality of long-term projections cannot be assessed by measuring their performance over a very short period of time.

The independent analyses of the Executive Team cannot be made without accepting a number of simplified assumptions. The most important of these are as follows:

The analyses deal only with the mandatory component of the pension system. The aim of the analyses was not to describe voluntary old-age security. The Executive Team would not have

the means or the resources to expand on the analysis, and therefore, the Executive Team and the Expert Team have agreed to limit the scope of the analysis prior to starting the study.

The calculations filter out the secondary effects of pension reform. The secondary effects of pension reform on the macroeconomic scenario were not considered from a quantitative standpoint, with the exception of the effects of increasing the retirement age. Setting the level of the secondary effects is a subjective matter. In certain cases, it is not even completely clear in theory which direction they will take. The Expert Team agreed in this matter as well.

Assessment of the proposals does not include the wider socio-economic effects. The Executive Team was not capable of undertaking such an analytic scope. At the economic level, the pension system's link between public budgets and the impact on the labour market is significant. This link could be affected by the definition of pension contributions and the size of the tax burden for labour. Not accounting for the secondary effects and the absence of wider socio-economic links visually improve the proposals that rely on increasing the premium rate or the tax burden or on a shift in the pension system deficits to other segments of the public budgets.

We have worked on an analysis of the existing pension system, the possibilities of making various parametric reforms and the pension reform proposals submitted by the political parties. The established technical apparatus has generated a range of valuable information over time, and the analyses have resulted in the following conclusions of the Executive Team:

The current system must be substantially reformed.

The current pension system is not sustainable over the long run, and this will cause the already high deficits to escalate significantly. It also maintains a high level and volume of income redistribution, which could be problematic from the standpoint of the labour market. The pension system needs to be radically reformed, and it is not just a question of adjusting the parameters.

Although the system will attain a surplus in the short run, this does mean that it is sustainable or stabilised. There is a substantial time delay in the pension system, and for this reason, the adoption of reform measures must prevent the actual onset of the problems. The projected surplus is a result of the recent increase in premium rates that, nonetheless, does not reduce the risks of the pension system for the public budgets. In addition, the surpluses of the pension system are conditioned by the government's discretion in valorising pensions. Last but not least, the projected surpluses are not sufficient for attaining intergenerational equality.

The reform must also take non-old-age pensions into consideration. These represent about 30% of the expenses for the entire pension system. If disability pension is higher than old-age pension, it could increase the demand for disability pension. In this case, the expenses for non-old-age pensions would rise excessively, and the stability of the pension system could be threatened. On the other hand, lowering the relative amount of disability pensions in relation to old-age pensions could be intolerable from a social standpoint and could increase pressure on replenishing the insufficient incomes of disabled persons from other parts of the public budgets.

The PAYG pillar will remain a dominant part of the mandatory pension system. The Czech pension system is "mature", i.e. the population is or will be in the near future relatively old. The system also covers, in principle, 100% of the population. The end result of these factors is the existence of significant implicit obligations for the PAYG system. These internal obligations of the system reduce the degree of freedom during reform. The proposals of all political parties count on the fact that the dominant (or even exclusive) component of the mandatory pension system will continue to be the PAYG state pension pillar.

Increasing the revenues of the pension system is not a solution.

In the interest of maintaining the stability of the pension system's performance, the tax burden may be increased or a part of the existing taxes may be redirected to the pension system. Use of the existing taxes, however, causes a deficit in another part of the state budget. Increasing taxes restricts the disposable income of active generations (and consequently future pensioners).

In addition, the present level of pension expenditures (and revenue for the pension system) is not low in comparison with the EU. The expenses for pensions in the Czech Republic have reached 8% of GDP. In the EU, this level is around 11%. If we account for the differ conditions (low share of employee compensation in Czech GDP compared to the EU; differences in the taxation of pensions in the Czech Republic and the EU; and the fact that the Czech population is currently younger than the EU population), these various expenditure levels are already comparable today.

The reform should focus on the expenditure side, particularly by increasing the retirement age.

The issue of rising life expectancy can be resolved by increasing the retirement age. A constant and gradual increase in the retirement age can increase the sustainability of the DB and DC pension systems. In DB systems, a higher retirement age helps to improve the financial situation of the system and to increase the pension of individual pensioners. In a DC system, a later retirement age increases paid annuity. The current retirement age is not sustainable over the long run. Even a relatively "sharp" increase in the retirement age does not reduce the average period for receiving old-age pension. An increase in the retirement age is a necessary condition for any pension reform.

When increasing the retirement age, however, it is necessary to have a functioning labour market. An effective labour market can increase the level of participation of economically active generations, which is particularly important for elderly persons. Even a relatively sharp increase in the retirement age does not prevent a long-term decline in the size of the overall work force. An increase in the retirement age is only a temporary measure for offsetting unfavourable demographic factors. For an increase in the retirement age to have a real impact, it is essential to improve the functioning of the labour market and to increase the likelihood of engaging older people on the labour market.

Solidarity in the state system will clearly remain high. An increase in pensions for higher-income citizens would cause deficits in the pension system or a relative decline in pensions for persons with below-average incomes. The system can be financially balanced with the help of parametric changes. However, if the increase in the retirement age is not significantly accelerated, the parametric measures stabilising the state system will end up preserving the level of income solidarity in the state system or even increasing it further. Reducing the level of state system solidarity would expose a part of the pensioners to the risk of poverty.

On the basis of the analysis and knowledge attained, the Executive Team has formulated the opinions presented below.

Decision-making on the strategy of the pension system must be made by politicians. In a pension system, influences and interests always behave in a contradictory fashion. An ideal pension reform does not exist. Maintaining the stability of the pension system in unfavourable demographic conditions always requires some sort of "scapegoat", and in the end, political decision-making must determine its form, size, and timing.

Key questions to answer:

- How will long-term financial sustainability of the mandatory pension system be secured?
- Can the financing of the mandatory pension system be diversified? And if so, how?
- What will income solidarity look like in the mandatory pension system?
- Should intergenerational inequality be reconciled in the mandatory pension system? And if so, how?

In finding the answers to these questions, the existing state of the current pension system should be accounted for and the trends that emerge in the upcoming years should be considered. It is important to realise that these questions create an integral whole and it is not possible to take up these issues separately, in and of themselves. An answer to one of them could aid significantly in answering the other questions.

A universal response does not exist for these questions. This is evident in the current pension reform proposals presented by the political parties. For example, the NDC proposal ensures financial sustainability through a relative decrease in the replacement rate as a result of changing over to the DC system. It does not diversify the financing of the mandatory pension system, and it continues to rely on the PAYG principle. Changing over to a DC system significantly reduces income solidarity and improves intergenerational equality. In comparison, the flat rate pension proposal attains financial sustainability by increasing the retirement age and by decreasing the replacement rate. It does not diversify the financing of the mandatory system, which remains PAYG. It brings a maximum level of income solidarity to the mandatory pension system, however, it reduces its volume by a decline in the required contribution rate. It significantly improves the intergenerational equality of the mandatory pension system, especially due to an increase in the retirement age.

There are relatively few important questions, but there may be a multitude of answers. The opinion of the Executive Team is only one of the possible elements in this wide spectrum of information.

According to the Executive Team, an in-depth reform of the current pension system is needed to achieve long-term financial sustainability. Continuing to increase the retirement age and restraint in valorising the payment of pensions are important factors. In respect to reducing the risks of the mandatory pension system, it is beneficial to diversify the financing of its obligations by introducing a fully funded contribution-based pillar. Income solidarity in the entire mandatory pension system should be reduced from its currently high values. Introducing a DC pillar to the mandatory pension system will be a catalyst in this direction. In the state pension pillar itself, we assume that income solidarity will still tend to increase in order to prevent old-age poverty in the risky age categories. The DC pillar also strengthens the intergenerational equality of the mandatory pension system. The FDC pillar will, of course, gives rise to a transitional deficit, and this must be taken into account when setting the concrete reform parameters.

During preparation of the pension reform, we recommend informing the public in a thorough and open manner. The conditions for the pension reform also depend on successful economic policy and the existence of a flexible labour market. The pension reform strategy should also include measures to improve the system of supplementary pension insurance and life insurance.

We recommend carrying out professional analyses that would complement the activities of the Executive Team and that would provide information on legislative continuity for the chosen pension reform proposal(s), their regulatory demands, the impact on the overall economic and social environment, etc.

1 Summary of Proposals

In this chapter, the proposals of pension reform and their outcomes are briefly described as they were presented by the representatives of the political parties in the Expert Team at the end of April 2005. A more detailed description and results are available on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz. At the end of each proposal description, the fundamental macroeconomic and microeconomic indicators are given in a table.

We start the discussion with a description of the baseline scenario, i.e. development of the current pension system if no reform steps were taken. This involves a projection of the pension system given the assumption that no legislative changes are made and that the government would maintain only the minimal required pension valorisation. Next the specific proposals of the political parties are described. These are working versions and do not necessarily represent the final position of a particular political party, and they could be developed further in the future.

1.1 Baseline Scenario

Development of the current pension system with no policy change

This model is primarily based on the unaltered legislation valid as of 1 October 2004. It involves a projection of the pension system under the condition that no changes have been made to any legislation and that the government would maintain only the minimum required pension valorisation. The main aim is to demonstrate the extent of the problems in the pension system if no reform steps are taken and also to establish a basis for evaluating the effects of various parametric changes to the pension system.

Parametric changes to the state pillar

Even with no changes in the legislation, the pension system is still not rigid. There are several important parameters that are affected by the government's decision-making. Specifically, this concerns the reduction limits, the base pension assessment and the method of valorising paid pensions. A description of the past development of these factors may be found on the accompanying CD-ROM or on our web pages.

Assumptions of future development

For the purposes of calculating the baseline scenario, the Executive Team has decided to set the values of these parameters in the following way:

- Valorisation of paid pensions: CPI + 1/3 increase in the average real wage,
- Indexation of the base assessment: according to the development of the average wage,
- Indexation of the reduction limits: according to the development of the average real wage.

Calculations do not include pensions for the civil service and armed forces.

The projection of the pension system excludes the pension schemes for armed forces and civil servants. This part of the pension system falls under the Ministry of Labour and Social Affairs. In 2003, pensions for armed forces and civil servants, such as fire fighters and the police, amounted to approximately CZK 5.6 billion. Income from premiums brought in around CZK 6.8 billion.

1.1.1 Scenario results

An assessment of development confirms long-term unsustainability.

If the existing legislation is not changed and if the key parameters (valorisation, the reduction limits and the base assessment) develop according to the outlined assumptions, the system's deficit would reach 4% to 5% of GDP per year. Thus, the system would accumulate a debt of almost 110% of GDP by 2065 (and ca 260% by the end of the century). The dynamics of the pension system's debt is affected by the assumption of a stable real interest rate for the state debt. If this escalation in the pension system deficit would actually occur (and in turn for the whole system of public finances), we could expect the financial markets to impose an increasing risk premium on Czech government bonds, which would be reflected in an increase in the relevant interest rates, and in turn, a much more adverse debt accumulation for the pension system.

Expenditures are lower than predicted by the majority of analyses.

Expenditures have reached their lowest level in comparison with earlier published studies. The primary reason for this is the accepted assumption on valorisation of pensions according to the law of the defined minimum (i.e. inflation plus a 1/3 increase in the average real wage). An analysis of valorisation after 1990 indicates that it is not realistic to expect full wage valorisation of paid pensions. On the other hand, data on valorisation since 1996, i.e. after overcoming an atypical transition period of economic shocks, show that this minimum assumed valorisation is not certain. In other words, it is essential in practice to have political decision-making that leads to somewhat less generous valorisation than was common during the past eight years.

The method of valorisation has a pivotal impact on expenditures.

The analysis contained in the specific model of parametric changes clearly demonstrates that faster-than-minimum valorisation should have a noticeable effect on the pension system's expenditures and the size of the deficit or the system's debt.

Lower expenditures are due to a number of factors.

The secondary factors that also explain slower expenditure development – than previously published – in the baseline scenario are as follows: (i) perfecting the methods of expenditure projection for non-old-age pensions; (ii) the recent full-scale adjustment of GDP data made by the Czech Statistical Office, which caused a decline in the relative indicators; and (iii) an increase in the retirement age, effective on 1 January 2004. Hence, this was incorporated into the current legislation and became part of the framework for calculating the baseline scenario. The calculations for the baseline scenario made prior to 2004 could not have included this.

The balance shows slight surpluses until 2023.

The registered surpluses are primarily the result of restructuring the contribution rate for social security when two percentage points were shifted from the insurance system for unemployment to the pension system. However, this accounting transaction did not improve the state of public finances in any way. For the long-term stability of public finances, it is important for pension expenditures to increase by around 5% of GDP during the projection horizon. Should the system of pension security not be reformed, the government would have to additionally reduce other public expenditures by this 5% of GDP.

However, these

In addition, the pension system only has the appearance of being stable up to

surpluses are not sufficient.

2020. If the pension system is to be financially sustainable over the long run (and correctly set in actuarial terms), large surpluses must be created during the next decades for covering the high deficits in the future caused by the rapid growth of expenditures after 2020. In other words, the strong population generations would have to generate a "reserve fund" in their economically active years that would finance their future pensions, because the upcoming weak population generations would not generate enough resources.

The system provides generous replacement; the real pension value substantially increases over time.

Throughout the projection period, the system ensures a relatively high replacement level measured by the overall replacement rate, which is maintained over the long run at a level of about 38% of the gross average wage. Thanks to this in particular, the level of the real value of old-age pension will dynamically increase.

There is an indirect correlation between generosity and stability.

The analysis clearly documents the indirect correlation between the macro-financial and micro-financial criteria. The more generous security the system provides, the lower its overall financial stability under otherwise unchanged circumstances, and vice versa.

On a micro-financial level, the analysis confirmed significant income redistribution.

The replacement rate of a hypothetical individual (HI) with a given earnings profile with earnings of 75% of the gross average wage is ca 77% over the long run (or 99% for net wages). On the contrary, an HI with earnings of 300% of the gross average wage will attain a long-term replacement rate of only ca 28% (or 42% for net wages). When interpreting the size of the replacement rate and the internal rate of return of the pension system in the baseline scenario, it must be stressed that budget restrictions of the system are not a part of the baseline scenario. The analysis is not interested in whether it has sufficient funds for financing its obligations.

Development of the internal rate of return influenced by several contradictory factors

On the whole for all analysed HIs, the internal rate of return for the pension system in the baseline scenario increases slightly for approximately 10 years and then a certain decline occurs in the medium term. The following long-term stability ensures that all HIs with an income of 100% or less of the average wage have a return from the system exceeding 5% per year (for the same income HI women, a return exceeding 6% per year). In principle though, the outcomes regarding the internal rate of return are not sensitive to the age of the HI upon retirement (or upon exiting the labour market).

The system motivates individuals to stay on the labour market.

Motivation for remaining on the labour market begins showing up in the younger generations born after 1960. The effect lasts another one or two years after reaching the statutory retirement age (for men). Following this, the implicit tax increases at a linear rate to high positive values. There are in general significantly lower implicit tax values for women than for men throughout the analysed old age of an HI. The analysis also revealed an overall decline in the implicit tax values over time that can be explained by an expected increase in life expectancy of future generations based on the employed demographic forecast of the Faculty Science at Charles University

in Prague.

With respect to the period between reaching the minimum early retirement age and the previous year, it can be said that the pension system is more actuarial neutral towards HIs with lower incomes.

The current system is more beneficial for women than for men.

The micro-financial criteria calculated for men and women indicate that the trends in the development of the pension system influenced primarily by demographic factors are identical for men and women. Nevertheless, certain differences are apparent. The pension system provides higher benefits for women than for men, particularly due to a lower retirement age and higher non-contributory periods. Women also profit from a longer life expectancy.

Table 1-1: General overview of the macroeconomic and microeconomic results of the baseline scenario

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	28,0	28,0	28,0	28,0	28,0	28,0	28,0	28,0	28,0	28,0
Revenues (% GDP)	8,5	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4
Expenditures (% GDP)	8,4	8,0	8,2	9,1	11,0	12,4	12,7	12,5	12,6	13,0
Balance (% GDP)	0,2	0,4	0,2	-0,7	-2,6	-4,0	-4,3	-4,3	-4,0	-4,5
Accumulated balance (% GDP)	0,3	2,4	6,3	4,4	-12,0	-42,7	-88,5	-127,2	-166,2	-244,1
Overall replacement rate (%)*	42,1	39,7	37,4	37,0	37,9	38,2	37,9	38,0	38,2	38,0
Microeconomic criteria										
Male - HI with average wage										
Gross replacement rate (%)	64,6	62,0	57,8	57,4	57,3	57,2	57,2	57,2	57,2	57,1
Internal rate of return (%)	6,3	6,4	6,4	6,0	5,6	5,5	5,5	5,6	5,6	5,7
Female - HI with average wage										
Gross replacement rate (%)	82,4	76,7	66,5	63,0	62,9	62,9	62,8	62,8	62,8	62,8
Internal rate of return (%)	7,5	7,6	7,4	6,7	6,3	6,2	6,2	6,1	6,1	6,2

* Ratio of average old-age pension to gross average wage in the economy

Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz.

1.2 ČSSD Proposal: the NDC System

1.2.1 Specifications

The pay-as-you-go state system based on individual accounts

Pension security continues to be based on the pay-as-you-go state system, but new notional accounts are created (non-financial defined contribution – NDC), and the status of every individual's paid premiums are monitored. An individual's pension is then calculated from this and is reinforced by the system's equivalence. To protect individuals with low earnings, the principle of minimum guaranteed pension is introduced.

Parametric changes increase retirement age

The statutory retirement age is gradually increased to 65 for men and women. Men reach this age in 2030, and women reach this age between 2033 and 2043, depending on the number of children.

From 2010, the premium rate increases

Staring in 2010, the premium will be transferred from the state employment policy (1.6%) to the pension system. These additional funds will be transferred in full to the individual accounts of the insured. Starting in 2010, the NDC premium rate will be 22.6% and the total premium rate for the pension system will be 29.6%.

Valorisation according to inflation and one half of wage growth

Paid pensions are valorised according to inflation and one half of the increase in the average real wage. The balances on the individual accounts are appreciated annually according to the increase in the volume of the total paid premium.

Pension as annuity according to unisex mortality tables

Old-age pension from NDC is calculated as a life-time annuity accounting for the calculated valorisation of pensions. The unisex mortality tables are used to calculate annuity. In addition to the calculated valorisation, the amount of old-age pension depends on the unisex period of life expectancy for the specific generation (year of birth) at the time of old-age retirement and the amount of the balance on the notional account.

Guaranteed minimum pension linked to the minimum subsistence level.

Up to 2040, minimum pension is guaranteed in an amount of 1.2 times the minimum subsistence level for a one-member household. Starting from 2040, this is reduced to 1.1 times the minimum subsistence level. ČSSD's specifications assume that the minimum subsistence level is valorised according to inflation and three fourth the rate of growth of the average real wage.

The transition period ends in 2040

The last year to fully retire under the "old" PAYG DB system is 2009. After launching the NDC system in 2010, the weight of the NDC pension component of old-age pension in total pension is 3.3% for each year between 2010 and 2040. The weight of PAYG DB gradually declines, and the weight of NDC pension in the overall old-age pension of an individual increases. The transition period ends in 2040, at which time the NDC system is fully employed for calculating old-age pension.

Disability pension according to NDC

Starting in 2010, newly assessed disability pensions are adjusted according to the NDC rules for calculating the insurance period. The NDC component for disability pension is calculated similarly to old-age pension – i.e. the weight of the NDC pension component of disability pension in total pension is 3.3% for

each year between 2010 and 2040.

1.2.2 Proposal Results

The rise in expenditures of the pension system is eliminated by a gradual transition to NDC.

A gradual transition to an NDC pension system eliminates rising expenditures that are expected by the baseline scenario. In the first half of the projection, expenditures gradually increase to 10.5% of GDP. In the second half of the projection, these expenditures gradually decline towards the initial level of around 8.5% of GDP. Besides expenditures for old-age pension, the development is also affected by expenditures for disability pensions. These gradually "switch over" to the NDC principles, which cause a substantial decline in the average expenditures.

There are risks on the expenditure side.

This decline can present a social risk with a potential negative impact on government social expenditures. Another risk on the expenditure side not accounted for in the projection is the development of the subsistence level and its link to the value of minimum guaranteed pension. In practice, the issue for applying any (N)DC system continues to be the fate of the assets of the (N)DC system for disabled persons.

The overall replacement rate significantly declines for old-age and disability pensions.

Handling the expenditure side of the old-age pension system is accomplished at the expense of a decline in the overall replacement rate. Particularly after ending the transformation period, this rate constantly declines to two thirds of the previous level (i.e. from the current 42% to 27% at the end of the century). A decline is caused in particular by fixing the statutory retirement age at a time when life expectancy is increasing. A similar decline is also registered for average disability pension in relation to average wage.

The settings of NDC allow for individual retirement.

In practice, it is possible for persons to voluntarily postpone old-age retirement with the goal of increasing their replacement rate. As a result, this could voluntarily increase the real age of retirement, which the system supports with its settings. A longer contribution period is fully reflected in the assessed pension amount.

Low pension level

Approximately 60% of newly awarded NDC pensions will be below the poverty level over the long run (ca one fourth of the average wage in the economy).

As a result of the natural reaction to increasing life expectancy during a slowdown in the pension age, NDC registers a surplus for most periods.

Expenditures are fully reflected in the pension system's balance, because revenue in relation to GDP remains constant from 2010 up to the end of the projection period. The system registers a slight, although declining, surplus during approximately the first third of the projection period. In the second third, it registers a deficit of around 1% of GDP annually due to substantial growth in the number of pensioners. Starting in the 2060s, a surplus of about 0.5% of GDP shows up in the pension system.

The accumulated debt does not exceed 23% of GDP.

The long-term surplus in an NDC system for old-age pensions is based on the natural reaction of the NDC system to the process of increasing life expectancy. The development in the segment of disability pensions also contributes significantly to a rise in the surplus of the overall pension system. During the first half of the projection, the pension system will, therefore,

accumulate an active asset position that peaks at a level of 10% of GDP assets. As a result of a deficit, a debt then starts to accumulate in the system, however, this does not exceed 23% of GDP. At the end of the projection, its weight in GDP tends to decline.

The individual replacement rate declines, except for persons with above-average incomes.

The replacement rate on the level of a hypothetical individual with a given earnings profile (HI) sharply and constantly declines. HIs with substantially above-average incomes are an exception, and they will benefit from the transition over to a NDC system. However, there is a deviation in the individual replacement rate for situations in which the statutory retirement age is lower than 65, the age at which HIs exit the labour market according to the model (and an "extra service" effect shows up).

The internal rate of return is roughly the same for various income groups.

The NDC system is fully equivalent, and the pension amount corresponds to the amount of funds paid and recorded on the notional account. During the long-term projection period, new pensioners only get an NDC old-age pension, and therefore, the replacement rate and the internal rate of return converge to one level for all HIs. In a full NDC system, female HIs have a slightly lower replacement rate than male HIs (due to interrupting their career and paying the premium for childcare). The use of the unisex mortality tables in calculating the annuity from the NDC system prevents a more substantial decline in the replacement rate for women (due to higher life expectancy).

In NDC, individuals with average and above-average incomes are better off.

NDC is beneficial for individuals with average or above-average earnings. With these HIs, the internal rate of return increases in relation to introducing the NDC system. For high-income HIs, this even involves a permanent change in comparison to the initial state prior to introducing NDC. For the generation of HIs that retire exclusively under the NDC system, the internal rate of return converges to one level, determined in principle by the volume of wages and salaries in the economy. In a NDC system, women attain a higher rate of return than men over the long run. This is the result of using the unisex mortality tables when calculating annuity (pension) for the NDC system.

Impulses in the transition period present a risk on the expenditure side.

It follows from the analysis of the implicit tax that the pension system in the transition period motivates high-income earners to remain on the labour market and low-income earners to exit the market at retirement age. Putting these impulses into practice presents a risk for the expenditure side that is not accounted for in the projections.

NDC is actuarial neutral for men and motivates women to stay on the labour market.

From the standpoint of retirement motivation, a full NDC system shows up for men as almost actuarial neutral after reaching the statutory retirement age. NDC is a fully equivalent system, i.e. the paid premium is fully reflected in a higher pension. A certain deviation from absolute actuarial neutrality is based on certain elements of this proposal's specifications (the difference between unisex and male mortality tables). On the contrary, women are significantly motivated financially by the NDC system to postpone retirement. This concerns the outcome of the difference between the unisex and female mortality tables. Unisex tables are used to calculate pension, which results in a higher pension for women than if the sex-specific tables were employed.

Table 1-2: General overview of the macroeconomic and microeconomic results of the NDC system

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	28,0	29,6	29,6	29,6	29,6	29,6	29,6	29,6	29,6	29,6
Revenues (% GDP)	8,5	8,9	8,9	8,9	8,9	8,9	8,9	8,9	8,9	8,9
Expenditures (% GDP)	8,4	8,2	8,6	8,9	9,8	10,2	9,6	8,5	8,2	8,1
Balance (% GDP)	0,2	0,7	0,3	0,0	-0,9	-1,3	-0,7	0,4	0,7	0,8
Accumulated balance (% GDP)	0,3	2,3	7,4	9,6	6,6	-5,6	-18,2	-22,3	-20,3	-11,3
Overall replacement rate (%)*	42,1	40,6	39,5	39,9	40,0	36,8	33,0	30,3	29,0	27,4
Microeconomic criteria										
*Male - HI with average wage***										
Gross replacement rate (%)	64,6	62,5	62,4	60,6	55,5	49,5	46,0	44,4	43,3	41,6
Internal rate of return (%)	6,3	6,5	6,6	6,1	5,4	4,9	4,7	4,7	4,6	4,6
*Female - HI with average wage***										
Gross replacement rate (%)	82,4	76,8	68,4	60,4	53,7	47,9	44,6	43,0	42,0	40,4
Internal rate of return (%)	7,7	7,8	7,5	6,6	5,7	5,3	5,0	4,9	4,9	4,9

* Ratio of average old-age pension to gross average wage in the economy

** Gross average wage, including entities under the limit

Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz .

1.3 KDU-ČSL Proposal: Partial Opt-Out

1.3.1 Specifications

An adjusted state pillar with the possibility of fund savings

The state PAYG DB pillar will go through parametric changes that strengthen its solidarity. In addition, this proposal allows a part of the funds from the state system to be transferred to a special capital account, which increases the equivalence of the system for those who use this option. The premium rate for pension security makes up 28% of gross wages, of which 20% of gross wages goes to old-age pensions and the remainder to non-old-age pensions.

Parametric changes increase the retirement age …

The statutory retirement age is increased to 65 for men and women without children (after reaching 63 years old, increased by four months per year for men and women). For women with children, a reduction in the retirement age according to the number of children is still valid.

… and eliminate the second reduction limit.

After 2007, the calculation for the personal assessment base up to the first reduction limit is reduced from the current 100% to 90%. The second reduction limit is indexed in terms of price up until it merges with the first limit (a reduction coefficient of 30% between the first and second limits will in principle not be applicable). Over the long run, the reduction coefficient is 90% up to the first reduction limit. Above this limit, the coefficient is 10%.

Pensions valorised by price

After 2007, paid pensions are valorised by price (according to CPI growth).

Selected population groups have a reduced rate in the state pillar.

The premium rate paid for pension insurance in the state pillar is lower for selected population groups: for citizens that have exceeded the statutory retirement age, the rate is reduced to half – 10% for non-opt-out individuals and 6% for opt-out individuals. For parents (mothers and fathers), the rate is lower in relation to the number of children (reduced by 1 percentage point for one child, by 2 percentage points for two children, by 3 percentage points for three or more children). This is valid for children raised by a parent up to 18 years of age and also applies to persons who do not participate in opt-out and to persons who partially opt out of the state pillar. A ceiling is also introduced for premium payments. For earnings that are triple the average wage, no premium for pension security is collected in the state pillar.

The earnings of the system are strengthened by general taxes.

The earnings of the state pension pillar are further strengthened by the income from increasing indirect taxes. The reduced VAT rate is increased from 5% to 8%, and the revenue is used to increase the income of the pension system.

A part of the premium may be transferred to the funded pillar …

Anyone who is under 50 years old at the time of the reform has the possibility of partially opting out of the state pay-as-you-go DB system and to transfer a part of the funds to a funded pillar. The decision to partially opt out of the system cannot be changed at a later time.

… and the premium rate differs according to the generation.

New labour market entrants can reduce the premium rate paid into the state pillar by 8 percentage points, and this rate will be saved in pension funds. The total premium rate for pension security is comprised of three components: 12% of gross wages invested in the state pension pillar, 8% of gross wages

invested in the funded pillar and 8% of gross wages invested in non-old-age pension. The transition generations that decide to opt out must allocate an additional 2% of their gross wages to pension funds.

Pension for opt-out individuals is based on the amount of the paid rate.

For opt-out individuals, the amount of old-age pension from a state PAYG DB system is calculated as a combination of pension from the state system and a portion of pension (12/20 of full pension). The weight of these components depends on the period of time in the existing system and reformed system.

The funded pillar is gradually introduced.

The premium rate paid to the funded pillar is accumulated gradually. New labour market entrants pay a rate of 2% in 2007, a rate of 4% in 2008, a rate of 6% in 2009, and a rate of 8% in 2010. The rate for transition generations is 2 percentage points higher for all of the indicated years.

Annuity according to various mortality rates for men and women

Pension in the form of life-time annuity is paid from the funded pillar with the application of various mortality tables for men and women. Annuity is calculated under the assumption of an annual valorisation in the amount of inflation, which corresponds to the valorisation mechanism in the state pillar.

1.3.2 Proposal Results

The balance of the state pillar is stabilised over the long run.

The balance of the pension system is around zero for the entire projection period. In 2007, there is the transitional decline in revenues, however, this is compensated on the revenue side by indirect taxes and on the expenditure side by parametric changes in the state pension system. The combined effect of parametric changes in the state pillar pushes down pension expenditures, and from 2015 to 2043, the pension system achieves a surplus, peaking at 0.9% of GDP. Increasing the revenue of the system and limiting old-age and disability pensions creates a defence mechanism against the demographic shock that pushes the system's expenditures up after 2030. The state pension system is balanced over the long run.

Over the long term, 50% of men and 10% of women opt out [2]; these figures are higher in the transition period.

The percentage of "opt-out" individuals declines over time as a result of increasing life expectancy when fixing the retirement age for younger generations. Men from the transitional generation opt out from the second income decile and above. Men from the five strongest income deciles opt out over the long run. Demand from women is much lower than in the case of men. On the basis of economic motives, only women from the tenth income decile would decide to partially opt out. In view of higher life expectancy, a lower retirement age, lower average income and a higher share in non-contributory periods, women attain a much higher rate of return from the

[2] Modelling of the choice was treated in a technical manner. For more details, see the accompanying CD-ROM (in the annex for this proposal).

[3] The choice was estimated exclusively on the basis of the model apparatus.

An undisputable advantage of this approach is the elimination of subjectivism. On the other hand, there are very strong assumptions that all individuals are fully rational, forward-looking and are capable of perfectly predicting the future. In reality, a number of additional factors that are outside the model apparatus may influence demand of the

state pillar.[3]

Expenditures in the state pillar do not exceed 8% of GDP.

In the first half of the projection, expenditures decrease from 8.4% of GDP to 6.3% of GDP in 2009, as a result of limiting newly awarded pensions (correcting the pension formulae) and paid out pensions (price valorisation) and increasing the retirement age. After 2030, the pension expenditures in the state pillar begin to increase as a result of the retirement of population strong generations. Nevertheless, changes in the parameters of the pension formulae and less generous valorisation of paid-out pensions accompanied by relatively strong demand for opt-out allows the effects of the demographic shock to be moderated and the expenditures in the state pillar to be stabilised below 8% of GDP.

Revenues decline as a result of opting out and the preferential treatment of certain population groups.

Premiums transferred to the state pillar decline from 8.5% of GDP to 6.6% of GDP in 2020, and subsequently increase and stabilise at 6.9% of GDP. In view of the strong initial demand for opting out, premiums transferred to the funded pillar rapidly rise to 1.9% of GDP. Over the long run, they stabilise at a level of 1.2% of GDP. The preferential treatment of families with children and individuals working at retirement age contribute greatly to the decline in revenue of the state pillar (0.3% of GDP).

State system revenues are strengthened by indirect taxes.

The revenue of the state pension system is strengthened by proceeds from increasing the VAT rate, the profit of which will be used to strengthen the revenue of the pension system. Pension system revenues will increase by 0.6% of GDP starting from 2007. In this way, the transition decline in revenues will be partially offset.

The state pillar accumulates a surplus; pension fund assets reach 45% of GDP.

The state system will accumulate a surplus over the long run. By 2065, the assets of the state DB system will reach 30% of GDP, and at the end of the projection period, more than 50% of GDP. Pension fund assets will register the highest value in 2050 when the share in GDP will be close to 45% of GDP. After reaching a peak, assets will decline and stabilise at a level of 37% of GDP at the end of the projection period.

The overall replacement rate declines to 26% at the end of the century.

The overall replacement rate in the analysed proposal stabilises below 30% over the long run. The parametric changes of the pension formulae and price valorisation are responsible for the decline from an initial level of 42%. Increasing the pensions of opting out individuals from the funded pillar is not sufficient for overturning this tendency. The replacement rate from the state pillar for "non-opt-out" individuals drops from 41.9% of gross wages in 2005 to 26.3% at the end of the projection period. The replacement rate of opt-out individuals following the initial opening phase declines from 41.3% to 32.8%.

The state pillar strengthens redistribution; the funded pillar strengthens

Changes in the pension formulae (especially the actual cancellation of the reduction limit on a gradual basis) increase redistribution and help the state pillar achieve balanced pensions. This can be seen in the relative differences between the replacement rates of high- and low-income HIs. On the contrary, introducing a capital pillar reduces the level of redistribution of the

individual for opting out. Therefore, the results cannot be considered to be a forecast of how the economic agents will actually behave.

equivalence for opting out.

pension system. The funded pillar is fully equivalent – as a consequence, opting out of the state pillar causes the replacement rate of low-income HIs to decline and the replacement rate of high-income HIs to increase. The difference between the individual replacement rate of opt-out HIs with half the average wage and HIs with triple the average wage is reduced from 74 percentage points (93 percentage points for women) in the state pillar to 50 percentage points (59 percentage points for women) when including pensions from the funded pillar.

The state pillar provides highs returns for individuals with low incomes and for women.

Evidence of income solidarity in the reformed state pillar is the significantly higher rate of return for individuals with low incomes and for women. While men attain a targeted rate of return of 2.2% to 6.2% in relation to the amount of income, this indicator is 3.1% to 6.9% for women. A higher rate of return for women is due to the lower retirement age for women with children, the reduced premium for raising children, more use of non-contributory periods relating to childcare, and the higher life expectancy for women at retirement. With the changeover to a two-pillar system, individuals with higher incomes obtain a higher return. On the other hand, individuals with low incomes lose out in this particular case. HI women and men with low incomes (in particular 50% and 75%) lose the benefit of high returnability attained as a result of strong redistribution in the state DB system and their return decreases by ca 0.4 to 0.6 of a percentage point. On the contrary, HI men with an income of triple the average wage would attain an additional return of ca 1% p.a. (increase from 2.2% to 3.2%). An identically defined HI woman would increase her return from 3.1% to 3.6% p.a. when opting out of a part of the premium.

Actuarial neutrality is strengthened by introducing a funded pillar.

As seen from the analysis of the implicit tax, it is very difficult to set the state PAYG DB system as actuarial neutral. Some changes made in the state pillar (especially reducing the premium rate to half for persons at retirement age) blur the incentives for immediately exiting the labour market upon reaching retirement age, but they do not manage to fully secure actuarial neutrality. In contrast, the DC system in its pure form is actuarial neutral by definition, because additional years in the work force and additional premium payments are fully reflected in the amount of calculated annuity. The combined system containing a state DB component and a funded DC component partially lessens the variation of the implicit tax in relation to the weight of the funded pillar. Introducing a funded pillar increases actuarial neutrality.

Table 1-3: General Overview of the macroeconomic and microeconomic results of voluntary partial opt-out

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	-	-	-	-	-	-	-	-	-	-
Revenues (% GDP)	8,5	8,4	8,4	8,4	8,3	8,2	8,1	8,1	8,1	8,1
Expenditures (% GDP)	8,4	7,6	7,2	7,2	8,4	9,3	9,4	9,0	9,0	9,2
Balance (% GDP)	0,2	-0,2	0,4	0,9	0,3	-0,2	-0,2	0,1	0,0	-0,3
Accumulated balance (% GDP)	0,3	1,4	2,9	11,7	21,3	25,6	27,9	32,9	40,1	53,3
Overall replacement rate (%)*	42,1	37,7	32,0	29,8	30,4	30,5	29,7	28,9	28,7	28,3
Microeconomic criteria										
*Male - HI with average wage and not opting out***										
Gross replacement rate (%)	64,6	57,9	49,1	43,3	41,5	41,3	41,3	41,3	41,3	41,2
Internal rate of return (%)	6,0	6,0	5,6	4,7	4,3	4,3	4,3	4,4	4,4	4,5
*Male - HI with average wage and opting out***										
Gross replacement rate (%)	64,6	57,9	49,1	47,2	46,2	45,6	40,9	40,5	40,1	39,4
Internal rate of return (%)	6,0	6,0	5,6	4,9	4,5	4,4	4,4	4,4	4,4	4,5
*Female - HI with average wage and not opting out***										
Gross replacement rate (%)	82,4	71,5	58,5	47,9	45,9	45,6	45,6	45,6	45,6	45,5
Internal rate of return (%)	7,4	7,3	6,9	5,8	5,3	5,2	5,2	5,2	5,3	5,3
*Female - HI with average wage and opting out***										
Gross replacement rate (%)	82,4	71,5	58,5	48,8	46,5	45,0	40,8	40,6	40,3	39,6
Internal rate of return (%)	7,4	7,3	6,9	5,6	5,1	4,9	4,9	4,9	4,9	4,9

* Ratio of average old-age pension to gross average wage in the economy

** Gross average wage, including entities under the limit

Note: Revenues and expenditures also include the FDC pillar for this proposal. Owing to the existence of opt-out and the gradual rise in the rate, the contribution rate cannot be expressed by one figure. Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz.

1.4 KSČM Proposal: Parametric Optimisation of the Pension System

1.4.1 Specifications

The current system is preserved.

The state PAYG DB pillar is preserved in its current state. Starting in 2030, the retirement age increases to 65 years old. The revenue side is strengthened by various measures, including an increase in the tax burden of labour and a shift in resources from other parts of the state budget. The other elements of the pension system will be kept the same as the baseline scenario.

The revenue side is strengthened by the following measures.

Pension system revenues are strengthened starting in 2007 when the state's cancelled contribution for supplementary pension insurance is transferred to the pension system.

Starting in 2012, the contribution to the state employment policy (1.6%) is transferred to the pension security system, which increases the rate of pension security to 29.6%.

Starting in 2015, full payment for social insurance in a minimum amount of the average wage is introduced for self-employed persons (i.e. self-employed persons will pay a minimum monthly premium for pension security of 29.6% of the average wage).

Starting in 2020, 10% of excise taxes for the entire country will be transferred to the pension system's revenues.

In 2040, the premium rate for the pension system will increase by 3 percentage points to 32.6%. In 2060, the premium rate will be raised again (by 0.9 of a percentage point to 33.5%). This measure should ensure that the accumulated balance of the pension system in 2100 is zero.

The retirement age increases starting in 2030.

The retirement age increases starting in 2030 for men and women (regardless of the number of children) by four months each calendar year until reaching the age of 65.

1.4.2 Proposal Results

Expenditures significantly increase over the long run.

Expenditures show a growing tendency similar to the baseline scenario (i.e. a system with no policy change). Over the long term, expenditures would be slightly less than in the baseline scenario. Increasing the retirement age, the effect of which is to reduce expenditures, outweighs the increase in expenditures over the long run due to increasing the minimum assessment base of self-employed persons to the level of the average wage. However, parametric optimisation is not capable over the long run of preventing expenditure growth from the initial 8% of GDP starting from about 2015 to ca 12% in the second half of the 2050s, at which time expenditures stabilise for the remainder of the projection period.

The revenue side of the pension system is significantly strengthened,

In 2007, the contribution to supplementary pension insurance is first cancelled, and the funds are transferred to the state pension system (0.1% of GDP). Then in 2012, the residual premiums from the state employment policy are transferred. This measure strengthens the revenue of the pension system by 0.5% of GDP per year. However, the performance of the other

however, this measure could have a negative impact on the rest of the economy.

parts of the state budget deteriorates to the same degree, and so the balance of the public budgets is not improved.

Starting in 2015, the minimum assessment base for self-employed persons is increased to the level of the average wage in the economy. The intensity of this step (+0.5% of GDP per year) must have been backed by a professional estimate, because there are no reliable statistics in this area. The estimate is at the upper limit, and there is a risk of rising unemployment as a result.

In 2020, 10% of excise taxes for the entire country are transferred to the pension system (0.3% of GDP). The pension system's balance is improved at the expense of the performance of other components of the state budget, and overall, the budget balance is not changed by this step.

In 2040, the premium rate is increased to 32.6%, and in 2060, it is increased by another 0.9 of a percentage point to 33.5%. Overall, the pension system's revenues increase over the long run by 2.5% of GDP per year. A risk of the mechanical estimate of the effect of increasing the contribution rate is that it dos not consider the secondary effects, which could increase the unemployment rate and shift a part of the work force over to a grey economy.

The pension system only appears to be stable.

The surpluses caused by the increase in revenue of the state pension system described above are only temporary in nature. Under the influence of expenditure growth, the system will register a deficit after 2035 that will stabilise at around 1.3% of GDP per year over the long run. In view of the accumulated balance, the system is set up, under the given conditions, in accordance with the specifications so that its asset position will be balanced by the end of the projection period. This long-term stability of the pension system is partially achieved at the cost of transferring the deficit tendencies away from the pension system to other parts of the state budget and partially by increasing the tax burden of economically active generations. These persons, i.e. future pensioners, are in this way guaranteed a higher pension by the pension system (income in the post-productive period), however, at the cost of reducing its disposable income in the period of economic activity (a higher contribution rate).

The overall replacement rate declines at first, and then returns to initial values.

The initial decline in the overall replacement rate, similar to the baseline scenario, is caused in particular by lower than wage valorisation of paid pensions and an autonomously rising number of permanently reduced old-age pensions. After the effects of these factors have died out, the situation is stabilised. The replacement rate moderately rises over the long run, which is the result of increasing the base rate paid by self-employed persons. Thus after a certain delay, they will be paid higher pension from the system. The rise in the replacement is also the result of the process of increasing the retirement age.

Significant income redistribution exists in the pension system.

Strong income redistribution is confirmed in particular by the analysis of the internal rate of return. For HI men, this ranges between 2.4% and 6.0% p.a. (in nominal terms). For HI women, this figure is in the range of 3.3% to 6.7% p.a.

At the level of the rate of return, this shows up negatively as an increase in the premium rate to 29.6% starting in 2012 (and further 32.6% from 2040

and 33.5% from 2060) and an increase in the retirement age in the 2030s. Due to the existence of non-contributory periods relating to childcare and higher life expectancy, HI women attain a higher rate of return than HI men, even when comparing the retirement ages for both sexes and eliminating age differentiation for women according to the number of children. In addition to income redistribution, redistribution from men to women is also present in the pension system.[4]

The implicit tax shows that the system only motivates pensioners to remain on the labour market over the short run.

In the early retirement period and approximately two to three years after reaching the statutory retirement age, the pension system economically motivates citizens to remain on the labour market and to postpone retirement. However, this effect does not begin to show up until generations born in and after 1960 (for women, this even involves somewhat older generations). Then the implicit tax rapidly increases and reaches high positive values. This means that the system discourages persons from remaining on the labour market. Women in general have a lower tax than men. So the pension system is more motivating for them with respect to remaining on the labour market and postponing old-age retirement.

[4] The assumption is that the non-contributory periods for childcare are used mostly by women, and not by men.

Table 1-4: General overview of the macroeconomic and microeconomic results of parametric optimisation

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	28,0	28,0	29,6	29,6	33,6	33,6	33,6	34,5	34,5	34,5
Revenues (% GDP)	8,5	8,5	9,8	9,8	10,7	10,7	11,0	11,0	11,0	11,0
Expenditures (% GDP)	8,4	8,0	8,3	9,3	10,4	11,5	12,0	11,8	11,9	12,4
Balance (% GDP)	0,2	0,5	1,5	0,4	0,3	-0,7	-1,1	-0,8	-1,0	-1,4
Accumulated balance (% GDP)	0,3	2,8	15,4	27,8	31,7	34,0	28,7	24,3	19,7	0,0
Overall replacement rate (%)*	42,1	39,7	37,5	37,7	38,8	40,1	40,7	40,9	41,3	41,1
Microeconomic criteria										
*Male - HI with average wage***										
Gross replacement rate (%)	64,6	62,0	57,8	57,4	51,3	51,3	51,3	51,3	51,3	51,3
Internal rate of return (%)	6,3	6,4	6,3	5,9	4,9	4,9	4,8	4,7	4,7	4,7
*Female - HI with average wage***										
Gross replacement rate (%)	82,4	76,7	66,5	63,0	61,4	51,8	51,1	51,0	51,0	51,0
Internal rate of return (%)	7,5	7,6	7,3	6,6	6,0	5,4	5,3	5,3	5,4	5,4

* Ratio of average old-age pension to gross average wage in the economy

** Gross average wage, including entities under the limit

Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz.

1.5 ODS Proposal: Flat-Rate Pension

1.5.1 Specifications

The state pillar pays everyone the same flat-rate pension.

The pay-as-you-go state pillar provides flat-rate pension – the same for everyone – amounting to 20% of the average wage. In addition, mandatory premium payments are reduced. In this way, the weight of state pension security is reduced and the space for voluntary private security is increased.

A gradual transition for various generations.

Everyone gradually changes over to the flat-rate pension system according to the different generations – based on an individual's year of birth, which is a criterion for incorporating persons into the new system.

(i) All individuals born in 1945 and before will retire and receive a full pension according to the rules of the current PAYG DB system. The paid DB is valorised by price.

(ii) The years from 1946 and 1974 (however excluding those who retire before 2007) are considered as transitional years, and the rules for both systems will partially apply – the "old" PAYG DB system and the "new" flat-rate pension system. Individuals born between these years will receive a combined pension calculated as a weighted average of pension according to the current pension rules and the new flat-rate pension rules. The weight of flat-rate pension will increase in a linear fashion from 0% to 100%, attaining 100% for persons born in 1975 and after. Valorisation of the components of flat-rate pension (FRP) is based on wages. Of course, the PAYG component is valorised by price.

(iii) Individuals born in 1975 and after will receive a 100% flat-rate pension that is valorised by wages.

The retirement age continues to increase along with life expectancy.

The statutory retirement age increases at the current rate[5] up to 65 years old for men and for all women, and then (towards the end of the 2030s) continues to increase – first by two months per year and then by one month per year. At the end of the projection period, it will reach 71 years old for both men and women. During the periods of increase, the retirement ages for both sexes converge and then increase at the same rate.

The premium rate is reduced to 20% of the gross wage.

From 2007, the total premium rate for the entire population is 20% (for old-age pension 12 percentage points; the rate for non-old-age pension remains at 8 percentage points).

Entitlement to pension after reaching retirement age.

All Czech citizens who reach the statutory retirement age are entitled to payment of flat-rate pension. Therefore, early retirement is not an option.

The transition period

Starting in 2007, additional changes are made to the old system:

[5] The retirement age increases by two months for men and four months for women every year.

accompanied by parametric changes.

- The base assessment is valorised by wages,
- The second reduction limit is valorised by price until it converges with the first wage-valorised reduction limit. The converged limits are then valorised by wages.

1.5.2 Proposal Results

Pension expenditures decrease to 6% of GDP.

Transition to the flat-rate pension system causes a reduction in pension system expenditures over the entire projection period thanks in particular to increasing the retirement age. An important role is played by the changeover from the currently paid DB pension to the lower flat-rate pension. As a result, expenditures for the pension system are reduced from the current 8.4% share in GDP, and in approximately 2030, this figure will be around 6% of GDP and will remain at this level until the end of the projection period.

A risk for the expenditure side is the low amount of flat-rate pension.

In respect to the expenditure side, the possible risks not included in the model should be pointed out: (i) the potential break in the development of old-age and disability pension amounts. If there is a relative decline in old-age pensions, the advantages of collecting disability pensions could increase, and this could lead to a potential rise in disability pensions. (ii) The replacement rate gradually declines in flat-rate pension to the target rate of 20% of the average wage in the economy. This low replacement rate could interfere with social sustainability.

The analysis does not include freed-up resources.

In view of these risks, it should be remembered that savings related to reducing the premium rate are not used in the model. According to the specifications of this proposal, these savings, which are on the side of employees, may be used at their own discretion, and hence, there is no guarantee that they will be allocated to old-age security.

The revenues of the pension system decline accordingly.

By implementing a flat-rate pension system, the revenues of the subsystem of old-age pensions decline under the influence of an immediate reduction in the premium rate from the current 20% to 12%. The revenues of the overall pension system in this way drop abruptly from the current 8.4% of GDP to 6% of GDP, remaining at this level throughout the entire projection period. Therefore, a part of the resources (2.4% of GDP) that creates additional sources for individual needs is freed up. The revenues flowing into the subsystem of non-old-age pensions remain unchanged at 2.4% of GDP.

After the initial decline, the deficits stabilise around zero by the end of the 2030s.

Introducing a system of flat-rate pension (in 2007) means an initial decline on the revenue side, and as a result, the pension system registers a deficit of around 1.8% of GDP. Following this, there is a gradual return to system equilibrium thanks to the reaction of the expenditure side, which begins to decline immediately after the start of the reform. The system's balance stabilises in a range of –0.3% to +0.3% of GDP starting in 2035.

The accumulated debt will not exceed 20% of GDP throughout the projection

Under the influence of transformation deficits, the accumulated balance will reach 17.5% of GDP around 2025. Thanks to a return to equilibrium, the accumulated balance is stabilised with a debt position in a range of 16% to 20% of GDP. In the last third of the projection period, this debt will be reduced to 13.4% under the influence of predominant, slightly surplus

period.	financing.
The overall replacement rate targets 20%, which will be reached in 2055.	The overall replacement rate gradually declines from the current 42% and stabilises at a setting of 20% set by the flat-rate pension system. A decline in the replacement rate is caused by (i) the predominant share of flat-rate pension components in paid pensions over time and (ii) price valorisation of paid pensions from the PAYG DB system.
The internal rate of return declines; system solidarity substantially increases.	From the standpoint of the internal rate of return, the differences increase between individual HIs with various income levels; therefore, the solidarity of the system rises. However, with a defined lower premium rate, this occurs on a smaller scale. The development of the internal rate of return in the specific stages of the projection is defined in particular by the method of pension valorisation and an increase in the retirement age.
The system motivates persons to retire at the statutory retirement age.	From the standpoint of the implicit tax, the system continually motivates persons to retire after reaching the statutory retirement age. An additional year on the labour market (and additional premium deductions) will not increase the amount of old-age pension paid in the future. Since the system does not permit early retirement, it is most beneficial for HIs to retire at the statutory retirement age.
The differences between men and women are not significant.	The results of the micro-financial criteria do not differ greatly extent for men and women. Development over time is more or less the same. Only the initial levels at the start of the projection are different. The current replacement rate and the system's internal rate of return are higher for women than for men. This is caused by the currently lower statutory retirement age and longer life expectancy for women as well as more extensive use of certain non-contributory periods.

Table 1-5: General overview of the macroeconomic and microeconomic results of flat-rate pension

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	28,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0
Revenues (% GDP)	8,5	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Expenditures (% GDP)	8,4	7,5	6,8	6,2	5,9	6,2	6,3	6,0	5,8	5,8
Balance (% GDP)	0,2	-1,5	-0,8	-0,2	0,1	-0,2	-0,3	0,0	0,2	0,2
Accumulated balance (% GDP)	0,3	-5,7	-15,3	-17,6	-16,5	-17,2	-19,4	-19,9	-17,9	-13,4
Overall replacement rate (%)*	42,1	37,7	30,9	26,1	22,7	20,7	20,1	20,0	20,0	20,0
Microeconomic criteria										
*Male - HI with average wage***										
Gross replacement rate (%)	64,6	62,0	42,3	28,9	-	-	-	-	-	-
Internal rate of return (%)	6,0	6,2	5,7	4,8	5,7	5,9	5,7	5,8	5,8	-
*Female - HI with average wage***										
Gross replacement rate (%)	82,4	76,7	48,7	30,1	-	-	-	-	-	-
Internal rate of return (%)	7,4	7,4	6,6	5,4	4,3	4,5	6,3	6,1	6,2	-

* Ratio of average old-age pension to gross average wage in the economy.

** Gross average wage, including entities under the limit.

The gross replacement rate starting from 2040 and the internal rate of return at the end of the projection period cannot be recorded for this proposal due to the structure of HIs. HIs always retire at the age of 65. However, the retirement age increases and early retirement is not possible.

Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz.

1.6 US-DEU Proposal: the Combined System

1.6.1 Specifications

Parametric changes to the state pillar with the possibility of opting out.

The state PAYG DB pillar undergoes parametric reforms that increase its equivalence. The premium rate for pension security is 28% of the gross wage, of which 20% of the gross wage is for old-age pension and 8% of gross wages is for non-old-age pension. Those who would like to transfer 3% to the capital pillar must also contribute an additional 6% of their own funds. So the total premium rate for these individuals is higher (28% + 6%).

Parametric changes to the state pillar increase the retirement age …

Initially, the statutory retirement age increases over time to 65 years old. Men and childless women reach this age by 1 January 2019. Women according to the number of raised children reach this age by 1 January 2031 at the latest. Starting in 2032, the retirement age for both sexes continues to increase by two months every calendar year. This stops increasing in 2043 at a level of 67 years old for both men and women.

and the equivalence of the system, …

Equivalence is strengthened for newly awarded old-age pensions:

(i) By a change in the setting of the reduction limits (the first limit is set for half of the gross average wage, the second reduction limit for 150% of the gross average wage) and the reduction coefficients. Up to the first limit, the personal assessment base is calculated from 80%. Between the first and second limits, it is calculated from 50% and above the second limit, from 30%.

(ii) By zero valorisation of the base assessment

The decisive period for setting the assessment base is increased to 40 years.

… penalties for early retirement,

The penalty for early retirement is increased to 1.5% of the calculated base for each 90 days commenced prior to reaching the statutory retirement age.

reduce the replacement rate,

Between 2010 and 2030, the replacement rate for newly awarded old-age pensions is reduced so that it is on average 30% of the gross average wage in 2030. For this purpose, a demographic factor is introduced to the system that indexes earnings in order to set the personal assessment base according to the year-on-year growth of the premium amount collected for one pensioner.[6] Up to and including 2009, earnings are indexed by wage for the purposes of setting the personal assessment base.

… the calculation of non-contributory periods,

In order to set a percentage assessment of pension, the calculation of non-contributory periods for insurance is gradually reduced from the current 80% (or 100%) to the target amount of 50%, with the exception of periods for childcare and care for the disabled. From 1 January 2007, the calculation is

[6] However, this element in and of itself (even in combination with the other elements introduced by this proposal) would not secure a decline in the relation of an average newly awarded old-age pension and the average wage to the required 30%, and therefore, its effect was strengthened in the model by an additional calibrated parameter.

reduced every year by 10 percentage points until it reaches a level of 50%.

… and the amount of non-old-age pensions.

The amount of non-old-age pensions is reduced in the following manner:

(i) the amount of newly awarded full and partial disability pensions is reduced by 10%;

(ii) the amount of newly awarded survivor's pensions is reduced by 5%.

A ceiling is introduced on premium payments.

A ceiling on the payment of premiums is introduced to the system amounting to three times the gross average wage. Earnings exceeding this limit are not accounted for when setting the personal assessment base.

Pensions are valorised by wage.

Starting in 2007, wage valorisation of paid pensions is implemented by which the living standard of a pensioner is kept constant in relation to the average wage during the period pension is drawn.

3% may be transferred to the funded pillar, however, an additional 6% must be contributed.

The reform allows 3% of the assessment base of the insured to be transferred to an individual capital account under the condition that the insured contributes an additional 6% of their own funds. The overall rate is 34%. Future pension from the state pillar is then proportionally reduced.[7] Partially opting out is completely voluntary and can be arranged anytime prior to reaching the statutory retirement age.

Pension is calculated as annuity according to various mortality tables.

Pension is paid from the funded pillar in the form of lifetime annuity (using various mortality tables for men and women) with wage valorisation. Entitlement to pension occurs upon reaching the statutory retirement age. It is also possible to take early retirement (similar to the PAYG pillar).

1.6.2 Proposal Results

Parametric changes cause expenditures to decline in the medium and long run.

Parametric changes for strengthening the equivalence of the PAYG system cause a decline in the overall replacement rate over the medium term. Savings also occur in the non-old-age pension segment. An expenditure-side risk is the substantial decline in the replacement rate for disability pensions. The significant strengthening of equivalence in the DB system could also be problematic in an environment of a sharp decline in the overall replacement rate. Therefore, a significant part of the new old-age pensions – around 40% over the long run – will be at risk of relative poverty.

However, a deficit will occur in the PAYG pillar in the short and

A deficit will develop in the short and medium term that will not exceed 0.5% of GDP per year. In the second half of the 2020s, the system will register a surplus that will later exceed 1% of GDP. During the final decades of the projection period, the surplus will decline somewhat as a result of renewed

[7] For individuals who decide to opt out, the pension entitlement is reduced to 85% (17/20) for each insurance period year in the PAYG system before and after the year in which the decision was made to opt out.

medium term.

growth in the number of old-age pensioners. From the standpoint of the accumulated balance, a debt will be generated in the PAYG system that will reach almost 5% of GDP in the mid-2020s. The asset situation of the PAYG pillar will then improve. The debt is eliminated at the end of the 2030s, and the system's assets begin to accumulate. These assets will reach ca 110% of GDP by the end of the projection period.

Over the long run, only 50% of men take advantage of partial opt-out.

The conclusions of the model analysis indicate that motivation to opt out will in general be higher for men than for women and for higher income groups. Due to stabilising the retirement age at 67 years old, however, opt-out motivation will weaken, because the profitability of the PAYG DB pillar will start to increase once again. Approximately 50% of the men will opt out in the long run given the conditions in the state system, however, none of the women[8].

The transitional deficit will not exceed 0.4% of GDP per year.

From the standpoint of the PAYG system's balance, we estimate the effect of introducing opt-out in the extent given in the specifications for the combined system leading towards worsening the balance by a maximum of 0.4% of GDP per year. This will mostly be in a range of 0.1% to 0.3% of GDP.[9] After 2060, the transitional deficit will practically disappear. This deficit shows up in the accumulated balance of the PAYG system and a more substantial debt is generated (almost 12% of GDP in the first half of the 2030s). Later, this debt is eliminated (second half of the 2050s), and there is a lower level of assets creation at the end of the projection period (70% of GDP).

The capital pillar reaches 20% of GDP.

In the FDC pillar, assets begin to be generated, reaching 20% of GDP in the long term.

Parametric reforms lead to a reduction in the individual replacement rate.

The effect of parametric reforms in the PAYG pillar is apparent on the micro-financial level, and on the whole, they reduce the individual replacement rate. Implementing opt-out after a certain period causes an increase in the replacement rate (or a slowdown in its decline). However, it primarily involves the result of a higher contribution rate (26% vs 20%) for old-age pensions using opt-out. A significant decline in the replacement rate is partially caused by the structure of HIs, who always retire at 65 years old. If the insured persons retire at the statutory retirement age, the decline in the replacement rate would not be as substantial.

The pension system's internal rate of return decreases.

Conclusions similar to those provided by the replacement rate can be identified even when using the criterion of the internal rate of return. As opposed to the replacement rate, however, this criterion does not deviate as a result of an increase in the contribution rate for the old-age pensions of persons who have decided to opt out. The PAYG DB system is more beneficial for women than for men. As a result of calculating the non-contributory periods for childcare, a temporarily lower retirement age and

[8] Modelling the choice was handled in a technical fashion. For details, see the accompanying CD-ROM in the annex for this proposal.

[9] The amount could change depending on the actual real demand for opt-out.

higher life expectancy, a higher rate of return is reached from the system under otherwise unchanged conditions.

Increased sanctions for early retirement are a motivation for postponing retirement.

During the period in which individuals may opt for early retirement, the pension system motivates individuals to postpone retirement by using the implicit tax. Here financial sanctions for early retirement are increased. For women, however, the motivation effect is somewhat stronger than for men (the effect of different mortality rates for men and women).

The initial effect of starting the reform has different effects on different individuals.

The analysis of the implicit tax shows that low-income earners will be motivated to retire even before the start of the reform in 2007. On the other hand, it would pay off for higher-income earners to wait until the reform before retiring, because the reform strengthens equivalence in the PAYG DB system. If citizens behave in line with these economic incentives, pressure will be put on expenditure growth in the pension system against the current projection.

The FDC pillar produces higher actuarial neutrality for the pension system.

Introducing the FDC pillar to the pension system reduced the deviations in the values of the implicit tax during the period close to reaching retirement age and afterwards. The pension system containing the FDC component has, therefore, become more actuarial neutral in comparison with only the parametrically reformed PAYG DB system.

Table 1-6: General overview of the macroeconomic and microeconomic results of the combined system

	2005	2010	2020	2030	2040	2050	2060	2070	2080	2100
Macroeconomic criteria										
Contribution rate (% of gross wage)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)	28 (34)
Revenues (% GDP)	8,5	8,9	9,1	9,2	9,3	9,3	9,2	9,1	9,1	9,1
Expenditures (% GDP)	8,4	8,7	9,0	8,7	8,5	8,3	8,4	8,2	8,3	8,7
Balance (% GDP)	0,2	-0,5	-0,8	-0,3	0,2	0,8	1,0	1,3	1,1	0,6
Accumulated balance (% GDP)	0,3	-0,3	-7,2	-11,2	-10,2	-5,2	4,2	18,2	35,4	69,6
Overall replacement rate (%)*	42,1	43,0	42,4	38,6	33,2	30,3	29,9	30,3	31,0	31,4
Microeconomic criteria										
*Male - HI with average wage and not opting out***										
Gross replacement rate (%)	64,6	58,4	41,9	31,3	27,0	22,9	23,0	22,4	24,6	24,0
Internal rate of return (%)	6,7	6,8	5,9	4,6	3,8	3,3	3,4	3,6	3,8	3,9
*Male - HI with average wage and opting out***										
Gross replacement rate (%)	64,6	51,6	41,5	35,7	35,0	37,8	33,7	34,3	34,2	32,8
Internal rate of return (%)	6,7	6,3	5,4	4,3	3,9	4,0	3,6	3,8	3,9	3,9
*Female - HI with average wage and not opting out***										
Gross replacement rate (%)	82,4	72,9	50,8	33,9	28,6	23,8	22,5	23,7	24,1	23,5
Internal rate of return (%)	8,0	8,0	7,1	5,4	4,5	4,0	3,9	4,1	4,2	4,3
*Female - HI with average wage and opting out***										
Gross replacement rate (%)	82,4	63,4	47,9	36,3	34,0	31,7	30,5	31,2	31,1	29,8
Internal rate of return (%)	8,0	7,6	6,6	5,1	4,4	4,1	4,0	4,1	4,1	4,2

* Ratio of average old-age pension to gross average wage in the economy

** Gross average wage, including entities under the limit

Note: Revenues and expenditures in this proposal also include the FDC pillar. Due to limited space, the third macroeconomic criterion – implicit tax – cannot be displayed here. A detailed overview of values for the implicit tax as well as for other criteria is contained in the description of the proposals on the accompanying CD-ROM or on our web pages: www.reformaduchodu.cz.

2 Comparison of the Political Party Proposals

2.1 Introduction

The complexity of the specifications makes it difficult to compare the proposals.

Comparing the proposals submitted by the political parties is not an easy task. Each of them presents a complex strategy of reform, and an isolated study of one particular parameter or indicator could lead to oversimplification. Nevertheless, we think that an attempt to compare these proposals is valuable because it demonstrates the inevitability of choosing between several mutually conflicting aims.

The pension system reform is a sort of "trade-off".

Any reform of the pension system conceals within itself a sort of trade-off or "something for something". An ideal reform with a low retirement age, high pensions for all participants and a low premium rate just does not exist. All of the proposals must work within this "magic triangle". For example, the KSČM proposal maintains high pensions with a slight increase in the retirement age. This, however, requires a significant increase in the premium rate and other taxes to maintain financial stability, which inevitably leads to a decline in the disposable income of households and restricts the possibility of increasing pension using one's own funds. The ČSSD proposal, similar to those of KDU-ČSL and US-DEU, attains equilibrium in the pension system by reducing the replacement rate for all citizens. ODS opts for a system of flat-rate pension at a level of one fifth of the average wage in exchange for a significant reduction in the premium rate. When restricting the revenue of the state system, the long-term balance is achieved by increasing the retirement age to the highest values for all submitted proposals and by reducing the level of state pension.

The proposals differ in the level and volume of solidarity ensured by the state pillar.

The "trade-off" is apparent even when searching for the desirable level and volume of solidarity. The current system has a high level of solidarity – it redistributes pension rights from income-strong groups to income-weak groups. Restricting the level of redistribution while respecting the budget restraints leads to a decline in pensions for the weaker income groups, which attain high replacement rates, and to an increase in pensions for stronger income groups for which the current system provides a very low level of replacement for pre-pension incomes. The ČSSD and US-DEU proposals provide ways of restricting solidarity and strengthening equivalence. As a result, however, the largest percentage of the population falls under the poverty level over the long run. On the other hand, the ODS and KDU-ČSL proposals encourage even further the already high level of solidarity in the state pillar. However, considering that it reduces the premium rate and allows for partially opting out of the state pillar, it also reduces the state-ensured solidarity and gives income-strong groups the opportunity to increase their pension outside the state pay-as-you-go system. The KSČM proposal does not change the level of solidarity. As a result, it reduces the opportunities of citizens with average and above-average incomes to increase their pensions using their own funds.

The specifications reflect different levels of

Last but not least, the different levels of confidence in the stability of capital and financial markets and the ability of citizens to voluntarily prepare themselves for retirement years are reflected in the analysed proposals. The KDU-ČSL and US-DEU proposals reflect confidence in the long-term stability

confidence in the stability of capital markets and the ability of citizens to prepare for their retirement years.

of capital markets and assume that their volatility will not have any long-term effects on the value of pensions. The ODS proposal relies on the rationality of citizens who will voluntarily prepare for their retirement years through the capital market. So these proposals give citizens the opportunity to finance their pensions from several sources and to diversify the risks of securing their retirement. On the other hand, the KSČM and ČSSD proposals reflect the lack of confidence in the long-term stability of capital markets, and in fear of the risks of volatile returns on capital markets, it gives preference to maintaining a pay-as-you-go state-provided pension system.

An overly detailed view could blur the main ideological differences.

It is beneficial to lay out the key choices before comparing the specific proposals according to the macro- and micro-financial criteria. When concentrating on the details of the specific proposals, these differences could be left by the wayside. When comparing the proposals, we will use the same method as was used in the descriptions of the proposals from the political parties, starting from the macro-financial criteria assessing the financial sustainability of the system and ending with the micro-financial criteria assessing the effect of the pension system on individuals.

2.2 Comparing the Macro-Financial Criteria

The description focuses on the main macro-financial criteria.

In this section, we focus on comparing the basic criteria that relate to the overall development of pension system's balance. Expenditures, revenues, the balance and the accumulated balance of the pension system, the overall replacement rate and the premium rate for pension security were set as the main macro-financial criteria. We include here only the main results and will concentrate on comparing these results.

All of the proposals respect the budget restraints.

An indisputable positive point of all the proposals is that they respect the budget restraints of the pension system.[10] For all proposals, the jointly and independently prepared demographic and macroeconomic framework defined certain limitations for the political parties in order for the pension system to remain financially sustainable in the long run. The proposal authors from the various political parties, however, resolved the issue of the right policy mix between the main objectives of the pension system in a variety of ways.

2.2.1 Expenditures of the pension system

The success of proposals when restricting the fiscal effects of an ageing population shows up during comparison of

The expenditures of the state pension system will reach 13% of GDP in the baseline scenario. An increase in pension expenditures by ca 5% of GDP in comparison with the current situation is the result of a demographic shock, when the number of pensioners during the 2030s sharply increases as well as the expenses associated with this increase. The effectiveness of the proposals in restricting the fiscal effects of an ageing population will, therefore, show up when compared with this projection. Almost all of the proposals work towards limiting pension expenditures (Chart 2-1). However, they differ in the intensity

[10] This is clear when comparing the results of the first and third rounds of the analyses. While the first round of specifications registered high deficits in the majority of cases, adjustments were made in the other rounds in order to strengthen the long-term financial sustainability of the pension system.

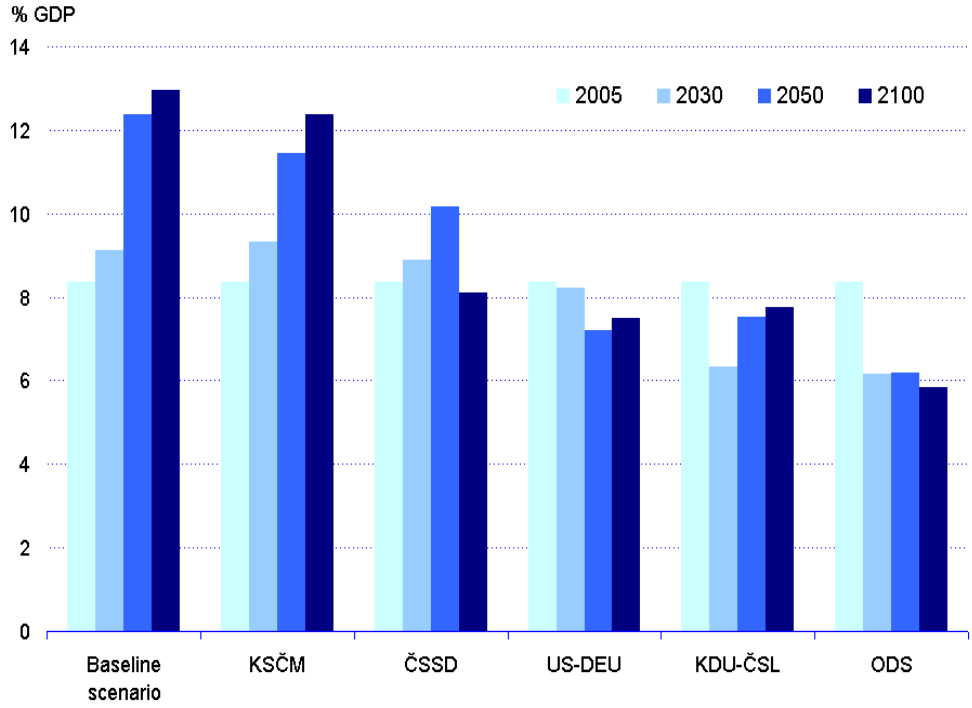
the expenditures for the baseline scenario.

and timing of the measures.

Pension expenditures for the proposals range widely from 6% to 12.5% of GDP.

The expenditures of the state system are reduced the most in the flat-rate pension proposal. Over the long run, they are stabilised to under 6% of GDP. This is the result of reducing the paid pension benefits to 20% of the average wage and increasing the retirement age, which roughly copies the rise in life expectancy, On the other hand, the expenses for KSČM's proposal of parametric optimisation shows the least amount of changes. One measure relating to the expenditure side is the shift in the statutory retirement age to 65 years old taking place in 2030. So in comparison with the baseline scenario, expenditures are reduced by only 0.6% of GDP to a final 12.4% of GDP.

Chart 2-1: Comparing pension expenditures for the state system



Most of the proposals push pension expenditures up to 8.0% of GDP.

The proposals of ČSSD, KDU-ČSL and US-DEU push pension expenditures down to a level of 8% of GDP. In the case of ČSSD, pension expenditures are stabilised thanks to introducing an NDC system that, given a specific retirement age, deals with increased life expectancy by automatically reducing the pension contribution. In the proposals of KDU-ČSL and US-DEU, a combination of two factors helps to reduce expenditures. On the one hand, the generosity of the newly paid pensions is limited by modifying the pension formulae, which then motivates citizens to partially opt out of the state pension system. As a result, the state system's expenditures decline by the amount of pension expenditures for individuals that opted out and transferred a part of the premium to the funded pillar.

Expenditures can only be

There are only three ways to reduce the pension expenditures of the baseline scenario: reducing the level of newly awarded pensions, slower valorisation (i.e.

curbed by increasing the retirement age or restricting the generosity of pensions.

less than according to prices and a 1/3 increase in the real wage) or an upward shift in the statutory retirement age. The political party proposals have used these instruments in various degrees and combinations. A higher retirement age reduces the number of pensioners, increases the system's revenue and creates GDP. The average pension may then increase at a faster pace under the given conditions. This option is used to a greater degree only by ODS (up to 71 years old) and US-DEU (up to 67 years old), which have also combined this with a reduction in the level of newly awarded pensions. Both proposals can then afford more generous valorisation of pensions (by wage) and the ODS proposal even a reduction in the premium rate. The other proposals (ČSSD, KDU-ČSL and KSČM) implement only a moderate increase in the retirement age, which must be setoff by a reduction in newly awarded pensions (ČSSD and KDU-ČSL), less generous valorisation (KDU-ČSL), an increase in the premium (ČSSD and KSČM) or strengthening the resources of the system with taxes (KSČM and KDU-ČSL).

Chart 2-2: Statutory retirement age by year of birth – men

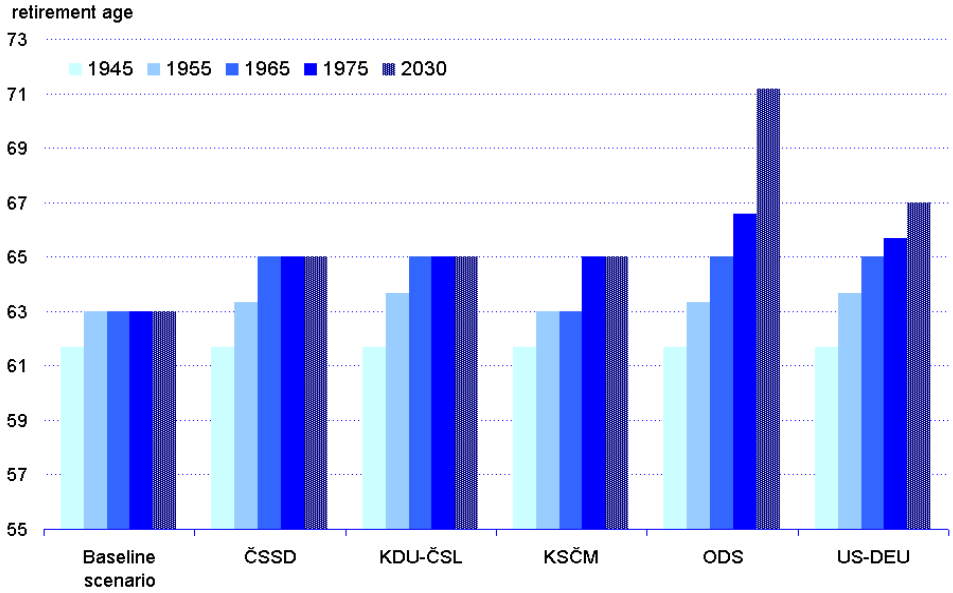
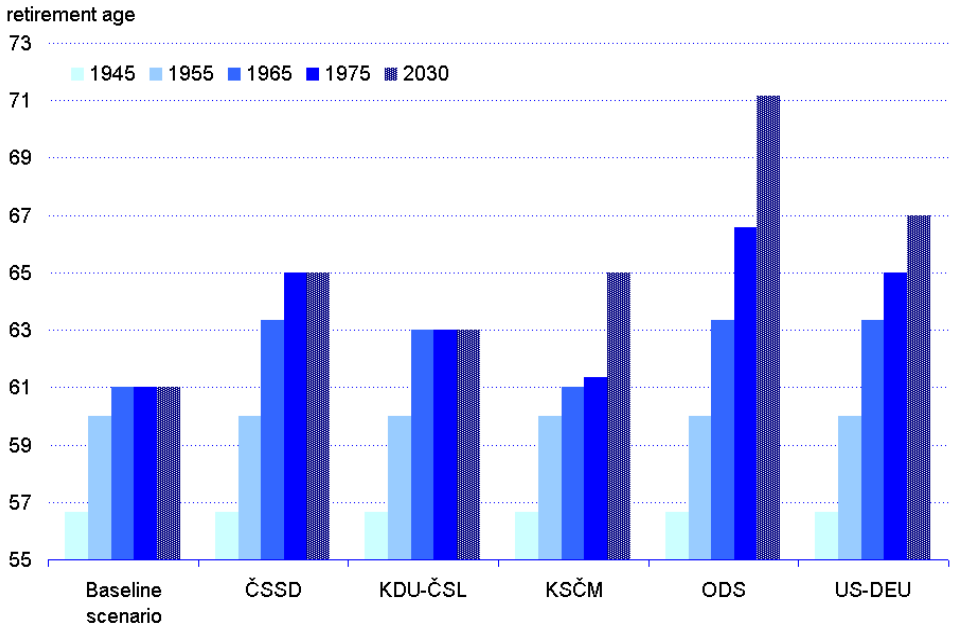


Chart 2-3: Statutory retirement age by year of birth – women with two children

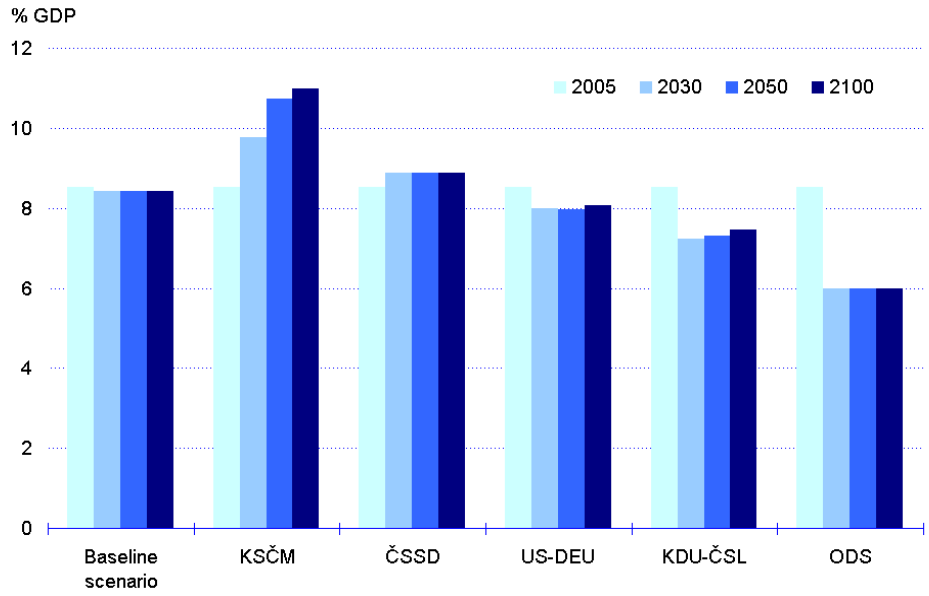


2.2.2 Revenues of the pension system

Besides the parametric optimisation proposal, there is no solution focused on the revenue side.

The premium rate for pension security is 28% in the baseline scenario, and the revenues of the pension system are stable over the long run at 8.4% of GDP. However, they are not sufficient in the long term for covering future pension obligations. The same problem is faced by KSČM's parametric optimisation proposal, because without significant measures on the expenditure side, it promises future pensioners the same level of contributions. This incongruence is then dealt with by increasing the premium rate to 33.5% and shifting the burden of pension financing to the state budget, which would fall into a deeper deficit. The other proposals do not consider an increase in the premium as a solution, and if resorting to an increase in revenues, it is much lower in nature (Chart 2.4).

Chart 2-4: Comparing the revenues of the state pension system



Only the proposals of KSČM and ČSSD increase state system revenues.

In comparison with the baseline scenario, only the proposals of KSČM and ČSSD increase the mandatory payments to the state pension system. Implementing the KSČM proposal would mean an increase in the system's revenues of more than 2.0% of GDP. ČSSD's proposal assumes an increase in revenue of ca 0.5% of GDP through a shift of the remaining part of the contribution for employment policy (1.6% of the gross wage) to the pension system. An increase in the revenues of the pension system eventually shows up as a decline in disposable income and household savings, which could result in restricting the volume of resources contributed to old-age security from own funds.

Most proposals cause a decline in the revenues of the state system.

The other proposals (ODS, KDU-ČSL and US-DEU), however, reduce the revenues of the state pension system. The ODS proposal shows the sharpest decrease, assuming a reduction of eight percentage points in the premium rate for all citizens starting in 2007. As a result, disposable funds of ca 2.5% of GDP are freed up. The KDU-ČSL proposal lowers the premium for selective groups (parents with children and citizen who have reach retirement age), however, it assumes an increase in the pension system's revenues by a portion of indirect taxes (0.6% of GDP). For the proposals of KDU-ČSL and US-DEU, the decline in the state system's revenues is generated in particular by citizens partially opting out of the state system. This causes an immediate decline in the state system's revenues, and the expenditures of the system will also be reduced in the future by the portion of the pension contributions of opting-out individuals. However, the percentage of persons opting out will slightly decrease over time, because the merits of the funded pillar decrease as life expectancy increases, and so the revenues of the state system slightly rises.

The payment burden of citizens increases the

The proposals of KDU-ČSL and US-DEU require co-financing of the transferred premium. As for KDU-ČSL, co-financing of 2% of the gross wage relates only to the transitional generations on the labour market at the time of launching the reform. Therefore, it will not affect the overall paid premium

need for co-financing the transferred premium.

over the long run. The US-DEU proposal defines opting out by increasing the payment rate by 6% of the gross wage for all individuals. If we were to account for these payments as well, we would find that the overall premium paid to the state and to the funded pillar is ca 0.7% of GDP higher than in the baseline scenario.

2.2.3 Pension system balance

The political party proposals are financially sustainable over the long term.

The balance of the pension system allows us to assess whether the proposals are financially sustainable over the long term and whether they refrain from creating pension obligations that they would not be capable of fulfilling in the future. This is the case for the baseline scenario. If the current system was preserved with no changes, it would generate a deficit of 4.5% of GDP over the long run. The rise in pension expenditures caused by the demographic shock could only be financed through the creation of a deficit, and the unchanged system would be destined to fail. The purpose of political party proposals is to prevent this from happening. All of the proposals, as they stand now, are financially sustainable over the long run. This sustainability, however, relates only to the pension system, and the other public budget segments are not taken into account.

The balance for the proposals is stable; some generate a transitional deficit.

The balance for the specific proposals is stabilised in a range of –0.3% to 0.7% of GDP in the long run, with the exception of the KSČM proposal, which has a deficit tendency exceeding 1.0% of GDP. However, some of the proposals have substantial transitional deficits that last for a relatively long period of time. These are proposals that allow partial opt-out from the state system (KDU-ČSL and US-DEU) and the flat-rate pension proposal.

A transitional deficit is the price for improving the revenue situation of opt-out individuals in productive or retirement years.

There is a decline in revenues in the proposals for ODS, KDU-ČSL and US-DEU immediately after introducing the reform, and the expenditures are reduced with a significant time delay (ca 15 to 30 years). This time discrepancy is the cause of the transitional deficit. In the flat-rate pension proposal, a deficit of 1.8% of GDP is generated immediately after introducing the reform. This is eliminated by around 2035. The deficit for the US-DEU proposal will amount to ca 0.8% of GDP in the short term and will also be eliminated around 2035. Not even the KDU-ČSL proposal is capable of circumventing the transitional impact of premiums. However, financing through an increase indirect taxes helps to bring in additional resources, which keeps the system from going into deficit. In the voluntary opt-out proposal, the generation of a transitional deficit is the price for improving the revenue situation of opt-out individuals in the state system in respect to its substantial redistribution relating to a relatively low replacement rate.

The NDC system is stable over the long run, despite the temporary deficit.

The NDC proposal submitted by ČSSD initially records surpluses, but then falls into deficit during the projection period (2030 to 2065). The deficit peaks around 2045 at 1.4% of GDP. The decline is caused by the retirement of population-strong generations. However, the stability of the system is supported by the fact that the system returns automatically to equilibrium without changing the parameters.

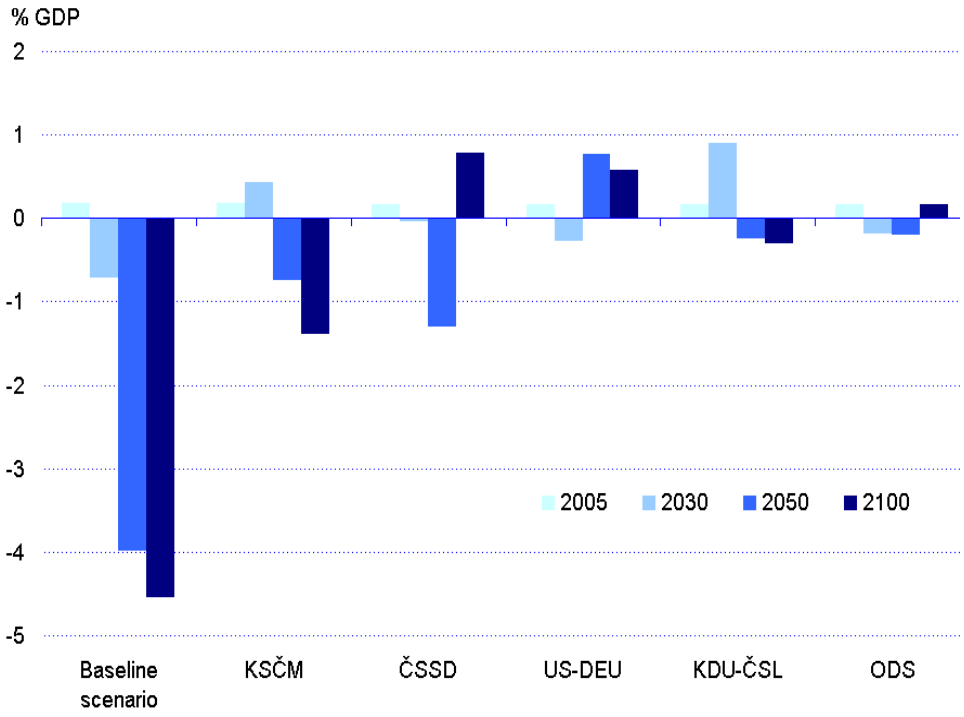
Financial sustainability in the parametric

The parametric optimisation proposal submitted by KSČM registers permanent deficits after 2040 that reach 1.3% of GDP at the end of the projection period. This deficit can be financed through the surpluses of the pension system

proposal is disputable.

generated during the first half of the projection period. However, this mainly involves virtual surpluses, because they are accompanied by the state budget debts that are carried over to the pension system after 2020, i.e. 0.9% of GDP per year[11]. Therefore, the problem is merely transferred away from the narrowly defined pension system, and these steps do not change the financial sustainability of public budgets.

Chart 2-5: Balance of the state pension system



2.2.4 Overall replacement rate

The overall replacement rate measures the generosity of the system, but ignores the individual differences.

The overall replacement rate expresses the ratio of average old-age pension to gross average wage. However, significant differences in the individual replacement rates can be concealed behind the same overall replacement rate that relate to the level of the system's redistribution. In this section, we will focus on the overall replacement rate, which is an aggregate indicator comprising the amounts of newly awarded pensions, the valorisation rate, the structure of paid and newly awarded pensions and the process of increasing the retirement age. The generosity of the system for various income-situated individuals and the level of the system's redistribution will be assessed in the micro-financial criteria.

A high replacement rate cannot be financed using

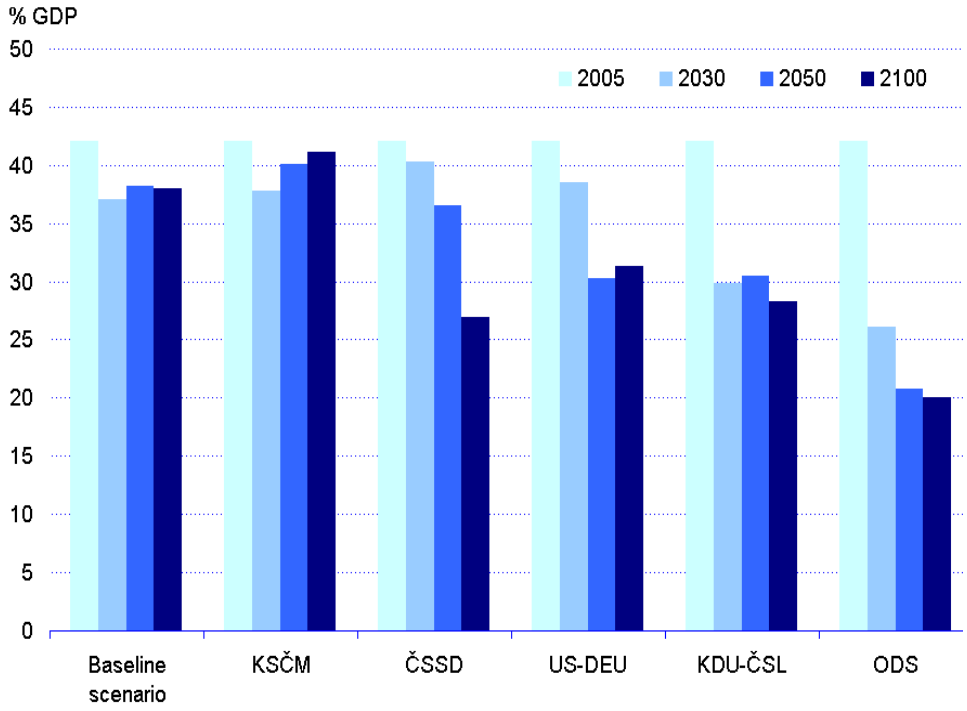
The parametric optimisation proposal submitted by KSČM has the highest replacement rate. Only this system sustains the replacement rate at a level of 40% of the gross average wage and exceeds even the baseline scenario. Here the trade-off principle for a pension system can be clearly illustrated. Parametric

[11] i.e. transfer of a part of the excise taxes collected, the contribution to supplementary pension insurance and the remainder of the premium for the state employment policy.

the current resources of the system.

optimisation and the baseline scenario provide a high level of average replacement, but the pension obligations are not covered by corresponding resources, and as a result, they are very difficult to fulfil. In the baseline scenario, the system's generosity is covered by the creation of a deficit, and in the parametric optimisation system, by an increase in the premium, which reduces the standard of living of the population in their productive years, and by shifting the deficit to other public budget segments.

Chart 2-6: Overall gross replacement rate



NDC reduces the replacement rate when receiving pension over the long term.

In the other proposals, the replacement rate is significantly reduced in comparison to the baseline scenario, and an average replacement higher that 30% of the gross wage cannot be expected for the target level. The replacement rate in the ČSSD proposal only slowly declines, which is the result of the long changeover to the NDC system. In Chart 2.6, all pensions are not paid according to the rules of NDC until the column for 2100. With an increase in life expectancy and a fixed statutory retirement age, this system pushes the level of paid pensions below 35% of the gross wage at around 2055 and to 27% at the end of the projection period. The replacement rate significantly declines, despite strengthening of the resources of the pension system.

Voluntary opt-out helps increase the replacement rate when individuals make rational choices.

Both proposals directly provide a higher replacement rate with partial voluntary opt-out than the NDC system. If we consider the moment when there is a certain difference in the premium rates, then a higher replacement rate is based on the fact that citizens have the option of choosing the most beneficial system for this rate. Citizens with higher incomes whose pension in the current system is significantly reduced can increase the replacement rate by opting out of a part of the premium in favour of the funded pillar. On the other hand, citizens with low incomes remain in the state system, and they will benefit from redistribution, which provides them with a higher pension than if they were to rely on their own funds. Despite the relatively low net rate of return of the

funded pillar assumed in the macroeconomic scenario (lower than an increase in the premium volume), a combination of two pillars provides a relatively high overall replacement rate. It is important to point out here that this is achieved in the US-DEU proposal mainly thanks to co-financing. Citizens that shift part of their funds to the funded pillar must increase premium payments by an additional 6% of the gross wage, which automatically increases their replacement rate.

From a philosophical point of view, flat-rate pension presents a different concept for old-age security.

The replacement rate for the ODS proposal declines in line with the specifications to 20% of the gross wage. Therefore, it would be difficult to compare to the other proposals, because the premium rate is significantly reduced by 8 percentage points. If citizens would use these funds for old-age security, there would be a sizable increase in the replacement rate. This, however, is based on the strong assumption that individuals are not short-sighted and that their planning horizon is in a range of several decades.

The replacement rate need not predict the ability of the pension system to prevent poverty.

A similar replacement rate could mean that there is a significant difference in the rate of success when achieving social sustainability. The percentage of pensioners who fall below the poverty level is important information for the social sustainability of pension reform. This is understood by the Executive Team as being relative to the average wage, where this relationship is constant over time. It was set arbitrarily at 24.5% of the average wage, which corresponds to the 2004 minimum subsistence level in the Czech Republic and is in line with the settings of similar institutions in EU countries[12]. For persons who contributed during the statutory period, the pension system should be capable of securing pensions at least at the level of basic needs. If the pension system does not guarantee income higher than the poverty level, the participants could be reliant on other social systems. The problem then is carried over to other segments of public finance and increases the deficit above and beyond the narrowly monitored pension system.

The best way to eliminate poverty is to ensure solidarity in the state pension system.

The lowest percentage of poor is found in systems that have the highest level of solidarity financed by a high premium rate. The lowest percentage of poverty, therefore, is in the parametric optimisation proposal, in which the percentage of new pensions below the poverty level declines and even below the level in the baseline scenario. The KDU-ČSL proposal with voluntary opt-out in the state system increased solidarity, which protects low-income earners against poverty. The percentage of new pensions below the poverty level does not exceed 4% in this proposal. Flat-rate pension is a clear exception to this rule. By definition, it is a system with the highest level of solidarity, nevertheless, all awarded pensions are below the poverty level. This is due to the definition of poverty level. If it would be set just under 20% (as for example in France), the percentage of poor pensioners would be zero. In addition, a flat-

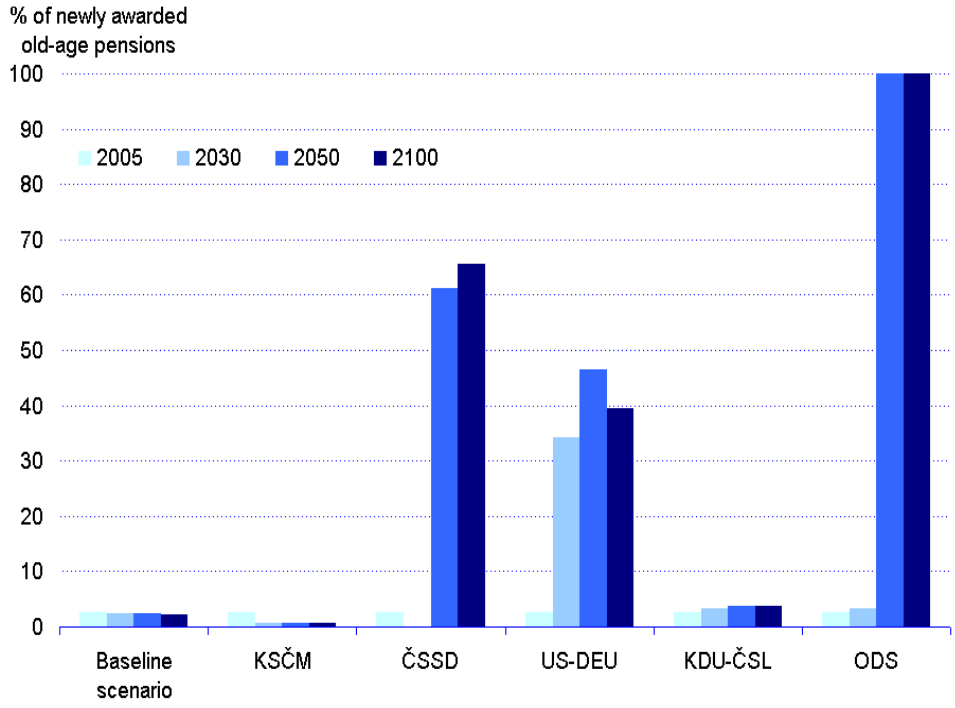
[12] For example, the minimum subsistence level is 20.7% of the average wage in Belgium, 18.4% in France, 23.4% in Ireland, 31.1% in Luxembourg, 18.8% in the Netherlands, 19.8% in the UK, 26.8% in Slovakia and 15.9% in Poland. It is worth mentioning that the relative minimum subsistence level does not depend on the economic development of a country. It can be assumed that a similar poverty level will be set in the Czech Republic, regardless of catching up with the economic level of Eurozone countries.

rate pension system with wage valorisation would protect against poverty during the entire pension period. The other proposals with less generous valorisation (KDU-ČSL, ČSSD, and KSČM) are not capable of assuring that pensions do not fall below the poverty level several years down the road.

Fully equivalent systems do not as easily protect citizens with low incomes and a short career against poverty.

With the exception of the ODS proposal, there is a large percentage of new pensions under the poverty level, even in the NDC proposal and the combined system. In the NDC proposal, 65% of newly assessed pensions are below the poverty level over the long term. This indicator reaches values of 35% to 45% in the US-DEU proposal. This is caused by introducing substantial equivalence to both pension proposals. A fully equivalent pension system is not capable of protecting citizens with low incomes and short, often interrupted, careers against poverty. It is, therefore, necessary to resolve this situation outside the pension security system, and increased costs in the area of social care should be expected. These costs, however, are not present in systems with solidarity.

Chart 2-7: Share of newly awarded pensions below the poverty level



Note: The data are not exhaustive, and the chart focuses exclusively on newly awarded old-age pensions. Non-old-age pensions (especially disability) and paid pensions are not dealt with. Paid pensions could fall below the poverty level due to lower than wage valorisation, even if the assessed pension is initially above this level. Moreover, valorisation affects even the amount of assessed pension in the funded pillar. The lower the level of valorisation, the higher the newly awarded pension can be. At the same time, however, there is an increased risk that pension will fall below the poverty level over time. On the other hand, old-age pension need not be the only income. This means that, when considering other incomes (e.g. survivor's pension), a pensioner would not necessarily be below the poverty level.

2.3 Comparing the Micro-Financial Criteria

The differences in the analysed proposals are

When evaluating the reform proposals, it is important not only to monitor whether the proposal is financially and socially sustainable over the long run and is capable of dealing with pension obligations, but also how they will affect

revealed in the micro-financial criteria.

the various income levels of individuals and how to redistribute pension rights within the generations. On a macro-financial level, the analysed proposals have encroached on the relatively narrow range measured by expenditures (6% to 8% of GDP), the balance (–0.3% to 0.7% of GDP) and the replacement rate (20% to 31% of gross wage). When using the micro-financial criteria, however, the differences between the proposals are increased. The proposals range from highly equivalent proposals to proposals with full solidarity. The proposals also affect in various ways the decision-making of economic agents concerning whether or not to stay on the labour market.

2.3.1 Individual replacement rate

The individual replacement rate is affected by the actual moment of retirement and the statutory retirement age.

The individual replacement rate expresses the rate of newly awarded pensions and the last pre-pension income. In order to compare the proposals with differing statutory retirement ages, it was necessary to utilise the hypothetical individual with a given earnings profile (HI). An HI is a man or a woman with two children who enters the labour market at 20 years old and who always retires at the age of 65[13]. The assumed retirement age (65 years old) can in this way substantially differ from the statutory retirement age of the actual proposals. Retirement after the statutory retirement age, as a rule, increases the awarded pension, either through a bonus in defined benefit schemes (e.g. in the baseline scenario, reflecting the current legislation) or by directly increasing the assessed annuity in defined contribution schemes (NDC and FDC).

The more extensive the spread is between the replacement rates of income-weak and income-strong individuals, the more the system exhibits solidarity.

Charts 2.8 and 2.9 compare the replacement rate for hypothetical individuals with a given earnings profile (HIs) who earn an average wage throughout their entire working career to levels of one-half and triple the average wage (HI 100%, HI 50% and HI 300%). The length of the segment then indicates a spread between the replacement rate for the weakest income earners (HI 50%) and the strongest income earners (HI 300%). The dot on this segment defines the replacement rate of an individual with an average income. The wider the spread is between the replacement rates of income-weak and income-strong individuals, the more the system is inclined to redistribution. The pension rights are redistributed from wealthy individuals to poor individuals. This restrains the premium components of the system, and the premium more or less takes on the character of a tax.

The generosity of the pension system is relative notion.

The positioning of the segment indicates the generosity of the pension system. The higher the replacement rate, the lower the decline in the standard of living a retiring individual will experience. However, the indicator compares net pension to gross wage, and as a result, overestimates to a certain extent the difference between the last income and pension. Chart 2.8 shows that the highest replacement for low-income earners could be provided by the baseline scenario (more than 90%) and the parametric proposal (more than 80%). The KDU-ČSL proposal provides a similar level of generosity for low-income males with a replacement rate of around 75%. On the contrary, the NDC system is

[13] A precise definition of a hypothetical individual with a given earnings profile (HI) is given in the annex entitled "Hypothetical individual with a given earnings profile". The definition of an HI presupposes the average structure and the scope of non-contributory insurance periods (studies, unemployment, sickness leave, or childcare).

most advantageous for wealthy individuals. This system introduces equivalence, and all individuals have a replacement rate of ca 45%, regardless of their earnings. A man with triple the average wage (though not women with the same earnings) will also be better off in the US-DEU proposal thanks to the adjustments in the pension formulae strengthening equivalence. It is clear from the given examples that the generosity of the system is a relative notion and depends on the income ratio of a particular individual.

Chart 2-8: Replacement rate for men born in 2000

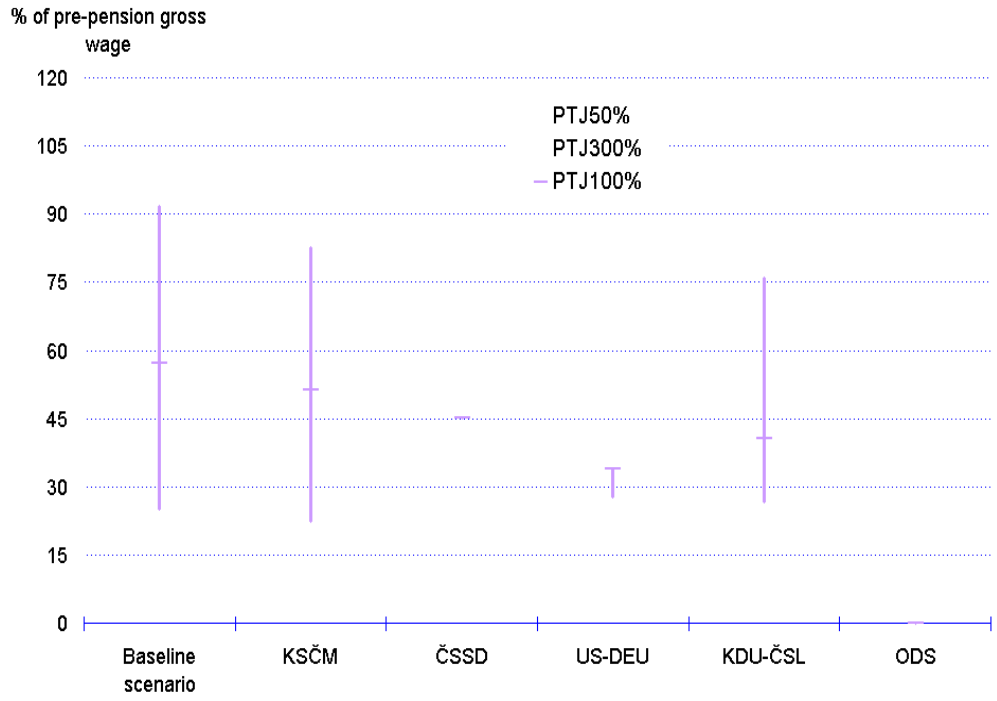
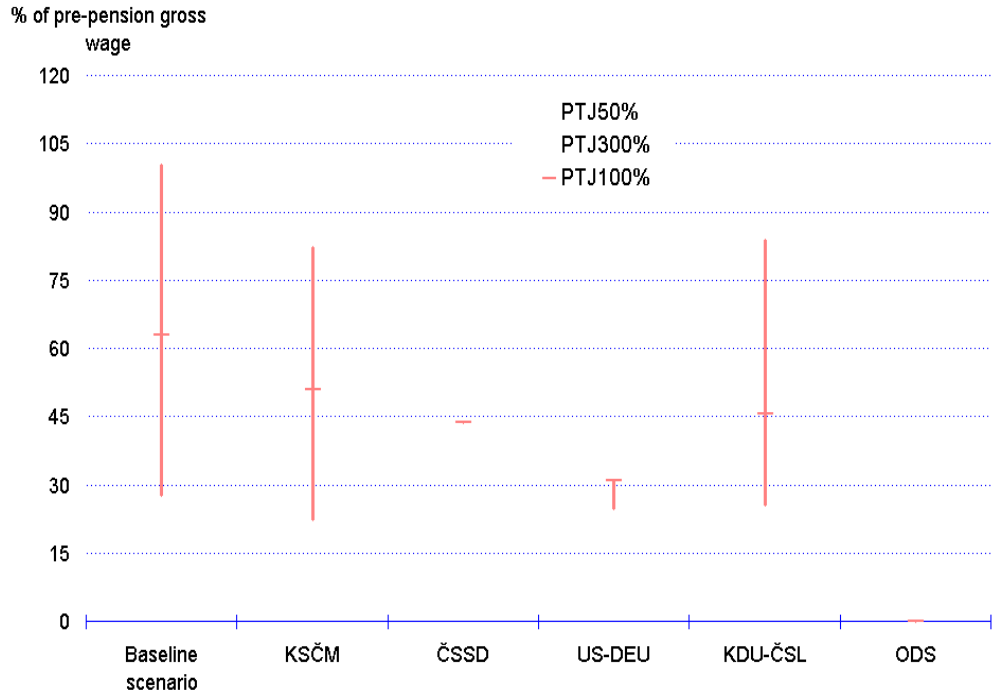


Chart 2-9: Replacement rate for women born in 2000



Note: In the KDU-ČSL and US-DEU proposals, the chart shows the replacement rate including the effects of opting out. In both proposals, HI men with an income of 100% to 300% of the average wage and HI women with an income of 300% of the average wage would benefit from opting out in favour of the funded pillar. In the US-DEU proposal, HI women with an income of 100% of the average wage also benefit from opting out.

The replacement rate is not an ideal indicator of the pension system's generosity…

Nevertheless, even this indicator does not have ideal prediction capabilities. It is affected by the amount of the premium rate. The proposals with a higher premium rate (KSČM, ČSSD, and the funded pillar in the US-DEU proposal) can offer a higher replacement rate. In addition, the replacement rate only predicts the amount of newly rewarded pension and neglects pension development during the lifetime of a pensioner. The proposals with lower valorisation (KDU-ČSL, ČSSD, and KSČM) can afford to have a higher replacement rate. On the other hand, full wage valorisation (US-DEU and ODS) necessitates a lower replacement rate. Therefore, it is more beneficial when assessing generosity to concentrate on the indicators that account for an individual's overall costs and revenue (see Section 3.2.2).

… nor of the level of redistribution.

The individual replacement rate is also affected by the definition of HI and the statutory retirement age, which could even influence the level of solidarity in the pension system. Charts 2.8 and 2.9 show that the replacement rate for an HI born in 2000 has a value of zero in the ODS proposal. This is related to the fact that the statutory retirement age for this person is almost 69 years old, and pension entitlement would occur after reaching this age. At 69 years old, an individual with an average income would obtain a pension of 20% of its pre-pension wage. A person with an income of half the average wage would obtain a 40% replacement rate, and a person with triple the average wage would receive only 6.7% of its pre-pension wage. This demonstrates a significant level of income solidarity that is, nonetheless, not observable in Charts 2.8 and 2.9. Additional deviations occur in the US-DEU proposal, because the replacement rate of persons who opt out is higher as a result of the premium rate increased

by the required co-financing.

2.3.2 Internal rate of return

The internal rate of return is the best way to assess the generosity and redistribution rate of the pension system.

The internal rate of return is an indicator that eliminates the disadvantages arising from a comparison of the proposals according to the individual replacement rate, and it considers participation in the pension system as an investment. The paid premium is the cost, and the benefit from this cost is the pension obtained during the remainder of a person's life. In this respect, it expresses the interest rate that must be applied to the paid premium so that an individual may obtain the given pension flows. The level of the internal rate of return predicts the generosity of the system and is not encumbered by the amount of the premium rate, the level of valorisation or the statutory retirement age.

Chart 2-10: Internal rate of return for men born in 2000

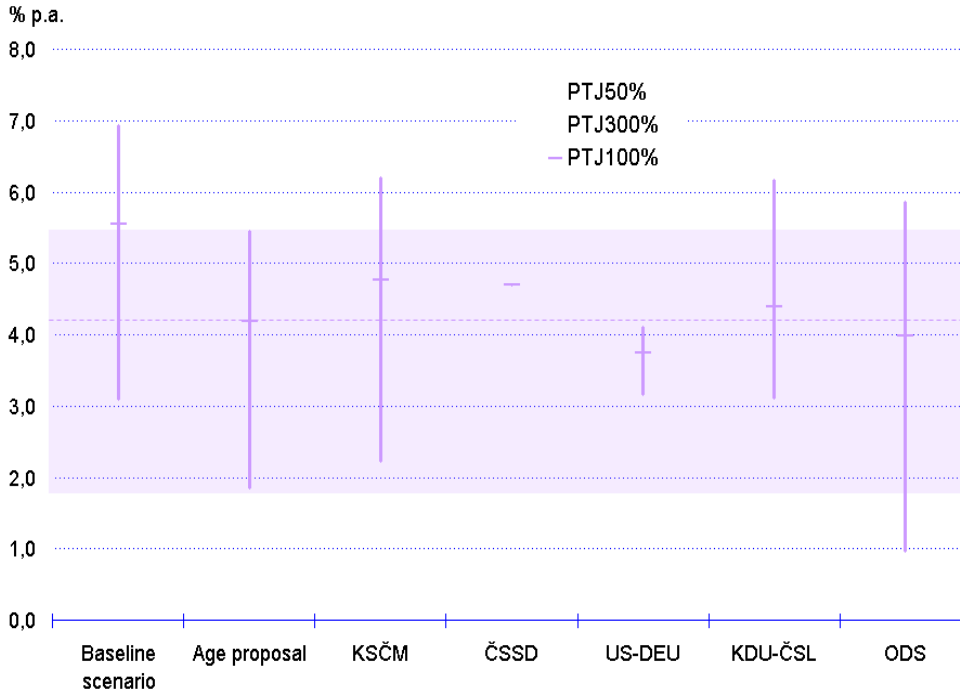
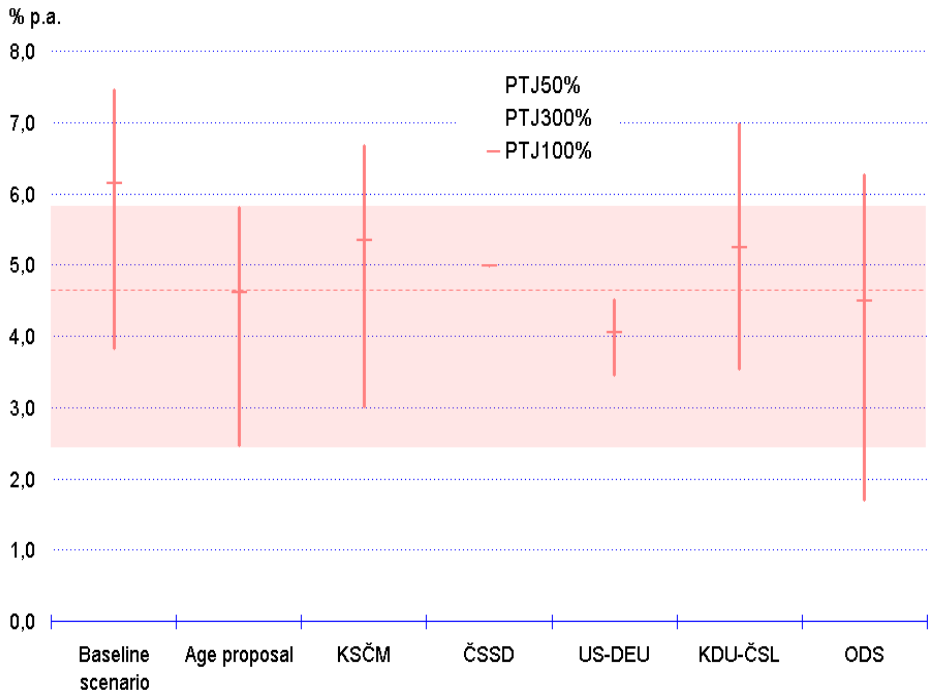


Chart 2-11: Internal rate of return for women born in 2000



Note: In the KDU-ČSL and US-DEU proposals, the chart expresses the internal rate of return, including the effects of opting out. Both proposals use opting out in favour of the funded pillar for HI men with incomes of 100% and 300% of the average wage and Hi women with incomes of 300% of the average wage. In the US-DEU proposals, HI women with 100% of the average wage also opt out. A partial changeover to the funded pillar increases the rate of return for opt-out persons and lowers the solidarity level of the system (measured by segment length).

The internal rate of return is not realistically achievable in the baseline scenario.

The internal rate of return for men and women is given in Charts 2.10 and 2.11. The positioning of the segment shows the generosity of the system, and the length shows the level of redistribution. It is not useful to compare the internal rate of return in the political party proposals with the baseline scenario. The baseline scenario shows a high rate of return (3.0% to 7.5% p.a.), which is not realistically achievable given the set revenues of the system. In order to maintain the generosity of the existing system, the premium rate would need to increase sharply, which would, however, reduce the rate of return. This is why the political party proposals are compared with the "age version" (annex for parametric changes – combined proposals) that changes the parametric settings of the system to make it financially sustainable. The comparison is indicated in the charts with a coloured band that represents the range between a person's rate of return with half the average wage and a person with triple the average wage (HI50% and HI300%) and with a horizontal dotted line indicating the internal rate of return of an HI100% in the age version.

The order of the proposals according to the generosity of the pension system cannot

From the standpoint of generosity, the exact order of the proposals cannot be determined. When considering only men with an average income, the most generous proposal is the KSČM proposal (4.8% p.a.) followed by ČSSD, KDU-ČSL, ODS and US-DEU. Women with an average income and two children would achieve a higher rate of return with the KDU-ČSL proposal (5.2% p.a.) than with the ČSSD proposal, because women benefit from a lower retirement

be clearly determined …

age and an insurance discount for the period of raising children. For men with triple the average wage, the highest rate of return is in the ČSSD proposal (4.7% p.a.), followed by US-DEU, KDU-ČSL, and KSČM and then the lowest rate for the ODS proposal (1.0% p.a.). In contrast, a person with a low income benefits most from the KSČM, KDU-ČSL and ODS proposals, followed with a wide gap by ČSSD and US-DEU. In respect to the internal rate of return, no proposal is really more advantageous than the other proposals. The merits depend on the income category to which a person belongs.

… however, the proposals differ in the level of solidarity.

The conclusions above demonstrate that the proposals differ primarily in the level of solidarity (segment length). So the proposals can be categorised in range from those having the most solidarity to those having the most equivalence as follows: ODS, KSČM, KDU-ČSL, US-DEU and ČSSD. Flat-rate pension contains the highest level of solidarity, because the pension benefit does not depend on the amount of the premium nor on the length of a person's career. In the case ODS, however, an increase in the level of solidarity is compensated by limiting its volume (reducing the premium rate). The KSČM proposal essentially maintains the current system's level of solidarity, although the volume rises through an increase in the premium rate. On the other hand, if we disregard the minimum guaranteed pension, the NDC system ensures the same profitability for all persons of the same sex. There is only a certain level of solidarity between men and women due to the unisex mortality tables when calculating annuity. Otherwise, the solidarity between the sexes in the state system asserts itself in the majority of the proposals through non-contributory periods (KSČM KDU-ČSL, US-DEU, and ODS), longer life expectancy for women (KSČM, KDU-ČSL, US-DEU, and ODS) and a lower retirement age for women (KDU-ČSL).

Opting out lowers the volume of solidarity.

The proposals that allow for partially opting out (KDU-ČSL and US-DEU) reduce the volume of solidarity. Persons that opt out and transfer a part of the premium to the funded pillar contribute less to financing the pensions of low-income groups. Opting out individuals also increase profitability by changing over to the funded pillar, because the low profitability in the state pillar is partially offset by the higher profitability in the funded pillar. However, the similarities between the KDU-ČSL and US-DEU proposals stop here. In the state pillar, these proposals develop in the opposite direction. By adjusting the pension formulae, the KDU-ČSL proposal strengthens solidarity. In contrast, the US-DEU proposal introduces higher equivalence in the same manner. This difference is shown in Charts 2.10 and 2.11 with a significant difference in the spread of the rate of return for a person with half the average wage and one with triple the average wage.

2.3.3 Implicit tax

The implicit tax assesses the effect of the pension system on the labour market.

The implicit tax expresses how the pension system affects economic decision-making during pre-retirement and at retirement age in respect to remaining on the labour market. If an additional year on the labour market is not fully reflected in higher pension, the system motivates a person to leave the labour market. The power of this stimulus is measured in relation to pre-retirement wages in the form of the costs of remaining on the labour market (paid premium and waiving annual pension) after deducting the returns (increase in the premium for the remainder of a person's life). A positive implicit tax

indicates a net loss from remaining another year on the labour market. In contrast, a negative tax indicates a net profit.

The character of the pension system could influence the employment rate for elderly persons.

It generally applies that a defined benefit system is difficult to set as actuarial neutral. The parameters of the pension formulae cannot be set so that the pension system properly rewards a higher pension to various individuals and sexes from various generations, earning various incomes for remaining an extra year on the labour market. The implicit tax attains positive or negative values in various areas depending on how the pension formulae are set (penalties for early retirement and a bonus for later retirement). In contrast, the DC system in its pure form is actuarial neutral by definition, because additional years and additional premium payments are fully reflected in the pension amount/annuity. The combined system containing the state DB component and the funded DC component partially reduces the implicit tax variation in the state pillar in relation to the weight of the funded pillar.

The current system is not actuarial neutral and can affect decision-making on whether or not to remain on the labour market.

These general conclusions have also been confirmed by the calculations made by the Executive Team. The current system, in relative terms, strongly penalises early retirement. Chart 2.12 shows that a man retiring three years early at the age of 60 will face a net loss of ca 20% of its pre-retirement wage. The implicit tax remains negative even two years after the retirement age (65 years old), because the current system acknowledges an increase in pension as extra years of service. The constant bonus for extra years of service, however, is not sufficient to compensate for the declining life expectancy (and receiving pension), which is reflected in the positive, increasing implicit tax at the age of 70 and 75. The KSČM proposal exhibits very similar behaviour, however, the negative implicit tax shifts to a higher age in line with the higher statutory retirement age.

Chart 2-12: Implicit tax for men born in 2000 and earning an average income

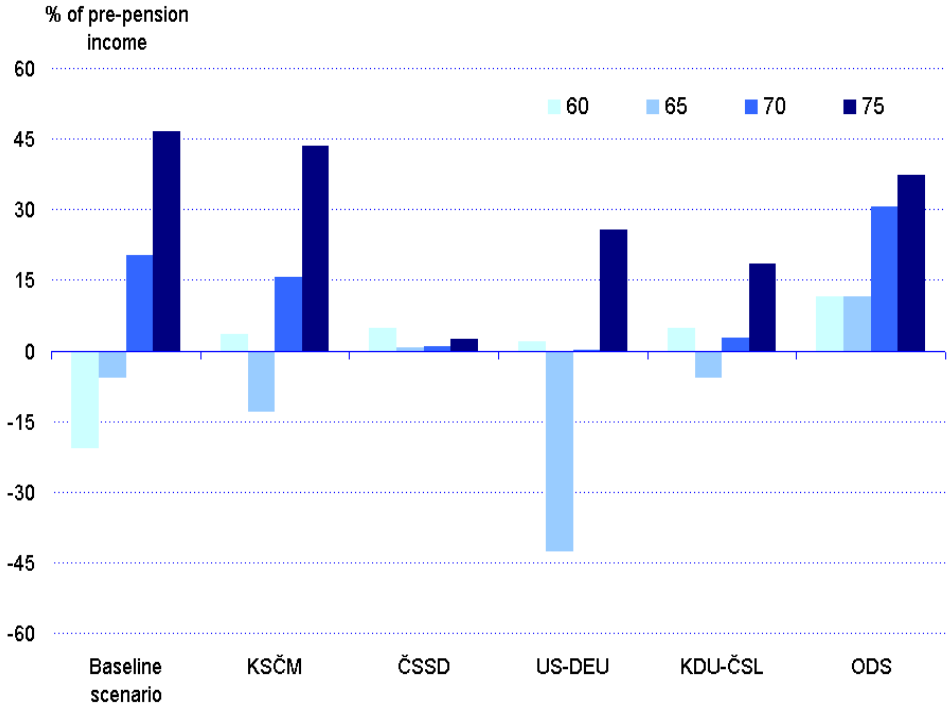
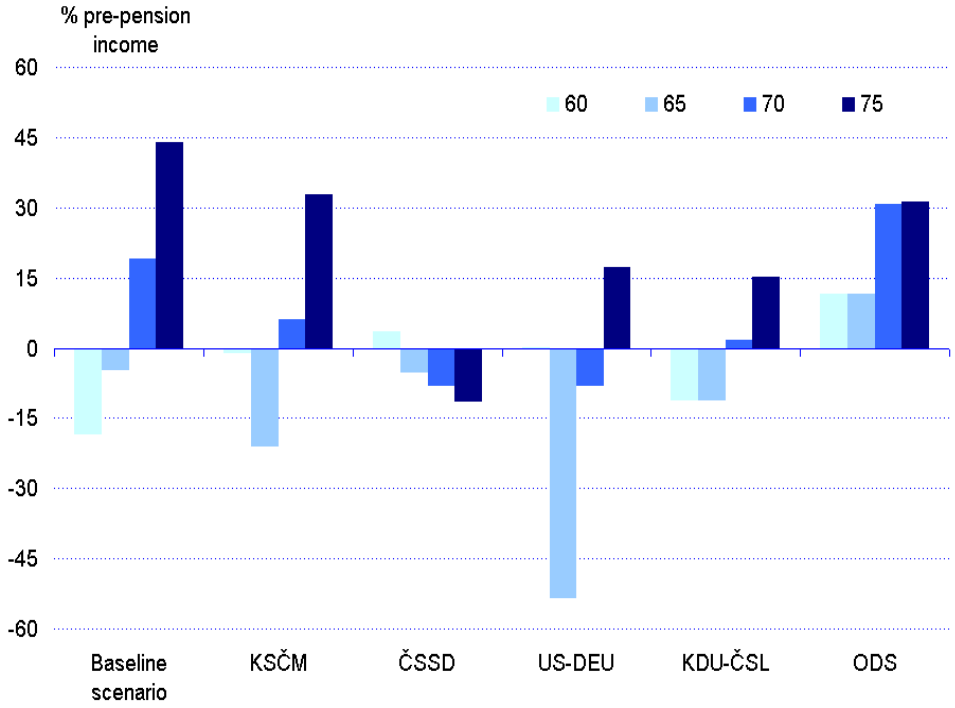


Chart 2-13: Implicit tax for women born in 2000 and earning an average income



Note: We assume in the chart that HI men and HI women decide to partially opt out of the state system for the KDU-ČSL and US-DEU proposals.

Out of all the proposals, the NDC system and voluntary opt-out improve actuarial neutrality.

The NDC system manages the best in the implicit tax criterion. This involves a defined contribution system that is close to actuarial neutrality. The values of the implicit tax, therefore, are very close to zero. Use of the unisex mortality tables for calculating annuity is the only factor interfering with neutrality. This system slightly motivates men to leave the labour market (positive implicit tax), and on the contrary, motivates women to remain on the labour market (negative implicit tax). Even the proposals with voluntary opt-out affect the labour market in a more positive manner than the baseline scenario. By introducing the defined contribution funded component, the implicit tax values approach zero and increase actuarial neutrality. Interference occurs only in the US-DEU proposal, which continues to restrict early retirement through parametric changes, and this is reflected in the high negative implicit tax for pre-retirement age (65 years old in the chart).

Flat-rate pension significantly interferes with motivation to remain on the labour market after the statutory retirement age.

Flat-rate pension is the worst off for motivating elderly persons to remain on the labour market. Flat-rate pension motivates persons to retire exactly at the statutory retirement age. They may not leave earlier, because they would not receive pension at all prior to reaching the statutory age. Nor is it advantageous for them to retire at a later time, because pension cannot be relatively increased in any way by paying additional premiums. Therefore, the implicit tax is positive. In the ODS proposal, however, the impact of the positive implicit tax should not be overestimated, because this proposal, in contrast to the other proposals, forces persons to remain on the labour market in other ways – cancelling early pensions and increasing the retirement age which follows the increase in life expectancy.

3 Conclusions of the Executive Team

3.1 General Commentary on the Pension System and its Reform

3.1.1 Modelling the pension system is a long-term undertaking

A projection up to 2100 has been chosen for modelling the future development of the pension system. This long-term projection period is essential for a number of reasons. These reasons are laid out in the following sections.

A projection of the pension system must fully encompass the current generation …

There is significant delay in the response time of the pension system, and each generation is involved from the moment of entering the labour market until their death. Every person pays contributions to the mandatory system during its economically active years. Their entitlement to future pension is based on these contributions, and they will receive this pension after retiring from the labour market. For example, the generation that is currently entering the labour market (persons born around 1985) will retire in about 45 years (i.e. in about 2050). They will receive pension for approximately another 25 years, up to ca 2075. However, there is a wide spectrum of individual data for the average pension period ranging from low values up to several decades (30 or more years). Nevertheless, for a full-model understanding of the generation, we actually need a projection period that significantly exceeds 2080.

… and be capable of testing the stability of the system across several future generations.

However, to analyse the pension system, is it necessary to embrace not only one generation but several generations or years of birth. Various generations will have various characteristics (e.g. a population-strong year), that are significant for the development of the pension system. It is important, in particular, to focus on the young, future generations, i.e. on the persons that the reform should actually target. These circumstances inevitably increase the overall projection period even further.

There are additional reasons for having a sufficiently long projection period ...

Unfavourable demographic development will take place in the upcoming decades in the form of a massive increase in the elderly population. According to the current forecasts, this should peak in 2050. The situation should improve somewhat after this time and then stabilise. It is important to monitor how the pension system adjusts over the long run to the overall situation. Therefore, it is essential to include in the projection a sufficiently long timeframe even following the peak of the demographic shock.

... a short projection period could distort the conclusions of the analyses.

The unfavourable demographic situation could be "handled" by making certain minor corrections in the pension system that shift the onset of the problem beyond the short-term projection period so that the problem cannot be seen in the analysis. Such measures do not resolve the situation. They only shift the solution to the future to much worse conditions, which is counterproductive for the government's financial position as well as the long-term standard of living of persons in their active or post-active years.

3.1.2 A projection is not a forecast

An important fact should be mentioned in relation to the projection period. Modelling the pension system and all associated activities are presented in the

form of long-term projections and not short-term forecasts. The purpose of short-term forecasts is to estimate as precisely as possible actual future development for several months, quarters or, at most, a few years. In contrast, long-term projections focus on monitoring the development of trends over the long run, which means several decades for the pension system.

The techniques for creating long-term projections significantly differ from those of short-term forecasts.

Of course, it is always important to accept some initial assumptions that are subject to a certain level of uncertainty. Short-term forecasts work with a more complex set of initial assumptions (in view of the quantity and detailed nature of the data). It is for this reason, among others, that the position of the economy in the economic cycle should be more precisely identified in economic forecasts to achieve the most accurate estimate of the short-term future, which allows cyclical factors to be accounted for. On the contrary, projections, which focus on the long-term horizon, may filter out the cyclical effects and focus only on the structural relations. Short-term cyclical fluctuations cannot affect the trend of the pension system's monitored parameters over the long run. The initial assumptions of the model could register a large spread, however, the long-term pension projection mostly shows a lower level of sensitivity (see the sensitivity analysis for the baseline scenario).

Projections cannot be assessed in the same way as forecasts.

In projections, it is essential to focus on the trends of the monitored parameters rather than on specific figures in a particular year. Due to the above reasons, the specific values of long-term projections could, and usually do, differ from reality over the very short term. They primarily monitor the trends, so the actual short-term development is "smoothed out" to a certain degree. It would, therefore, be inappropriate and misleading to analyse these long-term projections from a short-term perspective, to compare *ex-post* the absolute values in a concrete year with reality, or to make related conclusions on the reliability of the long-term projection.

3.1.3 Comparing the pay-as-you-go (PAYG) and the fully funded (FF) systems

There are two basic methods of financing pension requirements – pay-as-you-go and fully funded financing. In the PAYG system, the collected premiums from economically active persons – premium payers – are used to pay pensions. In the FF system, the paid premiums are invested in individual accounts.

PAYG and FF differ primarily in the determining factors of its aggregate rate of return …

We assume full intergenerational solidarity in a PAYG system (see Intergenerational solidarity below), which means, in principle, equality of the revenues and expenditures of the pension system every year. The rate of return for a PAYG system, under the condition of a stable contribution rate, is then determined by growth in the volume of collected premiums, i.e. level of wages and salaries in the economy. In the sense of the macro-scenario, this is the result of development of the average wage and the number of employed persons over the long run. The average wage is determined in the long run by labour productivity growth. The number of employed persons is determined in

particular by demographic assumptions over the long run – specifically the birth rate.[14] Therefore, the productivity of the PAYG system, under the given assumptions, depends on demographic development. On the contrary, the rate of return of the FF system is determined by the gross productivity of assets achieved on financial markets when fulfilling the conditions defined by a regulator and supervision and the amount of administrative costs (see below Significance of the institutional environment). The return of the FF system, therefore, does not directly depend on demographic development.[15]

… and in their sensitivity to various risks.

Although the factors influencing the rate of return of PAYG and FF systems are varied, these systems are diverse, even from the standpoint of their sensitivity to the range of possible risks. This fact is usually underestimated or neglected. Fully funded financing is exposed to the risk of turbulence on the capital markets. Fluctuation in the prices of shares and other instruments or changes in interest rates could significantly change the financial status of an individual pension account in the short run (reduction or increase), which is especially risky for persons who are relatively close to retirement age. In contrast, the PAYG system is almost immune to cyclical macroeconomic shocks. Nevertheless, even the PAYG system is not fully resistant to economic problems. The stability of PAYG pension systems is often times impaired in the event of a more widespread structural economic crisis, e.g. a sharp decline in the employment rate.

Even the FF system is not fully immune to the range of demographic factors …

It is sometimes asserted, although wrongly, that the FF system – as opposed to the PAYG system – is resistant to all demographic risks. There are generally two causes related to population ageing: a declining birth rate and rising life expectancy. The PAYG system is sensitive to both components of an ageing population – decline in the number of contributors to the system and an increase in the number of pensioners, which threatens the financial stability of PAYG systems. The FF system is resistant to a changing birth rate.[15] However, not even the FF system can be immune to the increasing life expectancy factor. In the conditions of the PAYG system, the increasing number of pensioners is reflected in a rise in the system's deficits, provided it concerns a PAYG defined benefit system. For the FF system on the contrary – provided it is characterised by a defined contribution scheme – there is an automatic decline in the value of newly awarded pensions during an increase in life expectancy (and a slowdown in the actual retirement age). The same effect occurs for the NDC system, which is contribution defined, albeit pay-as-you-go financed.

By combining both methods of financing, the risks of the entire pension system

Thanks to the differences in the sensitivity of the PAYG and FF systems to the above-mentioned risks, space is created for reducing the risks of the whole pension system by an appropriate form of diversification. The possibility of international diversification for financing pension obligations should also be mentioned. In the FF system, international diversification in the form of

[14] And the scope and structure of net migration

[15] A current topic in the literature is the possible decline in the rate of return on financial markets caused by the process of an ageing population. The debate is, nonetheless, theoretical, and a theory on the link between the rate of return of financial markets and an ageing population is not founded on an empirical basis.

are reduced.

foreign asset investment may be used, and as a result, the dependence of pension obligation financing on domestic economy development can be reduced. On the other hand, classic PAYG systems depend exclusively on the development of the domestic economy, whether in the form of average wage dynamics or development on the labour market (employment). In view of the above, it can be said that neither of the extreme versions are optimal – financing pensions only using the pay-as-you-go system or only using the fully funded method.

3.1.4 Comparing the defined contribution (DC) and the defined benefit (DB) Systems

At first sight, a person in a DC system has less certainty than in a DB system …

In a defined contribution system, the contribution rate that the insured pays into the system is fixed. The amount of a person's pension is calculated directly in proportion to the amount of paid contributions and appreciation and indirectly in proportion to life expectancy of the generation retiring at that particular time. Therefore, the amount of pension is not "guaranteed" in advance by the system. In contrast, a defined benefit system has a precise formula for calculating pension. After accepting certain simplifications (expected term of insurance, the income amount, or the assessment base, etc.), the insured can get a general idea of its pension amount several years before retirement.

… from a more detailed view, the DC system's uncertainty seems to be overestimated …

It is often omitted that credibility of the obligations of a DB system to a specific person is strongly conditioned by the fact that the key parameters of the pension system will not change over time. Of course in view of the long-term unsustainability of today's DB systems, this is a very strong and unrealistic assumption. Even the fact that a person's uncertainty in the DC system decreases with age is not sufficiently accounted for, whereas in a DB system, this uncertainty could even increase, especially if the DB system is not sustainable from a long-term perspective. With older persons in a DC system, a larger amount of the premium paid throughout a person's life is already "known" (actual paid amount) and so it does not present any uncertainty for the DC pension amount. In addition, with retirement approaching, the majority of the investment portfolio is allocated to more prudent and secure instruments (government bonds, time deposits, etc.) rather than to shares. This reduces the impact of capital market fluctuation risks on the pension amount. Last but not least, the extent of the risk associated with estimating the life expectancy of a given generation decreases with age, which reduces uncertainty when calculating annuity.

… and the uncertainty of the DB system is underestimated in view of the risk of political

On the contrary, the key parameters of the DB system that affect newly awarded pensions and the dynamics of paying them over time could theoretically be changed at any time.[16] The less financially sustainable the DB system is, the more these changes could occur. As for the calculation of pension, some of these changes could even be retroactive in nature. The older a person is (or the closer to retirement age), the riskier the change in the DB

[16] A change in the calculation of non-contributory periods, changes in the reduction limits, the percentage of earnings in these limits, base assessments, the accrual factor, valorisation of pensions, etc.

intervention.

system could be, because there is less time to adjust to the effects caused by its economic behaviour.[17]

In its pure form, the DC system sufficiently accounts for later retirement …

In relation to the long-term unsustainability of pension systems in their existing form and the present parameter settings, the impact of these systems on the labour market and employment has come to the forefront. Pension systems should not motivate participants to exit the labour market early. Staying longer on the labour market and a longer insurance period ensures a higher pension in pension systems (both in DC and DB systems[18]), which helps prevent the risk of poverty in an individual's post-productive years.

… because it is actuarial neutral.

DC systems in their pure form are actuarial neutral. In other words, the premium paid for additional years on the labour market fully reflect a higher pension amount. Therefore, a pure DC system does not motivate an individual to exit the labour market early, nor does it punish someone for retiring at a later time. In practice, this neutrality is almost impossible to attain in DB systems. Different generations, sexes or income groups receive preferential treatment in a DB system, or on the contrary, are penalised when making decisions about staying on the labour market.[19] So in a DB system, it is possible to motivate a person to stay longer on the labour market.

DB and DC systems differ in their reaction to life expectancy growth.

The reaction is automatic in a DC system …

When calculating newly awarded pensions, DC systems are capable of reacting to the prolonged life expectancy of individual generations. This is achieved by a principle of calculating pension using lifetime annuity. If we considering the risk that an annuity provider cannot precisely estimate the future development of life expectancy,[20] then the DC system is not able to pay more in annuities to a given generation of pensioners than their actual savings and appreciated resources. In DC systems, life expectancy growth is, therefore, fully accounted for in generations where this growth occurs.

… the reaction is ad hoc in a DB system and causes intergenerational inequality.

On the other hand, an automatic reaction to life expectancy growth does not exist in standard DB systems. A DB system exposed to such a shock leads to increased expenditures and, in turn, to performance deficits. Deficits caused by life expectancy growth in a DB system must be corrected ad hoc in the form of various parametric changes. These changes could be somewhat detrimental for generations that exhibit this life expectancy growth (whether it be changes in newly awarded pensions or a correction in the valorisation of paid pensions). More often than not, they are expenses also borne by older

[17] e.g. increasing voluntary savings, etc.

[18] With the exception of the equal pension system

[19] In theory, it is possible to attain full actuarial neutrality even in a DB system. In practice, however, the pension model for each generation, sex, income group and group of insured is inevitably different in respect to the structure and scope of drawing on non-contributory periods, which is hardly conceivable and in fact not feasible from the standpoint of legislation.

[20] Other risks for annuity providers include the projection of the return on resources in the annuity phase and the estimate of the long-term development of relevant macroeconomic variables (e.g. inflation). Therefore, insurance companies "secure" these risks in advance by creating reserves when calculating annuity, so even these risks are at least partially transferred to the insured individual.

generations (a reduction in the valorisation of all paid pensions), by younger generations (parametric changes in the revenue and expenditure sides of the DB system) and unborn generations (performance deficits that will need to be covered sooner or later by increasing taxes) with the risk of unsatisfactory effects on intergenerational equality.

The DC and DB systems also differ in the level of income solidarity for the pension system.

In their pure form, DC systems are also fully earnings related, because pension is fully dependent on the income (or the paid premiums) of a given person. In this respect, they provide all insured persons with the same replacement rate as their pre-retirement income, regardless of the absolute value of these incomes. In contrast, most DB systems have intrinsic intra-generational income solidarity. The replacement rate for pre-retirement incomes is therefore relatively higher for persons with lower incomes than for those with high earnings.

An inverse relationship exists between solidarity and full equivalence …

A system with high income solidarity is an effective instrument for the fight against poverty in post-productive generations, which is important from the standpoint of maintaining social cohesion. However, excessive income solidarity creates barriers in the pension system. The premium is perceived as a tax and, therefore, reduces the motivation to pay into the system, which as an end result supports a grey economy. A fully earnings-related system does not send negative impulses to the labour market, however, in its pure form, there is the risk of poverty (insufficient pension amounts) for some pensioners. The incomes of these risky categories must then be supported by other social systems.

A DB system is the easiest way to protect the groups at risk …

If there is agreement in society on the need to ensure income solidarity in the pension system[21], then the DB system is the easiest way to accomplish this. On the other hand, a DB system that only tries (in an imperfect and complicated fashion) to imitate a fully equivalent system makes no sense in direct competition with a DC system. It is just as difficult and impractical to incorporate the elements of income solidarity into a DC pension system, because it would lose its contribution character.

3.1.5 Diversification as an instrument of increasing the security of insured persons

Space exists for diversification of risks.

The DC and DB systems expose an insured person and the pension system operator to various risks in various degrees. Similar to the methods of financing (FF and PAYG), it is strategically beneficial even here to diversify the overall risks of the pension system. It is obvious from the standpoint of the different features of DB and DC systems that the needed potential for diversification exists.

A proper mix of solidarity and security can be achieved through

A DB system can secure needed solidarity, however, if the weight of solidarity in the pension system is to high, it could have negative effects on motivating persons to stay on the labour market. On the other hand, a DC system does not influence the labour market, but it could cause poverty for a part of the population. PAYG financing is vulnerable to demographic development and

[21] and solidarity other than income solidarity – see non-contributory insurance periods.

diversification.

tends to be politically abused in respect to intergenerational inequality. However, fully funded financing is sensitive to the development on financial markets, the quality of regulation and administration costs.

Diversification increases the certainty of insured persons, not the rate of return.

For these reasons, it is generally advantageous to have a combination of financing methods and features for a pension system. It is important to remember, though, that diversification is not an instrument for securing the maximum return of the pension system, but it helps reduce the overall risks faced by the pension system. A pension system relying only on the solidarity DB component, or on the contrary, solely on the equivalent DC pillar, or on the PAYG or FF methods of financing is not an optimally diversified system from the standpoint of the insured person or the state.

3.1.6 Intergenerational solidarity (equality)

The typical view on intergenerational solidarity in a PAYG system could be misleading …

PAYG systems identify intergenerational solidarity in a standard fashion, because the economically active generation finances the pensions of generations in their post-productive years through paid premiums. On the other hand, this solidarity does not exist in an FF system, because, under otherwise identical conditions, the pension amount depends on an individual's own contributions.

… and even a PAYG system may not have intergenerational solidarity …

Of course, intergenerational solidarity may not even exist in a PAYG system. If the return of each generation in a PAYG system was stable over time and did not change in relation to population-strong generations, then no intergenerational solidarity would exist. Every generation would obtain the same as past generations and upcoming generations, and the amount of this obligation would be stable over time and would not be dependent on demographic factors.

… although from political and economic experience most do have solidarity …

In practice, it is, of course, almost technically impossible to reach this actuarial optimum under the conditions of a PAYG defined benefit system. In addition, decision-making on the amount of benefits and the paid premium is subject to the political process in a PAYG DB system. With population-strong generations in their economically active years (and actually population-weaker generations of pensioners), it could easily occur that the system does not accumulate a sufficient surplus for covering the pensions of future strong generations of pensioners. The relatively higher amount of funds collected from the premiums of strong generations is instead usually immediately depleted, whether it be for higher pensions for existing pensioners or due a low retirement age (and then relatively more funds are divided between a larger number of persons).

… which causes a double intergenerational burden for population-strong generations.

This short-sighted view in managing the PAYG DB system and the intergenerational inequality associated with it could cause an economically active, population-strong generation to be taxed twice during its life by intergenerational solidarity. This could occur at first when it pays contributions into the system that are gradually allocated to the intergenerationally generous financing of existing pensions instead of an adequate part of the contributions being put aside for financing the pensions of future population-strong generations. This could occur again when this strong generation retires. Due to

a large number of pensioners and a relatively low number of contributors (a weaker generation replaces a strong economically active generation), the system registers deficit tendencies. This situation is often resolved to the detriment of the strong generation of pensioners. Either the amount of newly awarded pensions is reduced by various parametric changes, the valorisation of already paid pensions is restricted, etc. and/or the retirement age is substantially increased, at a faster rate than the rise in life expectancy, in an attempt to curb the number of pensions.

3.1.7 Significance of the institutional environment

The quality of a fully funded system and the overall diversification of risks depend on the manner and level of regulation.

A key parameter for the long-term effectiveness of a fully funded system is the appreciation rate of deposited funds for the set risk level of the system. The higher the appreciation rate, the higher the pension will be that the system is able to pay out. It is also true that the risk level of investment (volatility of the value) increases with an increasing rate of return. In practice, regulatory and supervisory policy attempts to connect the requirements for the system's security (limiting risks) with the requirements for continually attaining long-term, solid returns on a person's savings. This affects the appreciation rate that the fully funded system must achieve (setting investment limits in various forms, introducing various guarantees to the system, etc.).

Administration costs have a significant impact on the effectiveness of an FF system.

The net return of a fully funded system that is key for the future pension level (for the given contribution rates) is reduced by administration costs. Expenditures are usually created for marketing and business networks, as well as costs for managing portfolios and administration costs. On the one hand, competition on pension fund markets increases client comfort. However, it could also cause the expenditures of the whole system to rise. Demand for services, which increases administration costs – e.g. limiting the frequency of a client changing over to various funds, co-financing the costs associated with a change in a fund, etc. – can be restricted through regulation. The supply side can also be regulated, or the amount of resources that the funds can use for advertisement, etc. Regulation and supervision over a fully funded system, in practice, may not be assessed in isolation without considering the impact on the effectiveness of the FF system. The security of an FF system achieved at the cost of the system's long-term effectiveness is just as problematic for the standard of living of future pensioners as a profitable FF system with a low level of security.

Encouraging examples exist …

The Swedish funded pillar has recently been shown to be a promising solution to the fight against administration costs: the centralised collection of premiums combined with the anonymity of participants in relation to pension funds has significantly reduced the overall administration costs of the system.[22] The funds do not need to develop at a high cost their own systems of premium collection and control. In addition, since they do not know the names of their clients, there is no sense in using targeted advertisement and business strategies that are usually very costly. So this implicitly demonstrates the

[22] These costs are currently ca 0.8% of assets (see Hochmeister, T. 2004).

institutional diversity of Swedish pension funds from, for example, its Czech counterpart. Swedish pension funds work on the principle of an open mutual fund. In the Czech Republic, funds work on the principle of a joint-stock company. The Swedish system puts high demands (technical and moral) on the authority responsible for centrally collecting premiums and executing the internal accounting of financial transactions between pension funds.

… of course, regulation cannot reduce administration costs to under the minimum required level.

A certain level of costs is, of course, necessary in any system, and they cannot be reduced artificially through regulation. PAYG systems are usually a lot less costly from the standpoint of administration costs than FF systems, and hence, administration costs are seen as being much more problematic for funded schemes. These costs can, however, be cut with a combination of an effective environment in which the FF system functions and an appropriate level and form of regulation. Of course, there is a threshold, and undersizing could threaten the long-term stability of the system as a whole and the level of services and increase the level of risk that clients in an FF system are exposed to. It is difficult to identify the exact value of this limit. However, if regulatory policy would limit the administration costs to under the level necessary for securing all of the FF system's obligations set by the regulations and for reaching an adequate level of profit, the entities could stop offering their services and would start to exit the market, especially if they are not be capable of increasing the low limits for administration costs.

3.1.8 No ideal pension system

In view of the discussion and comparison of the PAYG and FF systems or the DC and DB pension schemes, it is not possible for one pension system to always perform better than other systems under all circumstances and in all aspects.[23]

There is no free ride; it always involves a trade-off …

The advantages of PAYG financing as opposed to the FF system are offset by the disadvantages of PAYG in relation to FF in other areas. An advantage for one individual (generation, sex, income group, etc.) is at the cost of another individual (generation, sex or income group). Resistance to one concrete type of risk is gained at the cost of exposure to risks in other areas. These mutual and inseparable links must not be neglected or forgotten in a discussion about pension reform.

The ideal system does not exist …

Individuals differ from the standpoint of their income level, type of work, and other key aspects for the pension system. Therefore, no one pension system exists that would maximise the returns (under the given risk) of all heterogeneous persons in the system. There is no such thing as an ideal pension system. Nevertheless, it is possible to diversify the risks that the system and participating individuals are exposed to. Some persons will see

[23] There is a rich and lengthy debate in the professional literature on the FF system's superiority, or lack thereof, over the PAYG system. Theories have attempted in vain to empirically prove that the FF system (contrary to PAYG) increases the national savings level and potential economic growth. Obviously, a more favourable impact on the labour market does not predominantly relate to the form of financing (FF vs PAYG), but to the DC vs DB character of a pension system. On the other hand, the theory that the FF system can have a positive effect on the development of the domestic financial market has, in principle, been confirmed.

improvements with this diversification in comparison to the current system, others will be worse off, and some will hardly see any change at all.

The current system is undiversified and vulnerable.

The current pension system is risky for society and for the individual participants. In the form of an unofficial social contract, it promises economically active generations benefits that are paid from a low age. From the long-term perspective, though, there will not be sufficient resources to support this system. Meeting these obligations would quickly put the financial position of the state at risk. On the other hand, when unexpectedly and sharply limiting pension obligations, the risk would be shifted to individuals who, thanks to the social contract, have assumed that the state will sufficiently provide for their retirement income.

Table 3-1: Comparison of the PAYG vs FF and DB vs DC pension systems

	Advantages	Disadvantages
PAYG	Resistance to cyclical development in the economy	Sensitivity to demographic development (birth rate and migration) Sensitivity to life expectancy growth Dependence on domestic economic development Risk of intergenerational inequality (PAYG DB) - risk of political abuse
FF	Resistance to demography (birth rate and migration) Possibility of international diversification Intergenerational equality (FDC) Dependence on quality institutional environment (1)	Sensitivity to development on financial markets High administration costs Sensitivity to life expectancy growth Dependence on quality institutional environment (1)
DB	Allows solidarity within generations Higher certainty regarding benefit amount, when system is sustainable and immune to political risks Possibility of motivating later retirement	Risk of demotivation in respect to remaining on labour market Unclear benefit amount in the event of long-term unsustainability of the system and political intervention. The risk does not decline with an increase in an individual's age. Cannot react automatically to life expectancy growth
DC	Does not penalise for remaining longer on At an older age, the uncertainty relating to the benefit amount declines. Automatic reaction to life expectancy growth	Risk of poverty for vulnerable groups Less certain benefit amount at start of career

Note: (1) It could be an advantage or disadvantage for an FF system. Institutional environment means regulation and supervision, political intervention and the efficiency of funds (administration costs).

The pension amount cannot be assessed without taking into account the

Therefore, the effects of pension reform cannot be assessed only from the standpoint of how much the replacement rate will fall or rise in the future or whether retirement will be a year earlier or later. Similar to the financial world, it is pointless to assess returns without taking into account the investment risk. So even in a pension system, quick conclusions cannot be made on reform

overall risks of the pension system …

without considering whether the risk of pension "rights" being fully covered by financial resources has been increased or reduced.

3.1.9 Strategic decision-making is needed

The strategy requires a long planning horizon.

A sufficiently long projection period creates the conditions for strategic decision-making on the form and characteristics of the pension system. Formulating a strategic aim is essential for several reasons:

The system must be sustainable over the long run …

This is essential for the long-term stability of the pension system. If the main assumptions of the long-term projection actually develop (demography, macroeconomic scenario, etc.), then the system must have adequate security that is capable of handling the anticipated problems.

… and individuals must have information for their decision-making.

This is essential for citizens who participate in the pension system. They must have sufficient information on the long-term perspectives and the strategic reaction to future demands and requirements. This is the only way that they can rationally and sufficiently adjust their behaviour to a given situation in advance.

Accepting a strategy does not imply long-term rigidity.

However, this does not mean that the pension system is completely rigid or that it cannot be modified if the need arises. Such a situation is not possible or even desirable.

In practice, the strategic goals are supplemented by adequate tactics.

The aim of the strategy is to formulate the long-term reaction of the pension system to anticipated problems. This, in practice, could be supplemented over time by a number of provisional and gradual measures. The frequency, extent, and so forth depend on, among other things, to what the degree the assumptions of the strategic decision-making are actually confirmed. For example, if life expectancy is significantly different than the original assumptions and if the deviation is not assessed as short-term, then it would be advantageous to adjust the rate for increasing the retirement age, etc. However, it is better at this point to avoid any sudden changes with respect to the chosen tactics, because it would most likely cause strong counter-pressures. In practice, these could gradually cancel out the effect of the original changes.

Separating the strategic issues from the tactics allows for a balanced compromise between the flexibility and transparency of the pension system.

Every person should know from the moment of entering the labour market what the terms and possibilities are for securing themselves during the post-productive period. Old-age security cannot be planned just a few years before exiting the labour market, but it is essential to systematically prepare for it throughout a person's productive years. In this respect, it is necessary to formulate a long-term sustainable and credible strategy for the pension system and to avoid any corrections or changes. These, in fact, would reduce transparency and credibility and would directly and indirectly affect the stability of the pension system, and eventually even the standard of living. The flexibility of the pension system in relation to the changing external environment will be secured by appropriate tactics for achieving the particular strategy.

The strategy must also resolve the issue of the pension system's 3rd pillar.

The pension system strategy must contain an objective not only for the state pension system (the 1st pillar), but also for the voluntary systems of private security – supplementary pension insurance and life insurance (the 3rd pillar). Both systems are currently faced with problems that must eventually be solved. In this sense, there is no reason from a time perspective to link improvements in the 3rd pillar to a method of reform for the state pension system. The reform strategy for the pension system should not directly or indirectly depend on the behaviour of citizens in voluntary supplementary schemes. However, if the reform of the mandatory system would implicitly rely on a higher level of involvement in voluntary schemes, then from an economic standpoint, citizens will be *de facto* forced to participate in these systems. It is, therefore, important to deal with these systems in this way.

3.1.10 A well-informed public is a condition for successful reform

A generous supply of information strengthens the credibility of the strategic goals …

It is impossible to carry out a reform without the participation of the public. Citizens must obtain objective information (i.e. impartial information that is not overstating or understating its purpose) on the existing pension system and the problems the system will likely face in the future. This is the only way to muster up a sufficient amount of support and understanding for the reform. Transparency and openly informing the public can develop into credibility, which is a key concern for any practical reform strategy. An unreliable strategy for the pension system is like having no strategy at all.

… and as a result, the long-term standard of living..

A well-informed public is not only important for obtaining support related to the chosen pension system strategy, and in turn accomplishing this strategy, but citizens also need objective information for optimising their own economic behaviour. Playing down the problems associated with the pension system could prevent individuals from sufficiently securing their own future. Smoothing over or downplaying the situation then increases the risk of substantial poverty in post-productive years. On the other hand, playing up or exaggerating the problems in the pension system causes an excessive level of private savings and unwarranted restriction of disposable income in economically active years. Both situations ultimately reduce the long-term standard of living of citizens. Formulation of the pension security's long-term strategy, accompanied by credible and consistent measures and a wide information platform, creates conditions for optimal economic decision-making on the part of citizens and maximising their lifelong wealth.

Being well-informed is a key factor in a reform that allows individuals to make their own decisions.

Providing intelligible, widely accessible, complete and accurate information is one of the most important tasks of the government in the area of the pension system and its reform. This task becomes even more important in situations when a reform of the mandatory pension system creates space for individual decision-making. A well-informed public then is one of the key assumptions of a successful reform.

3.2 Conclusions based on the Analyses

Before presenting the conclusions and knowledge gained from the analyses, it is important to mention some of the generalisations that were needed for carrying out the analyses.

3.2.1 The analyses concerned only the mandatory components of the pension system

The modelling involved only the mandatory components of the pension system.

When the Executive Team commenced its activities, an agreement was made with the Expert Team that all pension system modelling would deal exclusively with the mandatory components. In other words, the purpose of the analyses was not to show the development of voluntary old-age security components, such as supplementary pension insurance, life insurance or other forms of private investment.

The Executive Team was not able to consider another approach …

There are many reasons why this approach was chosen:

The lack or almost absence of a data base. Among other things, a part of the investments in real estate, building savings, investment in mutual funds, etc. can be considered to be a voluntary form of pension security. It is impossible to determine what part of these investments is actually motivated by old-age security and what part has other investment aims.

The demands on the complexity of the macroeconomic scenario would be substantially increased, for example, in area of setting the rates of return for various investment strategies.

In view of the diversity of products, even the complexity of the modelling apparatus would increase.

Given the deadlines and limited personnel and financial resources, the work would have never been completed. The quality of these "extensive" outputs would also be an issue in view of the lower-quality data base and the complexity of the problem requiring the acceptance of simplified assumptions.

3.2.2 The calculations intentionally filtered out the secondary effects of pension reform

The secondary effects were not considered on a statistical level …

During the modelling process, the secondary effects of the pension reform were filtered out. The changes in the parameters of the current system or the systemic reform (introduction of an NDC or funded pillar) could retroactively affect the parameters that were fixed during the modelling process. For example, increasing penalties for early retirement or reducing the premium rate for persons at retirement age could motivate citizens to retire at a later time. If citizens would actually change their behaviour, there would be a structural change in the retirement profile. This would not only affect the expenditures of the pension system, but also the macroeconomic scenario and the system's revenues by way of employment. Introducing an NDC system that is actuarial neutral could have similar effects. Another example is the implementation of a funded pillar, which could contribute to improving the allocation of capital and could have (the same as with the NDC) a positive impact on the employment rate. No consideration was given to the link between the system's

debt and interest rates, the effects of increasing the premium rate on the labour market or collection of direct taxes and other relationships. These and all other secondary effects, with the exception of the effect of increasing the statutory retirement age, were not accounted for in the analyses.

… because they cannot be objectively calculated. In some cases, the direction of their development is not even clear from a theoretical standpoint.

The reason is that they cannot be quantified, or quantification would involve disputable methods. In the literature, for example, there is a debate on whether introducing a funded pillar could contribute to an increase in the savings level and subsequently to economic growth. It could also be disputable whether lowering the premium for parents with children could increase the birth rate in comparison to the demographic baseline scenario. It is difficult to quantify what percentage of people would postpone retirement and for how long when their motivation to remain on the labour market increases (see the implicit tax). It is also unclear whether an ageing population would have an impact on the world rate of return on financial markets, etc. Accounting for the secondary effects would very often rely on subjective judgements, which could polarise the debate on the calculation results and significantly interfere with the transparency of the whole process. In the commentaries on the specific proposals, the Executive Team attempted to at least verbally point out the possible secondary effects in the event that these effects were to increase significantly in value.

Special analytic attention was given to the link between the pension system and the labour market for elderly persons.

In respect to what significance is given to efforts geared to increasing the employment of elderly persons, the Executive Team has attempted to enrich the analysis of proposals by calculating the "implicit tax". This tax quantifies the profit/loss from postponing retirement for one year. It is clear from these calculations which proposals motivate individuals to remain on the labour market, which ones are neutral for the decision-making of economic agents and which ones deter individuals from remaining on the labour market. Thus, the Executive Team measured the strength of the incentives to remain on the labour market. No other conclusions, however, are derived from these calculations. The existence of incentives in and of themselves does not mean that economic agents actually change their behaviour. In addition, even if the direction of a given proposal is known, it would be only speculation to estimate what percentage of people actually changes their behaviour and what percentage does not.

3.2.3 Assessment of the proposals must entail the wider economic and social effects

A more encompassing view, though, was not possible

The analysis of the proposals focused specifically on the pension system.[24] However, it should be remembered that the pension system is a part of public finances, and as such, should be sustainable on a long-term basis and should ensure adequate pensions. It should be reformed in such a way that the burden

[24] This was due to the timing and deadlines for the Executive Team's work as well as the limited capacity related to staff members and the financial resources for the Executive Team, the Working Group and the Expert Team. The coordinator informed the government on a continual basis of the need to have a comprehensive view when preparing the materials for the pension reform that would analyse the given proposals from the standpoint of the wider economic effects, legislative implementation, regulatory requirements, sociological aspects, etc. These suggestions have not yet been implemented.

for the Executive Team.

of resolution is not shifted to other segments of public finance. For this reason, among others, the pension system is not the only component of the state budget that will be substantially affected by the process of an ageing population.

On an economic level, the link to public budgets is especially important …

In securing financial sustainability, the pension system should not deplete resources from the state budget in the form of various subsidies for financing expenditures. The system should now be capable of securing pensions for persons who contribute to it for the statutory-defined period, at least to the extent of covering basic needs. If this level is not guaranteed, the participants will need to be supported by other social systems. The pension issue would then be shifted to other segments of public finance, and the pension reform as such would not be successful.

… as well as the impact on the labour market, by definition of pension benefit …

The pension system's link to the labour market is important. The pension system should not demotivate citizens at retirement age from actively participating in the labour market. After the statutory retirement age, the system should be set as actuarial neutral, i.e. elderly citizens should not be penalised for exiting the labour market at a later time. This allows elderly citizens to improve their income situation, and in turn, to become more self-sufficient and not dependent on the state. It also has a positive impact on macroeconomic development (higher employment and created GDP).

… and the amount of labour taxation.

A solution involving an increase in the premium could have a negative effect on the labour market. The Czech Republic has high labour taxation, and a contributing factor is also the high premium rate for pension security. This could impair the price competitiveness of the Czech Republic and have a negative impact on economic growth.

The reader should not forget the wider context of the reform proposals.

When filtering out the secondary effects, the proposals that rely on increasing the premium rate, increasing the overall tax burden or on transferring the pension system's deficits to other segments of the public budgets are favoured to some degree.

3.2.4 The macroeconomic scenario assumes successful real convergence

The macroeconomic scenario can affect the appearance of pension systems.

The form of the macroeconomic scenario can affect the choice of a reform strategy. It generally applies that an optimistic macroeconomic scenario (high labour productivity growth and increased employment) acts in favour of pay-as-you-go systems, and in contrast, the assumption of a high net rate of return from financial activity creates a more attractive funded pillar. The sensitivity analysis has demonstrated that high productivity growth to a certain extent helps restrict the expenditures of the current state PAYG DB system without limiting the generosity of newly awarded pensions. This is due to the fact that pensioners do not profit from overall labour productivity growth with this specific valorisation mechanism.[25] On the contrary, the funded pillar, by

[25] If the baseline scenario accounted for the wage valorisation of paid pensions, higher labour productivity would not bring any savings to the expenditure side of the pension system.

definition, is balanced over the long term, but with the specified interest rate[26], the assumption of labour productivity growth has an impact on the accumulation of assets and the size of the assessed pension/annuity. With higher labour productivity growth, assets tend to accumulate at a relatively slower rate (lower share of assets in GDP), which is reflected in lower calculated annuity and a lower replacement rate.

Successful convergence of Czech labour productivity to European levels is assumed …

The macroeconomic scenario used for the pension projection is derived from the assumption that the Czech Republic will converge to the level of labour productivity in the Eurozone. The assumption of convergence is supported by the empirical literature concerning economic growth. These studies show that the differences in the economic levels between countries that are similar in geography, natural resources, their approach to technology, and education and culture have a tendency to decrease over time. A country with a low productivity level shows higher labour productivity growth and tends to catch up with the level of more advanced countries.

… however, this cannot be guaranteed by the Czech economy …

Such convergence, however, was monitored in a relatively restricted number of cases. The most common case is the United States, where the performance between the individual states had converged. The assumption of successful convergence in the level of labour productivity can be considered relatively optimistic. Achieving this in practice, however, is not automatic, and according to a good majority of economists, it depends on the success of the government's entire economic policy in a wide range of factors. The conditions often mentioned for balancing the economic level are convergence of economic institutions (protection of ownership rights, law enforcement, quick market entry and exit for companies, etc.), a flexible labour market, development of the education system, a quality infrastructure, and last but not least, fiscal policy that is sustainable over the long run. Whether the Czech Republic will actually converge to the level of labour productivity in Eurozone countries depends on its success in implementing the above convergence conditions. The scenario prepared by the Executive Team already implicitly assumes relatively fast and successful implementation of the convergence assumptions.[27]

… the accepted macroeconomic assumptions are

The macroeconomic scenario assuming successful convergence in labour productivity in combination with the chosen net rate of return for funded systems favours in relative terms a PAYG system (the current or parametrically

[26] Behind the notion is the assumption that the interest rate does not depend on economic growth. From the standpoint of theory, it involves a very strong assumption because the neoclassic models of growth postulate the functional relationship between the interest rate and labour productivity growth. In reality, however, clear dependence between growth and the interest rate does not exist.

[27] There are also examples of EU countries with various success rates in removing the differences in the economic level. One example is Ireland, which was in the lead position after a long period of vigorous growth. On the other side of the spectrum, there are economies such as Greece or Portugal, which have not succeeded in reaching the economic level of advanced countries.

[28] The Executive Team assumed a gross real rate of return of 3.5% p.a. and administration costs of 2% of assets per year, which together amounts to a net real rate of return of 1.5% p.a. The European Commission uses a net real

more favourable for the PAYG system.

reformed DB system and NDC system)[28]. However, this constellation of parameters is less favourable for the funded pillar. When interpreting the results and choice of a reform strategy, these relationships should not be overlooked.

Real wage convergence temporarily increases the replacement rate in PAYG in relation to the FF system.

Productivity convergence or the level of the real wage has an effect on the replacement rate that the PAYG and FF systems could provide. This impact has been demonstrated by a technical simulation that isolated the effect of actual convergence on the replacement rate. Under otherwise identical assumptions[29], the replacement rate of an FF system is momentarily low in relative terms during wage convergence than in the PAYG system. In the environment of a converging economy, under otherwise unchanged circumstances, the PAYG system is more beneficial from the standpoint of the replacement rate than an FF pension system. This convergence-specific feature can supplement the general comparison of the PAYG and FF pension systems given in Section 3.1.

On the basis of the analyses, the following conclusions can be made.

3.2.5 A reform of the current system is necessary

The current system is financially unsustainable in the long term, even from the standpoint of income solidarity …

The analyses confirmed that the current system[30] is financially unsustainable in the long term and generates over time deficits of 4% to 5% of GDP. This outcome is in line with the conclusions of previous analyses. However, current calculations also show that the current system is microeconomically inefficient. It indicates strong income redistribution that produces high replacement rates for low-income earners and low replacement rates for above-average income earners. Voluntary pension schemes are constrained even with a relatively high premium rate to the mandatory public pension system. Thus, high redistribution could result in: (i) a substantial decline in the living standard of persons retiring with above-average incomes, (ii) a difficult transition in relation to this change, especially for the middle class whose incomes are just above the average wage and that, in view of high premium rate restricting the space for private savings, could not provide for themselves using their own resources, and (iii) an attempt to evade payment of premiums into a system that is not earnings related.

… however, it limits the risk of poverty in old age.

Nevertheless, a large advantage of the current pension system is that it keeps pensioners from falling below the poverty level. This is the direct result of the high level of income redistribution that relates to the large volume of premiums (the old-age pension contribution rate makes up ca 20% of the gross wage).

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interest rate of 2.5% p.a. in pension projections. This number is concealed behind a long-term real interest rate of 3% and administration costs of 0.5%.

[29] The rate of return of the PAYG and FF system, a stationary population, corresponding valorisation of pensions, etc. For more detailed information, see "Simulation of the sensitivity of the PAYG and FF system to labour productivity convergence".

[30] The existing pension system as projected in the baseline scenario, i.e. with no policy change

The impact of the pension system on the labour market is also problematic.

The current system is unbalanced even from an actuarial standpoint. This is reflected in labour activity soon after reaching the statutory retirement age. Individuals are, therefore, demotivated from staying on the labour market, despite the fact that later retirement is beneficial for all parties involved. Persons working after retirement age could increase the size of their pensions. Later retirement would improve the ratio of the number of pensions to working individuals, which has positive macroeconomic effects and can strengthen even the financial stability of the pension system. A positive aspect of the parametric changes made in 2001 is the fact that early retirement prior to reaching the statutory retirement age is penalised by a reduction in pension wealth.

The system needs a fundamental reform, not just parametric changes …

The current system may undergo a parametric reform to make it sustainable over the long run. There is a full range of parameters built in to the system that could be used to fine-tune the system. The age proposal of parametric reforms shows that the system can be made to be financially stable. This, however, should not be an argument for postponing the fundamental reform measures.[31] Eliminating microeconomic inefficiency (the actuarial imbalance and excessive income redistribution) is not, however, an easy task, because it would be necessary to correct the parameters of the pension formulae and to flexibly react to the demographic development by adjusting the key parameters. This is very difficult to achieve in a system where the parameters are often the subject of political struggles.

3.2.6 The pension system only appears to be stabilised over the next 15 to 20 years

The system's short-term surplus does not mean that it is sustainable or stabilised …

It would appear from looking at the results of the analyses that no problems will occur during the next two decades, because the system still registers a surplus. Reform measures then could be delayed for some period of time. The opposite is actually true. It is important to look at the pension system from the long-term perspective. The surplus of the next two decades (around 0.5% of GDP) will be depleted very quickly as the ratio of pensioners to active generations rises. So in the medium and long term, the system would suffer from deficits in a range of 4% to 5% of GDP per year, and this is unsustainable.

… and there is a significant time delay in the pension system.

In view of the substantial time delay in the pension system, it is important to respond to this situation sufficiently in advance, and not when the deficits actually show up in the system. The reform measures will not surface immediately in a long-term calibrated system. For the present generations of pensioners who are retired or will soon retire,[32] the conditions cannot be substantially changed.[33] The results from a reform decision usually show up

[31] The term "fundamental reform" means measures that reduce the microeconomic inefficiency of the system (excessive income redistribution) and that increase its diversification and resistance to risks. A fundamental reform, of course, should not overlook these ambitions of the pension system when securing overall financial sustainability.

[32] Of course, within the short-term horizon using the pension terminology – within approximately the next 10 to 20 years

[33] Large generation gaps would occur, putting pressure on reducing or completely removing the accepted changes.

with a substantial time delay – i.e. when the current system depletes its surpluses and deficits begin to appear.

Increasing the premium rate has in no way reduced the risk of the pension system for public budgets.

The main cause of the existing surpluses of the pension system relates to the increase in the premium rate from 26% to 28% in 2004.[34] The premium rate was increased at the cost of reducing the rate of the state employment policy. The pension system's balance sheet improved as a result, however, the deficit for other parts of the state budget worsened to the same extent. Therefore, this measure did not in any way improve the overall balance of public budgets. Transferring the deficit tendency of the pension system to other parts of the public budgets is not a solution from the economic point of view.

Surpluses are conditioned by a government's restraint in valorising pensions.

The Executive Team has constrained pension valorisation to the assumptions of the baseline scenario at the level of the statutory minimum (inflation and one third of the increase in the average real wage). This involves an optimistic assumption. The surpluses of the systems could tempt politicians to freely distribute the funds over the short term, but in the long run, this would create intergenerationally unequal and high pension valorisation. The more generous the government is in the area of pension valorisation, the shorter the surplus period for the pension system will be.

The surpluses would need to be substantially higher from the standpoint of intergenerational equality.

When disregarding the effect of increasing the premium rate, the pension system would register a deficit. Even in this situation, though, the existing surpluses of the pension system are not sufficient for sustaining intergenerational equality. It is important to realise that the system has a slight surplus in a period when the number of economically active persons has peaked.[35] In three to four years, this figure will start to decline, and the number of pensioners will continue to rise at the same time. The short-term financial position of the pension system is, therefore, completely insufficient from the standpoint of intergenerationally equal treatment of the pension entitlements for future population-strong generations of pensioners.

3.2.7 Increasing the retirement age can help in coping with life expectancy growth

Only a constant increase in the retirement age can improve the sustainability of DB and DC pension systems.

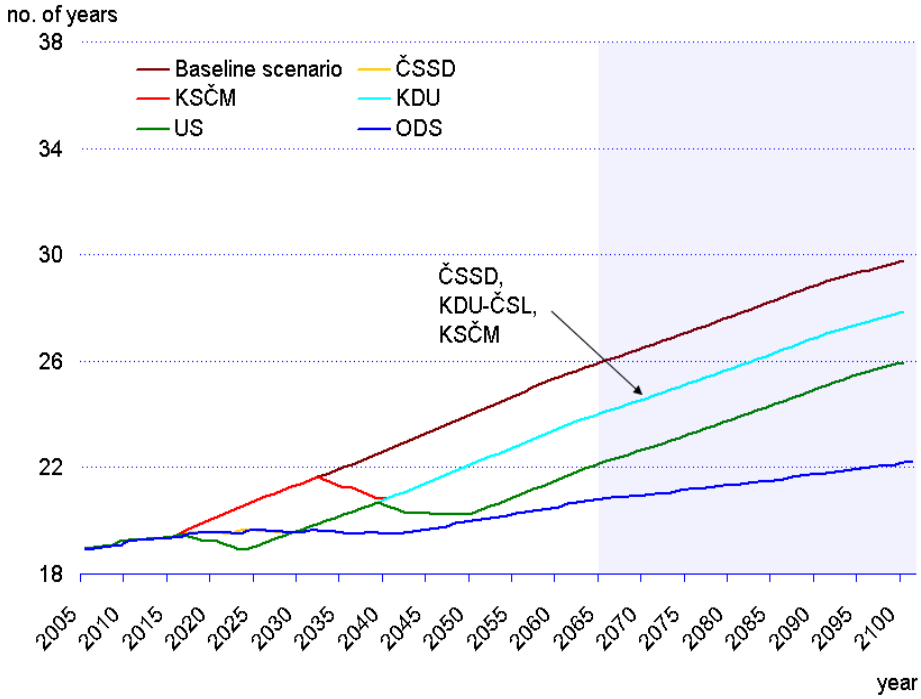
According to the demographic assumptions, population ageing will be very significant in the Czech Republic. Continual life expectancy growth will cause a significant increase in the number of elderly persons. With slower retirement age growth, this causes either a rise in deficits (in a DB system) or a decline in the level of newly awarded pensions (in a DC system). The only effective long-term protection against an unsustainable deficit or a sharp decline in the replacement rate is permanently adapting the retirement age to changes in life expectancy. The positive effect of a higher retirement age on the overall replacement rate in a DC system was clearly demonstrated in the independent materials available on the CD-ROM (the analysis of the NDC's sensitivity to setting the statutory retirement age). In Charts 3-1 and 3-2, a projection is

[34] The effect of this measure is around 0.6% of GDP on the revenue side of the pension system.

[35] 20 to 64 years old

given showing the average number of years that a man or woman spends in retirement[36] provided that they retiring exactly at the statutory retirement age. The curves differ according to what level and speed of increasing the retirement age each political party uses in the final version of its pension system proposal.

Chart 3-1: Average period for receiving old-age pension when retiring at the statutory age; men[37]



Source: Forecast (medium-term) and subsequent projections of the mortality rate of the Czech population (Burcin and Kučera, 2005) and own calculations

The current retirement age is not sustainable over the long run.

It is evident from the chart that the existing retirement age is not sustainable over the long run. If the retirement age for men would freeze at 63 years old, the average period of receiving pension between 2015 and 2100 would increase by more than 10 years. For women, this increase would be more than 11 years between 2020 and 2100.

Even a sharp increase in the retirement age would not reduce the period for collecting old-age pension.

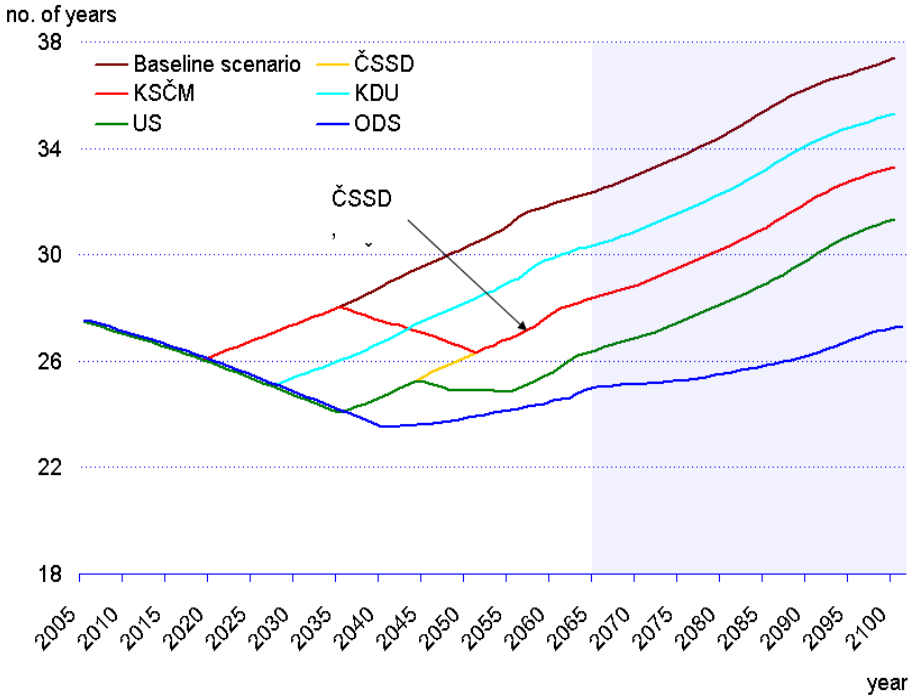
All of the political parties count on another gradual increase in the retirement age. However, only ODS expects a continual increase in the age in response to the trend of life expectancy growth. In this particular case, the retirement age will be around 71 years old at the end of the century. Both charts show that, even with such a "sharp" increase in the retirement age, the average period of a person spends in retirement when retiring at the statutory age does not decline. For men, this increases from the current 19 years to 22 years in 2100. For women, although a temporary decline is registered from the current 27.5

[36] A woman with two children is used as the model.

[37] Up to 2065, the calculations are based on demographic forecasts. Starting from 2065, these are based on projections. This is marked in different colours on the chart.

years to 23.5 in 2040, this value increase again to more than 27 years at the end of the century.

Chart 3-2: Average period for receiving old-age pension when retiring at the statutory age; women



Source: Forecast (medium-term) and subsequent projections of the mortality rate of the Czech population (Burcin and Kučera, 2005) and own calculations

The decline in the pension period for women is only temporary and very relative.

In the case of women, it would probably be better to use the term "temporary return to more sustainable values" instead of a "temporary decline". The currently low statutory retirement age for women in combination with relatively high average life expectancy produces an extraordinarily long period that women on average spend in retirement. The advantage that women have remains in the system even after adjusting the retirement ages of both sexes to the same level. Even with the highest increase in the retirement age (the ODS proposal), the shortest pension period for women (23.5 years in 2040) exceeds the longest period for men (22.2 years in 2100).

Increasing the retirement age is a necessary condition of any pension reform.

Increasing the retirement age is a necessary condition for any reform. If the current demographic assumptions on life expectancy are confirmed, then we should be prepared to increase the retirement age on a gradual but continual basis.[38] Otherwise, the system will either register a high deficit or will provide a declining relative level of pension. Even with more rapid growth in the retirement age, the period for old-age pension is still not reduced. These factors need to be considered when deciding on additional increases in the retirement age.

[38] Otherwise there would be a risk of substantial intergenerational inequality

An increase in the retirement age is often misinterpreted.

Increases in the retirement age are sometimes wrongly interpreted. For example, any additional increases in the retirement age will not affect persons older than ca 50 years old, because the retirement age for this group has already been set by the existing legislation. The impact on transitional generations that are currently on the labour market today will be limited. For example, if the retirement age gradually increases to 71 years by the end of the century, the generation born in 1970 will retire at 66 for men and 65 for women. A retirement age of 71 years old would only affect generations born after 2028, i.e. children born 20 years from now, at the earliest.

3.2.8 A functioning labour market contributes significantly to the pension system

An effective labour market could increase the participation rate of economically active generations …

An effective and flexible labour market contributes to the pension system in two ways. It can increase the participation rate of economically active generations. The sensitivity analysis has shown that a higher participation rate reduces to some extent the expenditures of the pension system in % of GDP over the long term. On the other hand, it is clear that the space for growth of the overall participation rate of economically active generations is limited. The participation rate for middle-aged generations (30 to 55 years old) is already adequately high today. For younger generations, a decline can even be expected in relation to the growing demand for higher forms of education.

… however, the main potential rests with the older generations.

A much higher potential for improving the financial and social sustainability of the pension system is concealed in the level of economically active elderly persons, especially those approaching retirement age. An effective labour market offering a sufficient amount of job opportunities for elderly persons creates favourable conditions for increasing the economic activity of older generations.

Increasing the retirement age does not prevent a decline in the labour force.

Without these conditions, the process of gradually increasing the retirement age may not be economically effective. From an aggregate standpoint, it is clear in view of the demographic development that the number of economically active persons will not increase above the current values, even if the retirement age is increased at a relatively rapid pace from the current level to ca 71 years old by the end of the century.

Increasing the retirement age only temporarily sets off the demographic factors.

If the retirement age remained over the long run at the level established by the current legislation (i.e. 63 for men and 59-63 for women), there would be a substantial reduction in the labour force as a result of an ageing population. As seen in the following chart, the upper curve is a projection of the labour force in the event that the retirement age is gradually increased to 71 by the end of the century. Such an increase only temporarily sets off the impact of demographic factors, however, it does not increase the overall number of economically active persons in comparison with the maximum in the first half of the next decade. From the second half of the 2030s, though, even this scenario reflects demographic pressures, and the size of the labour force will continually decline.

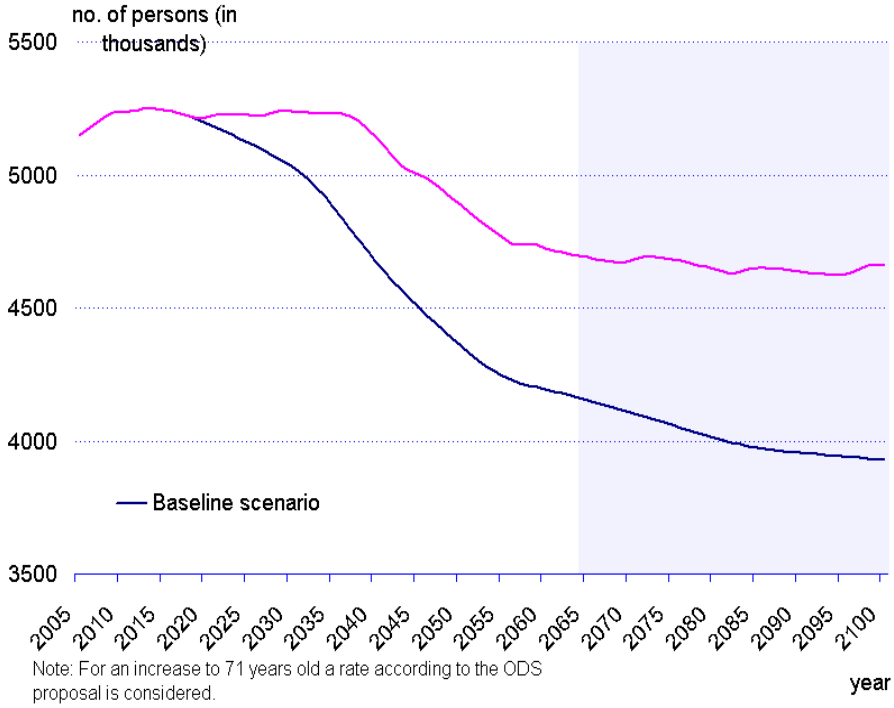
Improving the functioning labour market and increasing the possibilities

When projecting the labour force in a situation where the retirement age is increased, the model works with negative secondary effects in the form of an increase in the disability rate in the affected age categories. The projection of the participation rate of the affected groups is, thus, reduced by the effect of an increase in the disability rate. The number of unemployed also increases in

of elderly citizens is essential.

absolute terms. Of course, the overall unemployment rate in the model does not change with an increase in the retirement age. Despite these secondary effects, however, the model assumes in principle that an increase in the retirement age will be economically effective, and the relevant groups will actually increase their participation rate on the labour market.

Chart 3-3: Projection of the labour force in relation to various developments in the retirement age



Note: For an increase to 71 years old a rate according to the ODS proposal is considered.

The model assumes an effective employment policy for elderly persons.

In reality, the risk of unemployment is concentrated, among others, in the segment of elderly persons. An implicit part of the model apparatus is, thus, the assumption that the economic authorities accept such measures that make the labour market flexible and effective with a positive impact on the employment potential of elderly persons in particular.

3.2.9 A rigid one-dimensional outlook cannot be used for the pension system

In a pension system, tensions always exist between financial and social sustainability …

By definition, a pension system always contains contradictory tendencies. From an individual standpoint, the goal of course is to provide the highest possible pension. However, from an aggregate point of view, the goal is undoubtedly the long-term financial sustainability of the pension system. Both of these goals are to some extent mutually exclusive, and it is impossible to fully achieve both goals simultaneously.

… which are increased in an unfavourable demographic environment …

In a situation where the pension system is exposed to unfavourable demographic development, the contradictory nature of these goals becomes even more apparent. The current level of the overall replacement rate could be maintained at the cost of a significant increase in pension expenditures (% of GDP), and as a result, the pension system would accumulate a high deficit. If the financial stability of the pension system is to be maintained, then the relative amount of paid pensions must be reduced, or the number persons

collecting pensions needs to be restricted.

… which also emphasises the importance of increasing the retirement age.

The results of the analyses of the pension reform proposals clearly document this relationship. In addition to improving the internal ineffectiveness of the pension system, the pension system reform should find a balanced relationship between financial and social sustainability. Even from this perspective, it is essential to continue to increase the retirement age, because this aids in achieving both of these goals.

3.2.10 Czech pension expenditures are not low in comparison with the EU

Pension expenditures in the Czech Republic are 8% of GDP.

The current level of expenditures for the mandatory pension system is 8% of GDP. The European Union spends on average more than 11% of GDP on pensions. It is often thought that the current level of pension expenditures in the Czech Republic is low and that there is space for considerable growth.

However, no direct comparison can be made between the EU and Czech values:

However, these expenditures cannot be compared directly. There are at least three important differences: (i) The volume of compensation to employees (wages and salaries and the mandatory premium paid by employer) in GDP is substantially lower in the Czech republic than in EU countries; (ii) The Czech population is now considerably younger in demographic terms than the population of older EU member states; (iii) As opposed to the pension systems in the EU, old-age pensions in the Czech Republic are, in fact, not taxed.[39]

… (i) the Czech Republic registers a low share of employee compensation in GDP …

The effect of a lower share of employee compensation in GDP or its convergence to the EU level is discussed in detail in the sensitivity analyses of the baseline scenario.[40] Only the main points will be presented here. Faster growth of the dynamics of the average wage in relation to labour productivity and the subsequent convergence in the share of employee compensation in GDP would increase the revenues and expenditures of the pension system over the long run by almost one fourth. If the level of employee compensation in the Czech Republic in GDP were today up to par with European values, pension system expenditures would be almost 10% of GDP (and ca 16% over the long term, instead of the 13% in the baseline scenario). This increase would occur without any change being made to the pension system. From the standpoint of the balance, convergence in the level of employee compensation would lead to improvements in pension system performance over the medium term, because the effect of strengthening the revenue side would be stronger than the gradual increase in expenditures. However over the long run, the expenditure side would win out, and the system's balance would worsen by ca 1% of GDP per year compared to the baseline scenario.

… (ii) There are even differences

The second factor affecting the diversity of expenditures for pensions in the Czech Republic and the EU is the actual demographic situation. The Czech

[39] In the Income Tax Act for private individuals, such a high level of tax exemption is set that the number of pensions that is at least partially subject to this Income Tax Act is minimal.

[40] See the Analysis of Sensitivity of the baseline scenario to the macroeconomic assumptions.

in the actual demographic situation …

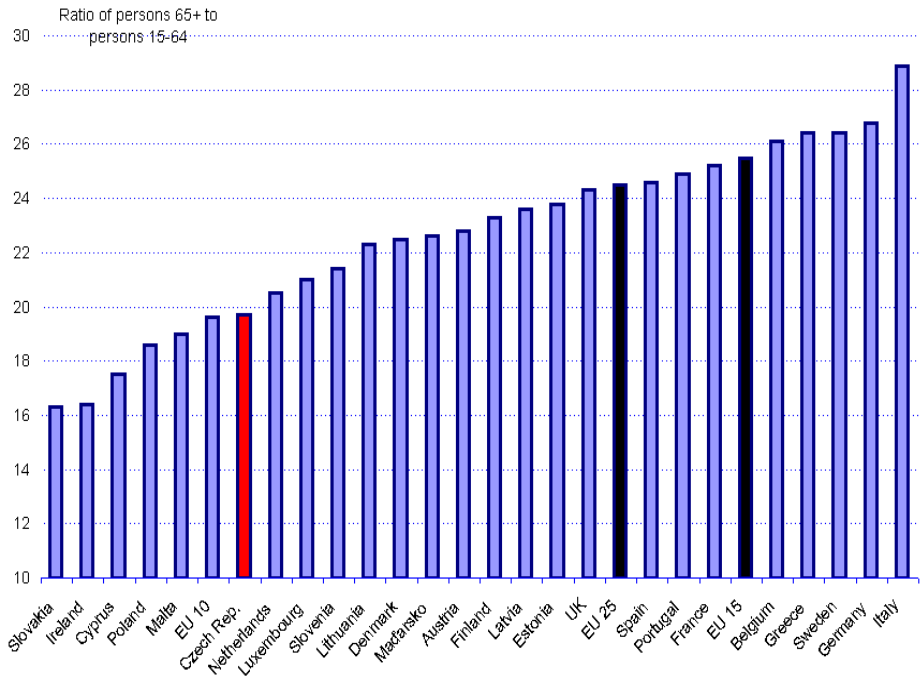
Republic currently registers a very low share of elderly persons in the active population (see Chart 2-4). Although the rate of population ageing in the Czech Republic will be one of the highest among developed countries, in demographic terms, the country still has a very young population in comparison with the EU. This factor also reduces the expenditure demands of the Czech pension system.

… (iii) and pensions are taxed in EU countries …

The last reason that reduces the pension expenditures in the Czech Republic, as compared with the EU, is the fact that Czech pensions are not taxed. In developed countries, it is common practice to deduct the premium from the income tax base, however, paid pension is taxable. It is almost impossible to make a precise calculation of this difference between the Czech Republic and the EU, because it would require in-depth knowledge of the tax systems of the EU member countries. Of course, it is possible to establish on the basis of an expert estimate that, if paid pensions were subject to private income tax and the government wanted to leave its net average amount unchanged (i.e. increase the average pension by the average of the paid tax), then this measure would require an increase in pension system expenditures of at least 0.5% of GDP per year.

… the Czech population is still very young in European terms.

Chart 3-4: Ratio of persons over 65 years old to persons between 15 and 64 years old, in %



Source: Eurostat News Release No.48, 8 Apr 2005 Note: EU 10 means new EU member states.

3.2.11 Increasing the revenues of the pension system is not a solution

The tax burden may be increased and a part of the existing taxes may be diverted to the pension

One way to confront the expected deficit of the pension system is to strengthen its revenue side. Specifically, it is possible to consider an actual increase in taxes (indirect taxes, premium rates, etc.) as well as redirecting a part of the current tax revenues to the pension system's revenues (remainder of the premium rate for employment policy to pension security, part of the collected indirect taxes to the pension system's resources, etc.).

system.

Using existing taxes causes problems for other parts of the state budget.

None of these methods are an actual solution to the deficit pressures in the pension system. Transferring a part of the currently collected taxes to the pension system helps improve the balance of the pension system, however, the performance of public budgets as a whole is not improved, because the state pension system is, in fact, a part of the public budget system. The deficit tendency is merely shifted from the pension system to the other components of the state budget. Either the public debt rises or taxes must actually be increased. Alternatively, other government expenditures must be reduced (social, investment, wage, operations, etc.).

Increasing taxes limits again the disposable income of active generations.

Increasing the overall level of taxation is a more concrete approach from the standpoint of fiscal transparency. However, even this does not truly resolve the situation, because for future pensioners to have relatively high pensions, they would have to immediately limit their disposable household income. An increase in taxes can apply to economically active generations (i.e. future pensioners) – if direct taxation is employed, as well as to current pensioners – if excise taxes are increased.

Fiscal neutral changes can be considered for financing the pension system.

Nevertheless, consideration can be given to financing pensions entirely from premiums, especially when there is strong solidarity in the state pension system. This offers the possibility of reducing premiums (and thus overall labour taxation), which would be offset by increasing other taxes (e.g. indirect taxes). From the standpoint of the system's revenues, this operation would be fiscally neutral, though, more favourable from the standpoint of the possible macroeconomic effects.

3.2.12 There is not much space for strengthening equivalence in the state pillar

Increasing pensions for higher-income earners would cause system deficits …

It is clear from the analyses of the pension reform proposals that there is not sufficient space for strengthening equivalence in the state pension system. Measures relatively increasing the pension of higher-income earners would cause dramatic growth in the expenditures of the system, and thus, intensify the already strong deficit tendencies.

… or a relative decline in pensions for below-average income earners.

An alternative is to finance a relative increase in the replacement rate of higher-income earners by reducing redistribution inside the pension system, and hence, to accept such measures that relatively reduce the amount of newly awarded pensions for below-average income earners. The NDC proposal introduces these measures systemically (changeover to an earnings-related system with a guaranteed pension). The combined system proposal reduced income redistribution by maintaining the existing benefit system while making significant changes to the reduction limits and the percentage of earnings included in the personal assessment base.

Equivalence in the state pillar works against the social sustainability of the pension

As a result of strengthening the equivalence of the state pension system in both analysed proposals, there is a sharp increase in the number of old-age pensioners with pensions that are below the poverty level. In the combined system, this concerns over the long term ca 40% of the newly awarded old-age pensions each year. With NDC, this figure is 60% over the long term. Thus, the level of redistribution in the state pension system is reduced only at the

system.

cost of significantly weakening the social sustainability of the pension system. This restriction is clearly illustrated in the analysis where the state system changes over to the DC principle, and at the same time, the statutory retirement age is significantly increased.[41] Although an increase in the retirement age significantly increases the overall replacement rate, the percentage of pensions that could fall below the poverty level compared to the current situation also increases when changing over to a DC system.

3.2.13 Solidarity in a PAYG DB system will continue to noticeably increase

The system can be financially balanced with the help of parametric changes …

The results of the baseline scenario demonstrated that there are serious problems built in the current pension system, and from a long-term perspective, the system without changes would register deficits of 4% to 5% of GDP. Therefore, parametric changes to the system that make it financially sustainable are inevitable.

… which could complicate the situation on the labour market.

If the retirement age is not increased at an adequate rate, then the only way to reach financial sustainability is through strengthening once again income redistribution and the excessive intergenerational solidarity. This causes negative secondary effects on the labour market, especially from the standpoint of the participants' willingness to pay a relatively high premium into a system that will be less and less earnings related. Every rise in income redistribution and intergenerational solidarity motivates the population more and more not to pay contributions.

3.2.14 Pension reform should not "target" the overall replacement rate

The overall replacement rate is often used …

In practice, it is possible to encounter an assessment of the pension system according to how it ensures a high overall replacement rate.[42] There are also political statements stating that the overall replacement rate must not fall below a certain per cent of the average wage, etc.

… however, the result is affected by a number of very diverse influences.

The sensitivity analysis of the baseline scenario clearly demonstrated the deficiencies of the overall replacement rate in assessing the pension system. The development of this indicator depends, among other things, on variables that are out of the direct control of the pension system. This, for example, involves the average wage (if the valorisation of pensions is lower than wages), the demand of citizens for early retirement, the structure of the population (or alternating strong/weak generations), etc. In addition, the overall replacement rate is affected by parameters differently in the short and long term. An example could be the impact of increasing the retirement age. The overall replacement rate is reduced in the short term and increased over the long term. Hence, the overall replacement rate is an indicator whose value is affected by a

[41] See the Analysis of sensitivity of the NDC to the settings of the statutory retirement age.

[42] Ratio of the average old-age pension to the average wage in the economy

range of exogenous components of the pension system, and it is not an appropriate indicator[43] for assessing the quality of the pension system or its reform.

On the other hand, the key criteria are those illustrating intergenerational and income redistribution.

Criteria that show intra and intergenerational solidarity are more relevant. From the standpoint of income (intragenerational) solidarity, it involves a micro-financial indicator of the internal rate of return for various income earners. Another interesting indicator is the implicit tax, which monitors the motivation of elderly persons to remain on the labour market. From the standpoint of intergenerational solidarity, the expenditures of the pension system and the internal rate of return are especially important.

3.2.15 The reform must also consider non-old-age pensions

Non-old-age pensions are not insignificant.

Non-old-age pensions (disability, widow/widower and survivor's benefits) represent approximately 30% of the expenses of the entire pension system. The largest part of non-old-age pensions is disability pension. Currently, the average full-disability pension is practically as high as the average old-age pension.

Disability pension being higher than old-age pension could motivate demand for disability pensions.

In the proposals that lead to a substantial decline in the replacement rate for old-age pensions and that do not contain measures relating to disability pensions, large differences between these pensions could occur. There will also be strong financial motives for abusing disability pensions, which could become a substitute for low early or regular old-age pensions. Of the analysed reform proposals, this risk mainly concerns the ODS proposal. In 2050, the average full disability pension would reach almost 165% of the value of the average old-age pension; in 2100 this figure would be as high as 175%. This risk also applies to some extent to the KSČM proposal, where the average full disability pension would over the long term be more than 106% of the average old-age pension.

On the other hand, a sharp reduction in disability pensions could be socially unacceptable.

The opposite risk is a situation in which corrections made to disability pension would substantially reduce the disability benefit in comparison with old-age pension. In such a situation, there is a risk that the standard of living of disabled persons will not be sufficiently covered by disability pensions. These persons are then also dependent on the social benefits of other parts of the state budget, and in this way, a part of the "pension" problem is shifted outside the pension system. Of the submitted proposals, this risk mainly concerns the US-DEU and ČSSD proposals. For US-DEU, the average full disability pension would be 84% of the average old-age pension in 2050 and 87% for the ČSSD proposal. In 2100, this figure will be around 81% for US-DEU and almost 91% for ČSSD.

3.2.16 The PAYG pillar will remain a dominant part of the mandatory pension system

The Czech pension system is

Although the Czech population is actually younger than the developed countries of the European Union, this characteristic will substantially change

[43] From the short- and medium-term perspective

mature …

for the worse during the next several decades. Therefore, in principle, the Czech pension system is already developed and fully mature.

… and also completely covers the entire population.

In addition, the mandatory pension system, for all practical purposes, universally covers 100% of the population. In a period of economic activity, all citizens, in principle, pay premiums into the system or "draw on" some of the non-contributory insurance periods. On the expenditure side of the system, it is difficult today to find a person older than 65 years old that is not entitled to pension benefits.

This creates significant implicit obligations for the pension system and reduces the degree of freedom in reforming the system …

A mature, pay-as-you-go financial system in combination with a fully covered population leads to a sizable implicit obligation for the PAYG system. Calculations in the baseline scenario show that the current pension system would lead to a debt of almost 250% of GDP by the end of this century. The existence of such a large internal debt for the pension system significantly limits the reform options. The first aim of the reform must be focused on maintaining the pension system's long-term financial stability and lessening the most crucial microeconomic inefficiencies of the current pension system. Any diversification in financing pension obligations would be only limited in nature, because it would worsen the pension system's deficit tendency.[44]

… which was respected by all the reform proposals.

All of the analysed proposals are aware of the maturity of the pension system, the high population coverage and the implicit obligations associated with it. In all of the reform proposals, the dominant (or even exclusive) part of the mandatory pension system continues to be the pay-as-you-go state pension pillar.

[44] From a purely economic point of view, this does not involve a "new" debt, because it is already present in the pension system in an implicit form. Also in the spring this year, the rules for interpreting the Stability and Growth Pact were somewhat loosened in this particular area. Nonetheless, from the standpoint of financial markets and the cost of financing the government's obligations, it would not be possible to carry out such a pension reform that would generate a transitional deficit of several per cent of GDP per year because it would not be covered by extraordinary financial resources or extensive savings in other public finance expenditures.

3.3 Opinions and Recommendations of the Executive Team

3.3.1 Political decision-making on the strategy of the pension system

Decision-making on pension reform must be carried out politically …

There are contradictory effects in the pension system. The advantages of one part of the population are attained at the cost of another part of the population. Every reform in some way or another worsens or improves the income prospects of pensioners when they retire. No economically ideal pension reform or pension system exists. This is why any decision-making on pension reform and the future appearance of the pension system must be exclusively political in nature. Only politicians have the power to make decisions on the contradictory elements of the pension system. A decision on pension reform is a decision on what should be sacrificed for the stability of the system. It is not possible to have a system with high pensions, a low retirement age and a low contribution rate all at the same time.

3.3.2 Key issues

Political decisions on the form of the pension system is essential, especially regarding the following issues:

…because a professionally "objective reform" does not exist.

- How should the long-term financial sustainability of the mandatory pension system be achieved?
- Should the financing of the mandatory pension system be diversified, and if so, how?
- What will income solidarity in the mandatory pension system look like?
- Should intergenerational inequality of the mandatory pension system be resolved, and if so, how?

These questions cannot be artificially detached from each other.

The final report clearly shows that there is no universal, "objective" answer to these questions. Every economist can have different professional preferences, their own experiences, and can emphasise various components in different ways, etc. In addition, it is important to remember that these questions form an integral whole and cannot be separated artificially.

There is a wide range of answers to these questions.

There is no universal answer to these questions, and the pension reform proposals are proof of this fact. For example, the NDC proposal secures financial sustainability by relatively reducing the replacement rate as a result of changing over to a DC system. It does not diversify the financing of the mandatory pension system, and it continues to rely fully on the PAYG principle. A changeover to a DC system significantly reduces income solidarity and improves intergenerational equality. In contrast, the flat-rate pension proposal attains financial stability by increasing the retirement age and reducing the replacement rate. It does not diversify the financing of the mandatory system, which remains PAYG. Within the mandatory pension system, it attains a maximum amount of income solidarity, however, it sharply reduces its volume, because the mandatory contribution rate decreases. It substantially improves the intergenerational equality of the mandatory pension system, especially as a result of increasing the retirement age.

The pension system's initial position should be taken into consideration …

Political decisions should be in line with economic principles and should consider the initial position of the Czech pension system. The current system is not financially sustainable over the long run. It registers a very high level of income solidarity. In the same way, it has a very high volume of solidarity due to a high contribution rate. The system is intergenerationally unequal and its financing is not diversified.

… as well as the likely autonomous trends.

However, when planning a pension reform, it is not enough to look only at the current situation, but the trends that will develop over the next decades should also be considered. The parametric changes of the pension system that strengthen its financial sustainability will most likely continue to increase income solidarity and intergenerational inequality. It is important to pay attention to the secondary effects that such development could generate (especially in the labour market).

There are relatively few important questions, but there could be many answers to them. The opinion of the Executive Team is only one part of the wide spectrum of possibilities.

3.3.3 The Executive Team's opinion

An in-depth reform of the current pension system is necessary.

Substantial parametric changes must be made to the pension system. It is essential to continue increasing the retirement age. A change in the financing of pension entitlements for the non-contributory insurance periods should be considered[45]. Introducing direct state payments (covered by increasing indirect taxes) for these periods would allow for a revenue-neutral reduction in the premium rate[46] (i.e. direct labour taxation) with a positive impact on the labour market. When calculating pension, this payment (or the assessment base) would be accounted for in a standard way,[47] which would make this type of solidarity more transparent and more equal.[48] An important factor is increasing the motivation of elderly persons to remain on the labour market, e.g. in the form of a bonus differentiated according to how much "over-time" they actually put in. Reducing the premium for persons working after retirement age could also help.

The high level of income solidarity reduces motivation to pay contributions

The level of income solidarity is high in the current system. This level could be preserved, which would eliminate the risk of poverty for certain population groups at risk. However, it would also have a negative impact on the labour market and on motivation to pay high premiums into an equal-age system. We, therefore, believe that reducing the volume of income solidarity in the state

[45] Now they are financed as a part of the solidarity of persons paying premiums and persons covered by a non-contributory period.

[46] When estimating the extent of non-contributory periods at a level of ¼ of all insurance periods and payment from the assessment base at a level of half the average wage, a decline in the premium rate from 28% to 24% can be estimated.

[47] Under the assumption that pension would be calculated based on lifetime earnings

[48] Today, the amount of pension attained for non-contributory periods depends on income earned at times with no non-contributory periods, which means that two individuals could have different pension amounts for the same non-contributory period.

into the system, therefore, it is beneficial to reduce the volume of income solidarity and to introduce an FDC pillar.

system would be advantageous. One possible way to do this would be to reduce the rate used for the system and to use the freed-up resources to invest in an FDC pension pillar. Another way would be to introduce two ceilings for the payment of premiums. The premium from earnings up to the first ceiling would be used exclusively for the state pension system. The premium from earning above this first ceiling (but lower than the second ceiling) would be partly used for the state system and partly for the FDC pillar. The earnings over the second ceiling would not require the payment of a premium to the state system nor to the FDC system.

Attention should also be given to non-old-age pensions.

Discretion in the area of pension valorisation is important for the long-term sustainability of the pension system. Attention should also be paid to non-old-age pensions, especially disability pension, which could serve as a substitute for early retirement. A partial solution to the problem in this area could be to limit the collection of disability pension to periods before reaching the statutory retirement age. We do not consider a substantial increase in the revenues of the pension system as a solution to long-term sustainability.

The FDC pillar lowers the intergenerational burden and contributes to diversification.

The FDC pillar helps reduce the intergenerational inequality of the pension system. It also contributes in respect to partial diversification of the financing of the pension system.

However, a transitional deficit will also develop.

A transitional deficit will occur at the cost of improving the diversification of risks, reducing intergenerational inequality and limiting the negative effects of the pension system on the labour market. From a fiscal point of view, it is good to calibrate the pension system reform so that the overall pension system deficit does not exceed the range of 0.5% to 1% of GDP during the "worst" years.

The strategic aim can be supplemented in various ways.

From a technical standpoint, these strategic goals may be achieved in a number of ways. The state pension pillar could be in the form of flat-rate pension, a parametrically adjusted PAYG DB system as well as an NDC system with minimum guaranteed pension. Each method would set the important parameters in a manner consistent with the strategic goal. Debate over a specific method is important, although secondary in nature. The most important factor is to find the widest consensus possible for the long-term strategic goal of the person system.

It is important to openly communicate with the public …

It is important to openly and thoroughly communicate the chosen strategic reform to the public on a long-term basis with the aim of attaining support. This will be gradually reflected in the credibility of the strategy. This method along with a sufficient amount of information will help citizens improve their decision-making and increase their standard of living over the long run.

… and to carry out additional professional

In addition to the debate on a specific form of the pension reform strategy, it is also beneficial to carry out necessary analyses and to use their results in the area of legislative requirements, regulatory requirements, the impact on the

analyses.

entire economy and the social environment as well as any other important identified areas.[49]

The strategy must be enhanced …

It is essential to immediately start incorporating specific measures into the pension reform strategy.

… and a successful economic policy and functional labour market will help.

Attention should also concentrate on the application of an economic policy that increases the likelihood of successfully achieving economic convergence in the Czech Republic with developed European countries.

In addition to this, it is important through an adequate labour market policy to create conditions for increasing the employment rate, especially for elderly persons.

The voluntary supplementary systems also need to be improved.

We also recommend to immediate deal with the problems of the 3rd pillar of the pension system, i.e. supplementary pension insurance and life insurance. Finding a solution to current problems does not depend on the situation in the mandatory state pension system.

[49] It is important to analyse the proposals from the standpoint of the level of difficulty in implementing them into legislation, from the standpoint of the effects and requirements on the regulation of financial markets or the creation of new regulation segments, from the standpoint of the widespread impact on the long-term macroeconomic environment in the Czech Republic or on the social systems, etc. The Executive Team was not able to investigate these areas. Such an analysis would demonstrate the advantages and risks of the specific pension reform proposals outside the area of pension systems.

Glossary of Terms

Below is a list of the specific terms used in the Executive Team's materials. The definitions of these terms may differ slightly from those normally used.

Actuarial neutrality	Situation in which the pension system does not generate any motivation for a person to exit or remain on the labour market (implicit tax = 0)
Annuity	Regular lifetime pension payment
Assessment base	The income used for measuring the premium
Co-financing	Mandatory payment from private resources with the possibility of opting out
Decisive period	Income from this period is used to determine the pension amount.
Defined benefit system	System in which the amount of pension is defined according to the pension formulae (usually dependant on wages, the insurance period, etc.)
Defined contribution system	System in which the pension amount is derived from the amount of the paid premium
Demographic rate of dependence	An indicator that expresses the ratio of persons 65 years old and above to persons 15 to 64 years old
Discount factor	Expresses the time value of money
Entities under the limit	Companies with less than 20 employees
Equity premium	Additional earnings above the non-risk rate of return that an individual requires when investing in stock
Executive Team	Team that carried out the analyses on the pension system
Expert Team	Team of political party members represented in the Czech Parliament
Fully funded (capital) system	System in which the premium is capitalised on the financial markets
Gross average wage	Average wage, including that of small "under-the-limit" entities (i.e. including employees in companies with less than 20 employees)
Hypothetical individual with a given earnings profile (HI)	Model person that retires at the age of 65 after 45 years of insurance and that throughout its active career has paid the premium from its income or drawn on the non-contributory insurance periods. The analyses worked with a static as well as dynamic person at various income levels (see the CD-ROM: Hypothetical individual in Section 2.3)
Hypothetical individual with a given dynamic earnings profile	An individual whose income in the economy has a growth tendency – in the analyses, an individual with an initial income of 80% of the average wage with a gradual rise to 120% of the average wage

Implicit tax (IT)	An indicator that defines whether or not and how the pension system is a motivating factor for exiting the labour market or for remaining on the market (see the CD-ROM for more information – Implicit tax in Section 2.3)
Indexation	The rate of increase in a specific indicator over time (e.g. assessment base, reduction limit, minimum subsistence level)
Individual replacement rate	Ratio of a newly awarded old-age pension to an individual's last pre-pension wage
Internal rate of return	Expresses the interest rate needed on the paid premium in order to pay an individual a specific pension
Macro-financial criteria	Indicators assessing the overall position of the pension system
Micro-financial criteria	Indicators measuring the effects of the pension system on an individual
Non-contributory periods	Periods that are counted for the purpose of setting the entitlement and/or amount of pension, even though the premium is not paid during this time (e.g. studies, unemployment, etc.)
Non-old-age pensions	General term for disability, widow, widower and orphan pensions
Opt-out	The possibility of transferring a part of the premium from the state pillar to an individual account
Overall replacement rate	Ratio of the average paid old-age pension to the gross average wage in the economy
Parametric changes	Adjustments that change the specific parameters of the pension system (e.g. statutory retirement age, reduction limit, base assessment, valorisation …) without changing its overall philosophy
Pay-as-you-go system	System based on the principle of pension payment from the currently deducted premium
Pension wealth	Current value of pensions that an individual obtains throughout its life
Reduction limit	Limit from which the amount of the assessment base changes for the purpose of assessing pension
Self-employed persons	Persons defined in Section 9 of Act no. 155/95 Coll.
Static HI	Hypothetical individual with a stable income level throughout its economically active years – in the analyses an individual with 50%, 75%, 100%, 200% and 300% of the average wage in the economy
Unisex mortality tables	Mortality rate tables for both men and women
Valorisation	Rate of increasing paid pensions
Working Group	A group created by the Expert Team to promote closer cooperation with the Executive Team

Abbreviations Used

CPI	Consumer Price Index
ČSSD	Czech Social Democratic Party
ČSSZ	Czech Social Security Authority
ČSÚ	Czech Statistical Office
DB	Defined benefit system
DC	Defined contribution system
ET	Expert Team
ExecT	Executive Team
FDC	Funded defined contribution system
FF	Fully funded system
FS UK	Faculty of Science at Charles University in Prague
HI	Hypothetical individual with a given earnings profile
IRR	Internal Rate of Return
IT	Implicit tax
KDU-ČSL	Christian Democratic Union – Czechoslovak People's Party
KSČM	Communist Party of Bohemia and Moravia
NDC	Notional defined contributions
ODS	Civic Democratic Party
OSVČ	Self-employed persons
PAYG	Pay-as-you-go system
PSP ČR	Parliament of the Czech Republic, Chamber of Deputies
US-DEU	Freedom Union – Democratic Union

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Annexes

Annex 1: Key macroeconomic indicators in the baseline scenario

Table P 1: Macroeconomic variables used in the model for the baseline scenario (average for the period)

		2005-2010	2010-2020	2020-2030	2030-2040	2040-2050	2050-2060	2060-2070	2070-2080	2080-2090	2090-2100
General											
GDP, c.p.	*growth* %	3,6	2,8	2,2	1,6	1,4	1,6	1,7	1,6	1,7	1,8
GDP per capita	*growth* %	3,5	2,7	2,2	1,7	1,6	1,8	2,0	1,8	1,8	1,7
Labour productivity	*growth* %	3,2	2,8	2,5	2,3	2,1	2,0	1,9	1,9	1,9	1,8
Labour productivity	*EU-12 = 100*	66,1	73,2	80,2	85,3	89,3	91,9	94,0	95,6	96,7	97,6
Labour market											
Employment	*growth* %	0,5	0,0	-0,3	-0,7	-0,7	-0,4	-0,2	-0,2	-0,1	-0,1
Participation rate (15-64)	%	76,7	78,5	78,7	77,3	77,1	77,1	77,3	77,2	77,1	77,2
Unemployment rate	%	7,9	7,2	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0
Average real wage	*growth* %	2,9	2,8	2,5	2,3	2,1	2,0	1,9	1,9	1,9	1,8
Prices											
Rate of inflation	%	2,8	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Other assumptions											
Real rate of retur - bonds	*% p.a.*	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Real rate of return - shares	*% p.a.*	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5
Administrative costs	*% assets*	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0