



universität
wien

Magisterarbeit

Titel der Magisterarbeit

“Pension System Reform”

Verfasser

Petr Kratochvíl

angestrebter akademischer Grad

**Magister der Sozial- und Wirtschaftswissenschaften
(Mag. rer. soc. oec.)**

Wien, im März 2012

Studienkennzahl lt. Studienblatt:

066 913

Studienrichtung lt. Studienblatt:

Volkswirtschaftslehre

Betreuer:

ao. Univ.-Prof. Mag. Dr. Peter Rosner

Contents

Introduction	3
1 Introduction to Pension Systems	5
1.1 Objectives of Pension Systems	5
1.2 Classification of Pension Systems	6
1.2.1 Public and Private Pension Systems	6
1.2.2 Defined-contribution and Defined-benefit Schemes	7
1.2.3 PAYG and FF Schemes	8
1.3 Simple Model of a Pension System	9
1.4 Various Risks For Pension Systems	10
1.4.1 Political Risks	11
1.4.2 Demographic Risks	12
1.4.3 Longevity Risks	13
1.4.4 Macroeconomic Risks	13
2 Pension System in the Czech Republic	15
2.1 Historical Overview	15
2.2 Current Pension System	16
2.2.1 Mandatory PAYG Scheme	16
2.2.2 Voluntary FF Scheme	18
2.3 Motivation for the Reform	20
2.3.1 Demographic scenario	20
2.3.2 Financial Sustainability of the Current Public System	22
2.4 Main Reasons for the Reform	25
3 Pension System Reform and Pareto Efficiency	27
3.1 PAYG Scheme as an Efficient Scheme	28
3.1.1 Open versus Closed Economy Models	30
3.2 Possibility of Pareto Improvement	31
3.3 Conclusions from the Debate	34
3.4 Recommendations	35

4	Political Economy of the Pension Reform	37
4.1	Favourable Conditions for Reforms	38
4.1.1	Pre-existing Conditions and Probability of the Reform	39
4.1.2	Interest Groups	41
4.2	Political Economy and Modelling the Reform	42
4.3	Conclusions	44
5	The Central European Experience With Pension Reforms	46
5.1	Historical Overview	46
5.1.1	Hungary and Poland Before 1989	47
5.1.2	First Years After 1989	47
5.2	Pension Reform in Hungary	49
5.2.1	Early Reforms	49
5.2.2	The New Pension System	51
5.2.3	The End of the New Pension System	53
5.3	Pension Reform in Poland	55
5.3.1	Early Reforms	55
5.3.2	The New Pension System	55
5.3.3	Conclusions	57
5.4	Pension Reform in Slovakia	58
5.4.1	Early Reforms	58
5.4.2	The New Pension System	59
5.4.3	Evolution of the New System	60
5.5	Lessons from CEE countries	62
6	Pension Reform in the Czech Republic	64
6.1	The New Pension System	64
6.1.1	Political Background	64
6.1.2	The First Pillar Reforms	65
6.1.3	The Second Pillar Reforms	67
6.2	Objections Against the New System	70
6.3	Evaluation	72
	Conclusions	74
	References	76
	Appendix A, Abstracts, CV	81

Introduction

Over the past decades the population has changed a lot. Due to many circumstances such as technological and economic growth or progress in medical sciences, people live much longer nowadays. This brings up many challenges for the current society. One of them being the problem of pension systems.

This thesis aims at bringing contribution to the discussion about pension system reform by exploring the theoretical basis of the reform and identifying problems in the reform implementation. There are three main topics of this thesis:

- *Problem identification*
- *Theory presentation*
- *Solution implementation*

Firstly, in chapters 1,2, we identify the problem. We define objectives of pension systems, classify the most important types of pension systems, and show how they work. We present also the basic way how to model a pension system and point out the main risks of different pension system types. Afterwards, we take the Czech Republic as an example of a country experiencing difficulties with pension system. We describe the evolution of the Czech system and show what are the main problems and how will they evolve in the near future. At the end of Chapter 2 we present main reasons for the reform.

Secondly, in chapters 3,4, we present the theoretical background of the pension system reform. We discuss the Pareto efficiency problem and present conditions under which the pension system reform might be Pareto-efficient. We also outline the political economy of the reform. Using a study describing the reform implementation in Latin America and transition economies, we identify the most crucial variables, such as pre-existing conditions or influence groups, which have an impact on the possible success of the reform.

Thirdly, in chapters 5,6, we investigate practical problems of reforming a pension system. In Chapter 5 we use examples from the CEE region -

Hungary, Poland and Slovakia and we evaluate their reforms. We identify the most crucial mistakes that were made and draw lessons out of them. These lessons have to be followed if the pension system reform in the Czech Republic should be successful. Finally, we discuss the current Czech reform and main objections against it. At the very end of Chapter 6 we evaluate the Czech reform and predict how the new system will work in the near future.

Chapter 1

Introduction to Pension Systems

In this introductory chapter we start with the main objectives of pension systems and reasons of their existence. Then we introduce basic concepts of different pension systems and economic tools which are used to model this environment, the so called overlapping generations models (OLG models). This we use later when analysing different pension schemes and the transition between them. At the end of this chapter we mention various risks the different pension schemes face.

1.1 Objectives of Pension Systems

Individuals are not economically active lifelong and therefore they have to secure an income after they retire. This could be essentially done on a private basis without any state intervention. Individuals could save or invest part of their income while they are economically active in order to use when they are older.

The problem one faces when deciding how much should one save or invest during his active years in order to be able to consume in retirement is caused by many uncertainties in the real world. First uncertainty is how long one is going to live. Living *too long* could cause outliving one's savings. This can be solved by an insurance provided by a private company, because although it is almost impossible to predict longevity of a particular individual, the prediction of longevity of a sufficiently large group of people is much easier. Such private company can then provide insured people with annuities knowing the average life expectancy.

In a simple world this setting would be sufficient without any need of gov-

ernment intervention. Barr and Diamond (2006) identify two sets of reasons why this approach is insufficient in the real world. The first set of reasons consists of existence of many imperfections, such as imperfect information, missing markets or numerous distortions in the economy. The second set consists of other government's objectives which could be easily accomplished through the pension system, such as fighting poverty or redistribution. An example of fighting poverty would be paying pensions to those people who were not able to save enough for their retirement. This could be also an example of redistribution. However, we can find redistribution which is not primarily poverty fighting such as redistribution towards married couples with children or towards war veterans.

As a result, pension system is nowadays a very complicated multi-purpose framework which influences the whole economy. Therefore its setting is crucial.

1.2 Classification of Pension Systems

Because the problem of shifting wealth (consumption) from one's productive middle age to one's higher age has to be solved in every society, some type of pension system exists in every country. In this section we would like to define the most common schemes.

1.2.1 Public and Private Pension Systems

As mentioned above the main purpose of a pension system is to ensure consumption smoothing. This could be done both on public or private basis. In developed economies people usually finance their consumption at higher age from both systems (pillars¹). Nevertheless the proportion of public and private system differs substantially among different countries.

The public pension system is usually state-organized, i.e. the state is responsible for both contribution collection and pension payments. This system is in most countries mandatory. Main reasons for this is individual myopia and possible insurance market failures. We distinguish two types of state-organized pensions (often a state pension consists of both types):

- *Flat-rate pension* - every pensioner is provided with an equal pension independent of former income.

¹If there are more systems from which people get pensions from we refer to these systems as to pillars. A pension system mostly have several pillars.

- *Earnings-related pension* - every pensioner is provided with a pension which is related to former income (usually a minimum pension is defined here).

According to Bezděk (2000a), all OECD countries except from Australia, Ireland, the Netherlands, and New Zealand have some type of earnings-related pension, using usually defined-benefit pay-as-you-go schemes (see later).

On the other hand, in most countries there exists a possibility to use a private pillar, which is very often subsidized from the government. This pillar can be organized in many ways:

- *Private pension funds*: these funds are usually under strict governmental supervision and are usually allowed to invest mainly into low-risk assets such as government bonds. These funds administer individual pension accounts, i.e. the future payments are related to former savings, and insured people are provided either with an annuity when they retire or they are allowed to withdraw the whole amount at once.
- *Employer-sponsored occupational scheme*: depending on a country these schemes are administered either directly by employers, or could be organized by financial institutions in case of small enterprises, or on the other hand, could be organized jointly on professional basis. Employer-sponsored occupational schemes are historically much older than any other type of the private pillar.
- *Other possibilities*: such as personal savings or individual life insurance.

The first two saving schemes in private pillar can be both mandatory or voluntary, the third one (personal savings, individual life insurance) is voluntary.

1.2.2 Defined-contribution and Defined-benefit Schemes

Before discussing the differences between the pay-as-you-go system and the funded system we introduce another classification of pension systems which describes how closely the benefits of the system are related to one's previous contributions. We distinguish following approaches:

- *Defined-contribution scheme*
- *Defined-benefit scheme*
- *Notional defined-contribution scheme*

In a defined-contribution scheme (DC scheme) insured persons pay fixed contribution, usually a fixed fraction of their income. The benefit they get when they retire is not guaranteed and depends, for example in case of private pension funds, on the return on investment. Therefore the possible benefit from this scheme can vary a lot.

On the other hand, in a defined-benefit scheme (DB scheme) one has a guaranteed future pension, generally a fixed fraction of former income, the so-called replacement ratio. The formula used to compute the pension can take into account not only the former income throughout the whole productive years, but also the highest former income or the last income one had before one retired. Sometimes it takes into account the length of the service as well. Although in this scheme people pay a regular contribution which is usually defined as a fraction of income, like in the DC scheme, the crucial difference is that here the sponsor (which could be the state or the employer, for instance) ensures that the insured persons get their guaranteed benefit after they retire. In other words, the sponsor's contribution ensures the balance of the DB scheme and he is the one who takes the risk.

The last approach is the notional defined-contribution scheme (NDC scheme). This scheme mimics the DC scheme insofar as it *pretends* every person had an individual account, even though these accounts are fictive and do not match any real funds. This scheme is used in pay-as-you-go schemes and each contributor pays a fixed fraction of his income as a contribution which is credited to his fictive personal account. This account pays a notional interest which is set up by the government (the notional interest rate does not equal the market interest rate). When one retires, the account balance is converted into an annuity.

We would like to point out that both the DC scheme and the NDC scheme could incorporate some redistribution for example through determining a minimal guaranteed pension.

1.2.3 PAYG and FF Schemes

Speaking about pension systems and pension system reform, the essential division is the one between a pay-as-you-go scheme (PAYG scheme) and a fully funded scheme (FF scheme). We will start with introducing both extreme cases and, later on, show that in reality a middle approach is often taken.

A PAYG scheme is based on intergenerational solidarity and is usually run by the state (although we can find PAYG schemes run by employers). In this scheme, the current retired population receives pensions which are paid from contributions of the current working population. This scheme has

to be mandatory in order to safeguard future payments, i.e. to be able to promise future pensions for the current working population. There are no investments in this scheme and it works fully on a redistributive basis.

In a FF scheme, on the other hand, contributions of current working population are invested into assets and the return on these is credited to one's personal account. In retirement, the insured persons are paid either an annuity or some other way of payment is used (sometimes a one-time withdrawal is possible). In this scheme there is no redistribution and one's pension fully depends on one's savings. The FF scheme is the most usual scheme used in private superannuation schemes, however, it is sometimes used also in public schemes.

The FF scheme is a DC scheme, i.e. there is a defined contribution one has to pay, but the benefit is not guaranteed and depends on many exogenous variables such as the rate of return. The pure PAYG scheme is, on the other hand, a DB scheme, because pensions are guaranteed as far as the legislation is not changed. Nevertheless the PAYG scheme can be organized as a NDC scheme and then there is no strict guarantee of the future pension amount either.

1.3 Simple Model of a Pension System

After defining the most important divisions among pension schemes we would like to point out the main characteristics of the PAYG and FF schemes, some of which we will analyse more thoroughly in the next chapters. We will start with introducing the way how a pension system is modelled using an OLG model. In this subsection we start with a simplified one, just to be able to show the main differences between a PAYG and a FF scheme (see Rosner 2003 or Ribhegge 1999).

In this OLG model people live for two periods. In the first period they work, in the second they just consume (using only savings they have made in the first period in case there is no public pension system). In each period there are only two generations alive - one is working and one is retired. We will assume everybody dies at the same age having consumed all his savings, i.e. leaving no bequests.

Let's start with a PAYG scheme. In this scheme contributions have to equal pensions in every period t :²

$$N_t^w W_t b_t = N_t^r P_t, \quad (1.1)$$

²We assume here that the pension system is balanced and it does not have to be subsidized from other taxes.

where N_t^w and N_t^r stand for the working population and for the retired population in the period t , respectively. W_t is the real wage, b_t the rate of contribution and P_t the pension paid in the period t .

Let's assume the population is constantly growing at rate n and the real wage is constantly growing at rate w :

$$N_{t+1}^w = (1 + n)N_t^w,$$

$$W_{t+1} = (1 + w)W_t.$$

Now we can define a rate of return i of the PAYG scheme as follows:³

$$1 + i = \frac{P_{t+1}}{P_t} = (1 + n)(1 + w) \frac{b_{t+1}}{b_t}. \quad (1.2)$$

From this equation we see that if we keep the rate of contribution b_t constant, we have $i \approx n + w$, for low enough values of n and w . In other words each generation gets approximately $(n + w)$ -times more on pensions than they have paid on contributions.

In the case of the FF scheme the rate of return equals the rate of interest r . Each generation invests a fraction b_t of its income W_t and gets in the next period the pension P_{t+1} :

$$P_{t+1} = (1 + r)W_t b_t.$$

Therefore, if we want to decide which pension scheme is more suitable we compare rates of returns of both schemes. Aaron's condition (Aaron 1966) states if

$$n + w > r \quad (1.3)$$

the PAYG scheme is to be preferred. However, in the long term, according to the macroeconomic theory we should have an equality, i.e. $n + w = r$.

This result does not mean, because of the transformation costs, that whenever $n + w > r$ holds or vice versa we should change the pension scheme accordingly. We will discuss this matter in detail in Chapter 3.

1.4 Various Risks For Pension Systems

In the Section 1.1 we have mentioned possible risks one faces when securing an income for the retirement. In this section we would like to specify these risks and discuss them with relation to the PAYG and to the FF scheme. From the following text it will also be clear why a multi-pillar system is

³This rate of return is only imaginary as far as there is no real interest payment.

recommended in order to minimize every possible risk.⁴ According to Börsch-Supan and Reil Held (1997) and Holzmann (1997) we discuss the following risks: political, demographic, family, longevity and macroeconomic risks.

1.4.1 Political Risks

With a political risk we mean those political actions which can substantially change the amount of future pensions. Neither of these two schemes is resistant to this risk. A legislation can be easily changed which affects both schemes. We are experiencing, for example, continual small parametric changes of PAYG schemes in many countries which directly influence current pensions. As an example of this we can mention abolishing the minimum replacement rate in Austria in 1984 which substantially decreased women's pensions (Rosner 2003).

Table 1.1: Pensions in Austria

<i>Year</i>	1983	1984	1985	1986	1987	1988	1989	1990
<i>Pension of women</i>								
<i>as percentage</i>	58.8	59.0	56.4	51.7	49.7	49.4	49.1	50.2
<i>of pension of men</i>								

Source: Rosner (2003).

Pension funds, on the other hand, may be misused or in extreme cases nationalized - recall the very recent Hungarian case. It is assumed that political risk is bigger in case of PAYG schemes, because goals of governments (and governments themselves) are constantly changing. These political risks are much smaller in case of pension funds as far as in developed countries the property rights are guaranteed.

⁴The World Bank recommends a five pillar framework with following pillars: a non-contributory zero pillar to ensure a protection against poverty (for example a flat-rate pension); a mandatory first pillar based on a PAYG scheme; a mandatory second pillar based on an individual savings account (FF scheme); a voluntary third pillar taking all possible forms such as individual savings or employer-sponsored scheme; a non-financial fourth pillar such as family support, social programs or assets such as house ownership. See The World Bank Pension Conceptual Framework, available at http://siteresources.worldbank.org/INTPENSIONS/Resources/395443-1121194657824/PRPNoteConcept_Sept2008.pdf.

1.4.2 Demographic Risks

The demographic risk is nowadays very often discussed and is often used by politicians to give a reason why the transition from a PAYG scheme to a FF scheme (or to a mixed scheme) is inevitable. Although this opinion is in political discussions often not doubted at all, economists have shown that the transition from a PAYG to a FF scheme does not solve the adverse demographic problem.

As Barr (2000) argues, we can show this as follows. In the first case, we assume the real output is staying the same despite of the adverse demographic development. Let's assume the generation t is twice as big as the following generation $t + 1$, but the output does not change and hence the real *per capita* wage doubles, i.e. $W_{t+1} = 2W_t$. Recalling the equation describing the PAYG scheme from previous section

$$N_t^w W_t b_t = N_t^r P_t,$$

we see that in this case, in spite of lowering the replacement ratio $\frac{P_t}{W_t}$, the real pension P_t stays the same. This case does not pose any risk to a FF scheme either because higher *per capita* output (and higher real wages) ensures that the demand of the current working population for assets stays the same and therefore the current pensioners have real pensions they expected.

The problem arises when the output growth does not offset the adverse demographic development. Let's assume again that $N_t = 2N_{t+1}$, with the overall output staying the same $W_t = W_{t+1}$. From the equation describing the PAYG scheme we see that either the future pension has to be halved $P_{t+1} = \frac{P_t}{2}$ or the contribution rate has to be doubled $b_{t+1} = 2b_t$, in order to keep the pension level the same $P_{t+1} = P_t$. Both policies are not sustainable in long-term since they would lead at the end to having no public pensions at all.

Unfortunately, this problem cannot be directly solved by transforming the PAYG scheme into a FF scheme, because supply of assets the current old generation would like to sell in order to finance its consumption exceeds the demand of the smaller current working population. Therefore the future real pension is also under the funded scheme considerably lower than expected (due to higher prices and/or lower rate of interest - capital is less scarce with respect to the working force).

As we have shown, the problem lies not in demographic, but in the low output: *"PAYG and funding are both mechanisms for organizing claims on future output; since demographic change generally affects that output, it generally causes problems for pension schemes, however they are organized. [...]"*

The solution to population ageing lies not in funding per se but in output growth.” (Barr and Diamond (2006)).

1.4.3 Longevity Risks

The longevity risk has been already mentioned. Everybody faces a risk of living *too long* and outliving one’s savings. This risk does not exist in PAYG schemes at all. In a FF scheme where one is paid an annuity, on the other hand, there is a moral hazard and an adverse selection problem.

An individual faces a moral hazard because he can, to a certain extend, influence how long he is going to live (e.g. people with a healthy life style live longer). Unfortunately the seller of the annuity (an insurance company) knows only the average longevity and therefore offers an annuity based on information it has about the whole generation and not about the particular individual.

The second risk (adverse selection problem) refers to the fact that people with shorter expected longevity are not going to buy annuity based on average longevity. Because of this, the expected longevity of those willing to buy an annuity is higher and therefore insurance companies have to adjust (raise) the price of the annuity. After that also the expected average longevity of those willing to buy the *new* annuity raises and the insurance company has to adjust the price once more. This goes ad infinitum. Theoretically this could lead, as Bezděk (2000a) points out, to a situation where there is nobody offering annuities.⁵ This problem could be solved by a compulsory purchase of an annuity for all insured persons.

1.4.4 Macroeconomic Risks

There are various kinds of macroeconomic risks. Generally speaking, FF schemes are much more subject to these risks because of their nature. One of the most discussed are the capital market risks (variation in the rate of return, inflation or exchange rate fluctuations). These risks can be mitigated by investing into low risk assets, inflation-indexed bonds or into assets in the same currency area where we want to consume later in the retirement.

Another possible macroeconomic risks are negative output shocks or unemployment. Also these risks are bigger for a FF than for a PAYG scheme. In case of a negative output shock, an unfunded system could be exposed to

⁵On the other hand Brown (2002) shows that based on utility even for low-income groups buying an annuity is favourable if the administrative cost are sufficiently low. This is due to the fact that the threat of outliving one’s savings is severe, even though the probability might be low.

lower revenues, but impacts on individuals can be mitigated. As well as in the case of unemployment where it leads to lower contributions to the system, but in the short-term the pension system can be subsidized from other taxes.

As the last note, we would only like to point out that even though these risks influence the funded scheme much more than the unfunded scheme these risks can be in contrast to the main risks of the unfounded scheme (e.g. political risks) diversified. One can invest in different assets in different currencies, but in the PAYG scheme one cannot mitigate the political risk, for example.

Chapter 2

Pension System in the Czech Republic

In the previous chapter we have defined the basic concepts of pension schemes. In this chapter we introduce the pension system in the Czech Republic and argue why a reform is necessary.

2.1 Historical Overview

In the description of the Czech pension system we start with a very short overview of its history (Müller 2000). Like in other countries the first pension system in the territory of the present Czech Republic was intended only for civil servants (started in 1771). Afterwards other professional groups were also slowly granted a pension scheme: miners in 1854, manual workers in 1906. In 1924 the Manual Workers' Social Insurance Act established the fourth pension scheme providing all employed people with an old-age pension. This pension system was a FF scheme, financed both by employers and employees and a state subvention is provided. Pensions had a flat-rate basis and a earnings-related part. It is worth noting that in those days pensioners became their pensions first at the age of 65. The last notable change before the World War II was the foundation of the fifth scheme in 1929, providing means-tested pensions which were tax financed.

After communists taking the power in 1948 the National Insurance Act was introduced putting a PAYG scheme into practice. The pension system was part of the state budget and from the year 1952 onwards it has been financed through a wage tax. There were three groups of workers according to the importance of the sector they work in for the state, each group getting a different pension (advantaging workers in heavy industry). In 1956

the age of retirement was lowered to 60 (55) for men (women) and in 1964 the age of retirement for women was linked to the number of children - 53 years for women with five children or more, 57 years for women without children. Apart from this there were not many changes of the system during the communist era.

After the velvet revolution in 1989 no big pensions system reform took place. In 1990 the Czech Social Security Administration (*ČSSZ, Česká správa sociálního zabezpečení*) was founded as a part of the Ministry of Labour and Social Affairs which was responsible for the pension system administration.

The state pension persists to be a PAYG scheme. Contributions are paid by both employers and employees. The pension system was extended to cover also the self-employed and the system was made homogeneous by cancellation of former professional privileges, such as for example those for miners, and it relates benefits more closely to previous earnings and the length of the contributory period. In 1991 the Pension Act introduced the pension indexation to the retail price index (during the communist era there was no indexation). In 1994 the existence of private pension funds was enabled. The participation in these funds was voluntary and state subsidized.

2.2 Current Pension System

In order to be able to discuss the pension system reform in the Czech Republic, we have to firstly describe the current system and offer predictions about most important variables influencing it. We start with the description in this section and the prognosis will follow in the next section.¹

2.2.1 Mandatory PAYG Scheme

The Czech pension system has nowadays (in year 2011) two pillars. The first pillar is a mandatory public PAYG scheme which covers almost the whole population and which is uniform (there are no special schemes for different professions). The second pillar is a voluntary private state-subsidized FF scheme. The public scheme offers four types of pensions:

- *Old-age pensions* - 74% of total pension system expenditure in 2009,²
- *Disability pensions* - 18%,

¹The information about the current pension system is taken from the Ministry of Labour and Social Affairs of the Czech Republic, <http://www.mpsv.cz>.

²Source: Czech Statistical Office (CZSO), <http://www.czso.cz>.

- *Survivors' and Children's pensions* - 8%.

Our main focus in this thesis is of course on the old-age pension. The contribution rate into the public scheme is now 28% of the gross wage (6.5% is paid by the employee himself and 21.5% is paid by the employer).

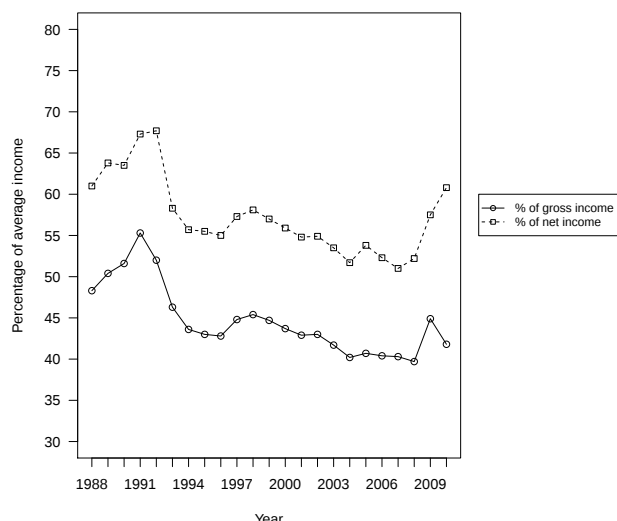
Originally one received the regular old-age pension if one has contributed into the system at least for 25 years and has reached the age of retirement or has contributed for 15 years and was 65 years old. The age of retirement is nowadays 62 years for men and 55-60 years for women depending on how many children they have raised. Women are retiring one year earlier for each child raised, i.e. at the age of 60 in case they had no children and at the age of 55 in case they have raised 5 children or more).

But these system parameters are continuously being changed and in 2018 the mandatory contribution period into the system in order to qualify for the regular old-age pension will be 35 years and reaching the retirement age or 20 years but being 5 years older than the retirement age. The retirement age is also being continuously increased and in 2033 it should be 65 years for men and 62-65 years for women (64 if they have raised 2, 63 if 3 and 62 if 4 or more children). There also exists a possibility for earlier retirement in case one has contributed at least for 25 years to the system and one is not more than 3 years younger than the official retirement age (for those whose retirement age is above 65 years this condition is extended to 5 years). In the case of earlier retirement the pension is lowered.

The current old-age pension consists of two components, a flat-rate and an earnings-related component. The flat-rate component is 2,170 CZK and the earnings-related component at least 770 CZK per month (the current living wage in the Czech Republic is 2,020 CZK). The earnings-related component is influenced not only by one's income, but also by the contribution period. The current average old-age pension (the second quarter of 2010) is 9,839 CZK³ which is 42% of the current average gross wage. This ratio between old-age pensions and wages is decreasing in long term as shown in the following table (we have experienced a reverse trend in last years because of the economic crisis which has influenced wages, but not old-age pensions):

³Source: CZSO.

Figure 2.1: Relationship between pensions and wages



Source: CZSO, own computations.

In order to secure certain living standards for pensioners pensions are automatically annually valorized. Only in the case when annual inflation rate is below 2% or above 5% a special approach is taken.

The goal of securing certain living standards is accomplished as the ratio of retired people under the poverty threshold is smaller than it is in the whole population. Below the threshold of 60% of median income there is 8% of the whole population, but only 4% of those older than 60 years, 4.4% of those older than 65 years and 6.6% of those older than 75 years.⁴

2.2.2 Voluntary FF Scheme

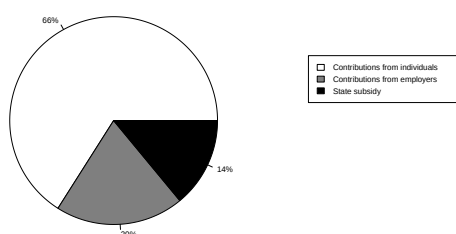
As mentioned above, since 1994 the existence of private pension funds (FF, DC scheme) was enabled. This scheme is opened to everybody older than 18 years, who has a permanent residence either in the Czech Republic or in any EU member state and is contributing either to the public pension system or to the public health insurance system. Every person, once he decides to participate on this pension scheme, is obliged to contribute at least 100 CZK per month. The state subsidy is at least 50 CZK and at most 150 CZK per month (in case one contributes more than 500 CZK per month). These

⁴National Strategy Report on Adequate and Sustainable Pensions (2005).

contributions can also be paid by the employer. Another form of subsidy of this pension scheme is a tax relief and a relief on pension system and health insurance contribution for its contributors.

At this moment (year 2011) there are 10 private pension funds which are regulated by the Ministry of Finance of the Czech Republic. This pillar is widely used and at the end of the year 2009, 4,447,252 persons were participating. This makes 58% of the population in productive age. The average annual per capita contribution in 2009 was slightly below 9,500 CZK with the following average distribution of sources of contributions:

Figure 2.2: Distribution of contributions into private pension funds



Source: CZSO, own computations.

If we express the individual private pension fund contribution in terms of average wage we get that people save within pension funds in long term approximately 2% of their income.⁵ This amount is considered as too low in order to generate decent future pension and it will be shown later why and how people should be motivated to save more.

Pension funds in the Czech Republic are investing mainly in bonds - 84% (out of which 83% are government bonds), to a lesser extent they invest into other financial assets such as shares (5%). The valuation of investments in pension funds in the long term is rather low and did not exceed the inflation rate in many years in a row (2007,2008,2009). In 2010 the valuation if corrected for inflation was 0.3-0.5%. This low valuation is also due to the fact that pension funds are obliged to have non-negative annual nominal valuation. This condition is about to be cancelled according to the proposed pension system reform.

⁵See National Strategy Report on Adequate and Sustainable Pensions (for 1999-2005), in year 2009 it was 2.3%.

2.3 Motivation for the Reform

In the previous text we have described the current old-age pension system in the Czech Republic. In this section we would like to provide the reader with reasons why the reform of the current pension system is necessary. In the next chapters we will afterwards discuss how feasible is this reform.

2.3.1 Demographic scenario

One of the main exogenous variables that influence every pension system is the ratio between economically active and retired population. The retired population is always somehow dependent on the active population regardless of the particular pension scheme adopted (as shown in Chapter 1). Therefore in times when the population is getting older and the dependency ratio⁶ is growing we have to adapt the pension system. In the 21st century almost every developed country is facing this problem and the Czech Republic is not an exception:

⁶Dependency ratio is in the of case pension systems a ratio of retired people and economically active people. Generally the dependency ratio is a ratio of not economically active (i.e. dependent) and economically active population (i.e. independent, productive).

Table 2.1: Old age dependency ratio in developed countries (65+ in % 20-64)

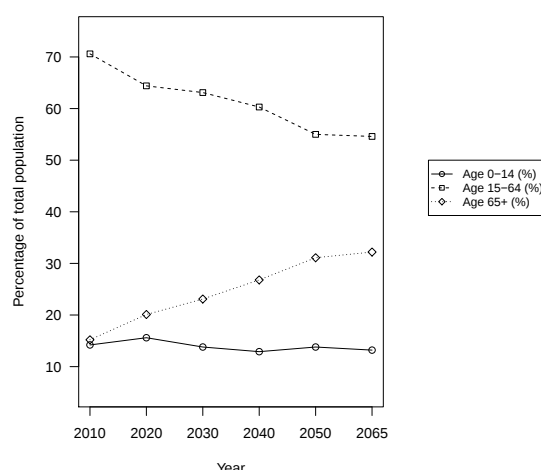
<i>Country</i>	<i>Year 2000</i>	<i>Year 2050</i>	<i>Country</i>	<i>Year 2000</i>	<i>Year 2050</i>
Australia	21%	48%	Korea	11%	68%
Austria	25%	55%	Luxembourg	23%	40%
Belgium	28%	50%	Mexico	9%	35%
Canada	20%	45%	Netherlands	22%	39%
Czech Republic	22%	60%	New Zealand	20%	50%
Denmark	24%	39%	Norway	26%	45%
Germany	26%	54%	Poland	20%	56%
Finland	25%	52%	Portugal	27%	63%
France	28%	58%	Slovakia	19%	57%
Greece	27%	64%	Spain	27%	73%
Hungary	24%	50%	Sweden	30%	43%
Ireland	19%	50%	Turkey	10%	31%
Iceland	20%	40%	Switzerland	25%	43%
Italy	29%	71%	UK	27%	47%
Japan	28%	72%	USA	21%	39%

Source: OECD.

As we see from the table, the dependency ratio is going to grow significantly over the following years in all listed countries. The average dependency ratio in OECD countries in this time period will more than double-up (from 22% to 47%). If we concentrate on the Czech Republic, using 2009 Czech Statistical Office forecast and its middle scenario up to the year 2065,⁷ we get the following results: While the number of population stays approximately the same - 10.4 million in 2009 and 10.7 million in 2065 (this slight population growth will be due to the immigration), the age structure of the society will change a lot as shown in the following figure:

⁷This forecast works with three scenarios: low, middle and high. In the low scenario one expects very low level of fertility and low level of migration, in high scenario it is vice versa. In this thesis we present only the middle scenario.

Figure 2.3: Distribution of age groups in years 2010-2065 in the Czech Republic



Source: CZSO.

This change of the age structure of the population does not affect only the amount of pensioners whom a pension has to be paid (the number of people in the oldest age group (65+) grows from 1.6 million in 2010 to 3.4 million in 2065)⁸, but it also affects the amount of the contributors (the number of people in productive age will sink from 7.4 million in 2010 to 5.8 million in 2065).

2.3.2 Financial Sustainability of the Current Public System

The pension system reform is proposed mainly due to the fact that the current public PAYG scheme is not financially sustainable in the long run and therefore cannot secure future decent living conditions for the contemporary young generation. In this subsection we would like to present the financial balance of the public pension system and also its future projections.

Between the years 1993 and 1996 the pension system had surpluses. This has changed in 1997 and till 2004 the system was in deficit. Main reasons for this change is lowering the contribution rate from 27.2% to 26%. Also the

⁸This expenditure growth could hardly be outweigh only by raising the retirement age.

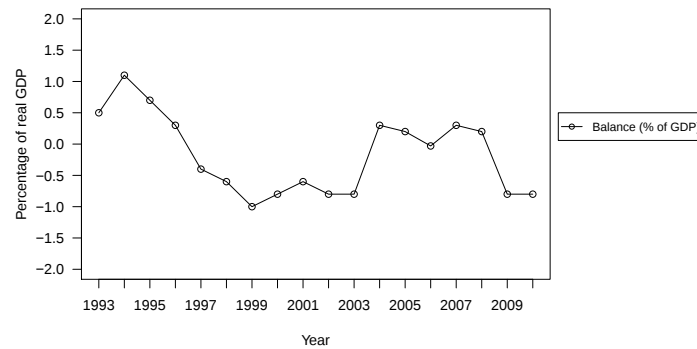
system of public pension indexation was amended stating that the annual pension indexation should equal at least the inflation and one-third of the increase of the real wage which has lead to higher system expenditures. In 2004 the contribution rate was raised to 28% which lead to financial consolidation of the system and we have seen surpluses for many consecutive years.

There were other important changes that were introduced in 2004 and have helped with financing the pension system. One of them was the restriction of the possibility of early retirement - even though one received lower pension if retiring earlier, this possibility was very popular and widely used mainly because of a very high unemployment rate among older people (according to Bezděk (2005) in 2003 45% of all new pensioners have retired earlier). The other change that was introduced was raising the minimal pension system contribution base⁹ for self-employed which has also led to higher system contributions. This contribution base is in case of self-employed still much lower than in case of employees (in 2004 the base for self-employed was only 30.8% of the base for employees). This affects the pension system a lot because of the increasing amount of self-employed in the system.

In the last years, contributions into the pension system were not sufficient mainly due to higher unemployment. The adverse demographic problem also influences the pension system balance, but in the short term issues like higher unemployment or changes in the contribution rate are much more relevant. The financial balance of the pension system in the last years is presented in the following chart:

⁹The contribution base is a part of earnings of the self-employed that serves as a basis for the calculation of pension system contribution.

Figure 2.4: Financial Balance of the Public Pension System



Source: CSSZ, Müller (2000), Bezděk (2005), own computations.

Because of the upcoming pension system reform in the Czech Republic there has been several studies predicting the future financial balance of the pension system. All these studies predicted big deficits of the pension system account mainly because of the ageing of the population. In 2004 a committee of experts was set up in order to assess the pension system reform proposals of the main political parties in the Czech Republic (those which were represented at that time in Chamber of Deputies) and also the so called basic scenario which has shown prospects of the pension system without any reform.¹⁰

The committee predicted¹¹ a long term annual deficit of the pension system of about 5% of the GDP. This would mean an overall deficit of 110% of GDP in 2065 and 260% in 2100. The replacement ratio would decrease from 42% in 2005 to 38% in 2100. These predictions did not assume that the pension system is totally rigid and the annual pension indexation and changes in the pension calculation (mainly changes of the pension system contribution base) were taken into account. The committee also assumed that the government bond interest rate stays the same over the examined time period - if we allow for higher interest rate over the time, which is reasonable, the deficit of the pension system would be significantly higher.

¹⁰At this point we are going to present only the results of the basic scenario, because the parties' proposals were not taken into account after 2004.

¹¹See the Final Report (2005) of the committee. Source: Ministry of Labour and Social Affairs of the Czech Republic.

These results were confirmed later in 2010¹² when discussing the pension system reform once more after taking no significant action after presenting the findings of the first committee in 2005. The main message of the new committee is the same as the one back in 2005 - the current public pension system is not financially sustainable in the long term. This second committee predicted annual system deficit of about 4% of the GDP after 2050 and overall debt of 100% of the GDP in 2065. The slight change in predictions is on one hand due to parametric reforms which has been put through and updated demographic scenario (both improving prospects of the current system) and as well as due to the financial crisis (leading to change of prospects of the system in the short term, but not influencing it significantly in the long term).

Also other authors came to the same result that the public pension system is financially unsustainable in the long term. Marek (2007) for example estimates that in 2050 the annual system deficit is going to be almost 9% of the GDP and the overall debt 155% of the GDP. He tries to estimate the financial balance for longer time period and according to his study in 2150 the annual deficit is going to be almost 16% of the GDP and the overall deficit 2,526% of the GDP.

2.4 Main Reasons for the Reform

In previous sections we have shown that the current pension system in the Czech Republic is not financially sustainable in the long run if we take demographic and macroeconomic trends into account. This is one of the main reasons why the reform is necessary. This financial balance problem leads not only to the impossibility of guaranteeing sufficient pensions for future old generations, but it is also intergenerationally very unjust as long as the current expenditures of the system have to be paid by future generations.

Another important goal of the pension system reform is the diversification of pension funding. According to the Final Report - PES (2010) in the year 2008 the pension from the public pension system formed 94% of the income of Czech pensioners. This is a very risky situation, because almost all pensioners depend on one pillar. In the first chapter we have discussed various risks to different pension schemes and in this current situation in case of lowering public pensions for example due to lack of funds, pensioners would find themselves in a very critical situations without having almost any possibility to find a compensatory source of income.

¹²See the Final Report - PES (2010). Source: Ministry of Labour and Social Affairs of the Czech Republic.

Another topic to discuss when discussing the reform is also the problem of the intragenerational redistribution. The Czech public pension system was very egalitarian, for example in 1998 approximately 50% of all pensions were in $\pm 10\%$ interval from the average pension (Bezděk 2000b). That has led to a Ruling of the Constitutional Court in April 2010 stating that the pensions ought to be more earnings-related, which has forced the government to change the way how to compute the pension in order to agree with the Ruling (the so called Small Pension Reform).

The problem of intragenerational redistribution and egalitarian public PAYG schemes is well known and many authors pointed this out (see for example Cubeddu 1998). On the other hand some authors argue that there exists a positive correlation between one's lifelong earnings and one's longevity and therefore there exists no intragenerational redistribution (see for example Mitchell and Zeldes 1996).

Chapter 3

Pension System Reform and Pareto Efficiency

In this chapter we would like to start discussing the pension system reform. Firstly, we introduce theoretical concepts of this transition and afterwards we discuss some practical problems. We start with Pareto efficiency discussion in this chapter and then in the next chapter we present the political economy debate.

In Chapter 1 we presented the Aaron's condition stating when the FF scheme is more efficient than the PAYG scheme - if $r > n + w$, i.e. when the real interest rate exceeds the sum of the population growth rate and the real wage growth rate.¹ Even though if this condition is satisfied, it does not directly imply that the transition from a PAYG to FF scheme is efficient. The reason for this is the existence of transition costs which are not inconsiderable.

In this section we discuss the possibility of Pareto improving transition from the PAYG to the FF scheme. With a Pareto improving transition we mean a transition where no generation (present or future) is worse off and at least one generation is better off.

We start in this chapter with an article from Breyer (1989) in whose model the Pareto improving transition from PAYG scheme to FF scheme is not possible. Afterwards we present Homburg's model (Homburg 1990) where he shows that if certain conditions are met the transition could be Pareto improving. In conclusion we compare these two approaches.

¹However as it was already mentioned in Chapter 1 $r = n + w$ should hold in the long run according to the macroeconomic theory.

3.1 PAYG Scheme as an Efficient Scheme

In his seminal paper Friedrich Breyer (1989) asks the question whether it is possible after the pension scheme has been changed to compensate the first generation of pensioners for their loss without making any future generation worse off than under the PAYG scheme. He presents two models: an open economy, and an closed economy model. He shows that in both cases the transition from a PAYG to a FF scheme is not Pareto improving. We are going to present only the first model, but at the end of this section we also mention results of the second model (for the closed economy).

In the open economy model (as well as later in the close economy model) an OLG model with 2 generations is applied. We use the same notation as in the Chapter 1. We assume that the population growth rate is exogenous and constant. We further assume that only one good exists and every worker is endowed with an income of one unit of this good. Capital markets are perfect in this model and the interest rate is constant and exogenous. Regarding the notation we have to distinguish now between the contribution into the PAYG scheme (b_t^{PAYG}) and the contribution into the FF scheme (b_t^{FF}). Furthermore we have to distinguish between pensions paid from the PAYG scheme (P_t^{PAYG}) and pensions paid from the FF scheme (P_t^{FF}) which are defined as follows:²

$$\begin{aligned} P_{t+1}^{PAYG} &= (1+n)b_{t+1}^{PAYG}, \\ P_{t+1}^{FF} &= (1+r)b_t^{FF}. \end{aligned}$$

We define discounted lifetime consumption (which is the same as discounted lifetime income) for an agent in period t as

$$V_t = 1 - b_t^{PAYG} + \frac{(1+n)b_{t+1}^{PAYG} + \psi_{t+1}}{1+r}, \quad (3.1)$$

where $1 - b_t^{PAYG}$ is the consumption in the period t and ψ_{t+1} is a government subsidy per pensioner which is paid as a compensation for the pension system reform. We do not have to express the FF scheme payments, because they do not change the lifetime consumption V_t . The last thing we have to define is the government debt which exists due to these compensations:

$$D_{t+1} = (1+r)D_t + (1+n)\psi_{t+1}. \quad (3.2)$$

After these definitions we can compare two following situations. In the first situation (let's call this situation A), only the PAYG scheme with a

²Note that both expressions are the same as in the Chapter 1, but in Breyer's model the wage is constant, i.e. $w = 0$, and normalized to one, i.e. $W = W_t = 1$.

constant contribution rate b^{PAYG} exists ($b^{PAYG} = b_t^{PAYG}, \forall t$). In this plan, which is set up in period $t = 1$, there are no government subsidies, i.e. $\psi_t = 0, \forall t$. Agents of generation $t = 0$ have the following lifetime consumption (note that they did not pay any contributions into the pension system, but they receive pensions from it, because they are pensioners in period $t = 1$):

$$V_0^A = 1 + \frac{1+n}{1+r} \cdot b^{PAYG},$$

and agents of other generations ($t \geq 1$) have following lifetime consumption:

$$V_{t \geq 1}^A = 1 - b^{PAYG} + \frac{1+n}{1+r} \cdot b^{PAYG} = 1 + \left(\frac{1+n}{1+r} - 1 \right) \cdot b^{PAYG}.$$

In the second situation (let's call this situation B) we introduce a FF scheme and compensate the first generation (generation 0) for not having a PAYG scheme using a government subsidy ψ_1 . Let's assume that the population growth rate is smaller than the interest rate ($g < r$). Because of this compensation the following holds:

$$V_0^B = 1 + \frac{\psi_1}{1+r} = 1 + \frac{1+n}{1+r} \cdot b^{PAYG} = V_0^A \quad (3.3)$$

$$\Rightarrow \psi_1 = (1+n) \cdot b^{PAYG}.$$

Paying this subsidy causes a government debt which has to be paid by future generations. Because of the condition $g < r$ future generations can afford paying off this debt while getting the same pension as in plan A . The crucial question is, whether the debt can be paid off in a finite time horizon. This would make those future generations, who do not have to pay off this debt better off, while making no generation worse off, because all generations get at least the same pension as they would get in plan A .

The lifetime consumption for future generations is

$$V_{t \geq 1}^B = 1 + \frac{\psi_{t+1}}{1+r} = 1 + \left(\frac{1+n}{1+r} - 1 \right) \cdot b^{PAYG} = V_{t \geq 1}^A.$$

$$\Rightarrow \psi_{t+1} = (n-r) \cdot b^{PAYG}, \forall t \geq 1.$$

Now we examine if the government debt D^B under the pension plan B can be paid off. In the period t the debt is equal to

$$D_t^B = (1+r)^{t-1} \cdot N_0 \cdot b^{PAYG} \cdot \left[1 + n + (n-r) \cdot \sum_{\tau=1}^{t-1} \left(\frac{1+n}{1+r} \right)^\tau \right],$$

where the first part of the term is equal to the original debt in the period $t = 1$ and the second part of the term is equal to the sum of all compensations to the following generations. The N_0 stays for the size of the original population.

After several steps (see Appendix A.1) we get that the per capita government debt remains constant over the time:

$$\frac{D_t^B}{N_t} = \frac{D_t^B}{N_0 \cdot (1+n)^t} = b^{PAYG}. \quad (3.4)$$

This means that the government debt is never paid off, i.e. no future generation can be made better off under the plan B compared to plan A without making any generation worse off. Therefore this transition from the PAYG to FF scheme is not Pareto better even though we have assumed that the rate of return of the FF scheme is higher than the rate of return of the PAYG scheme.

In the closed economy model, which is also an OLG model with two generations, the worker's income and the interest rate are both endogenous. Furthermore, in this model, after the transition from PAYG to FF scheme is pursued, it is not possible to compensate the first retired population for its lost without making any future generation worse off compared to their possible gains from the original PAYG scheme. Even though if we assume that the FF scheme is more effective - Breyer shows that the FF scheme leads to higher per capita production in every period - the transition is not Pareto improving.

3.1.1 Open versus Closed Economy Models

When modelling the pension system reform the question of whether an open or closed economy model is more appropriate arises. We are aware of the fact that a transition to a FF scheme (or to a mixed scheme) influences the domestic interest rate to some extent. This effect is of course much stronger in case of big economies such as Germany than in case of smaller ones such as the Czech Republic.

In this thesis, nevertheless, we use mainly open economy models. As Börsch-Supan, Ludwig and Winter (2005) have shown in their paper the closed economy models are doing much worse in modelling the pension system reform compared to the open economy models due to neglecting effects of international capital mobility. *"To the extent that capital is internationally mobile, population aging will induce capital flows between countries, and these capital flows will modify the effects of population aging and pension reform in each country vis-à-vis a world of closed economies."* We think that

especially within the EU the international mobility of capital is rather high and therefore it is more appropriate to use open economy models.

3.2 Possibility of Pareto Improvement

The article of Friedrich Breyer caused a wide discussion and one of the replies was the article of Stefan Homburg. Homburg argues that Breyer's conclusion about Pareto efficiency is due to the setting of his model and that it does not correspond to reality. The main flaw of Breyer's model is the modelling of pension system contributions as lump-sum taxes. Therefore Homburg's model takes contributions as flat-rate taxes on labour income and pensions themselves as lump-sum payments. This setting corresponds much better to reality. Recall the fact that in the Czech pension system there is one pension system contribution rate, which is basically a labour income tax. On the other hand, pensions can be viewed as lump-sum transfers regardless of the Ruling of the Constitutional Court in 2010 and the Small Pension Reform, because strong intragenerational redistribution prevails.

Homburg (1990) presents also an OLG model with two generations. As well as Breyer, he considers small open economy, i.e. wages³ w_t and rate of interest r are exogenous. The interest rate and the size of the population are assumed to be constant. The member of each generation solves following maximization problem while he is young:

$$\max_{c_t^1, c_{t+1}^2, l_t} U(c_t^1, c_{t+1}^2, 1 - l_t), \quad (3.5)$$

with following constraints

$$\begin{aligned} c_t^1 + s_t &= w_t \cdot l_t \cdot (1 - b^{PAYG}), \\ c_{t+1}^2 &= (1 + r) \cdot s_t + P_{t+1}^{PAYG}, \end{aligned}$$

where c_t^1 (c_{t+1}^2) stays for the consumption of generation t in its first (second) period, s_t stays for savings and l_t denotes one's labour supply, i.e. $(1 - l_t)$ denotes one's leisure. The sum of one's labour supply and leisure is normalized to one. The utility function $U(\cdot)$ is assumed to be strictly monotonically increasing, strictly quasi-concave and has second derivatives. Goods are assumed to be normal.

In the first step, Homburg shows that the PAYG scheme is not Pareto efficient, i.e. it is possible to make one generation better off without making any worse off using, as he calls it, *capital reserve system cum government*

³From now on we use w_t for wages and not for wage growth rate.

debt (CRCD). This system is an optimal solution to following optimization problem:

$$\max_{b, P_{t+1}, D_t} V_t(b, P_{t+1}), \quad (3.6)$$

with the following constraints

$$b \cdot w_t \cdot l_t = b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG} - D_t,$$

$$P_{t+1} = P_{t+1}^{PAYG} - (1 + r) \cdot D_t,$$

$$P_{t+1} \geq 0.$$

Note that we have to distinguish between wages and labour supplies in both cases (i.e. between the case with the original PAYG scheme and the case when CRCD is put into practice), because these are determined by the existing pension scheme. The first condition secures that in the period t the retired generation gets its pension payment $P_t^{PAYG} = b_t^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG}$ which is paid either by taxing the current working population or by a government debt. The second constraint secures, that the debt D_t is repaid by the generation t . And this constraint, together with the last one secures that the government debt $((1 + r) \cdot D_t)$ is never bigger than the implicit debt of the PAYG scheme (P_{t+1}^{PAYG}).

If we combine the first and the second constraint we get the following condition:

$$P_{t+1} - (1 + r) \cdot b \cdot w_t \cdot l_t = P_{t+1}^{PAYG} - (1 + r) \cdot b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG}. \quad (3.7)$$

This condition secures that the government policy (government chooses b, P_{t+1}, D_t) does not change one's lifetime income. The following holds

$$P_{t+1}^{PAYG} > (1 + r) \cdot b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG},$$

when the growth rate is bigger than the interest rate, i.e. $\frac{w_{t+1}^{PAYG} \cdot l_{t+1}^{PAYG}}{w_t^{PAYG} \cdot l_t^{PAYG}} > (1 + r)$. Homburg calls this generation a *winner*. If the opposite holds, he calls the generation a *loser*. Proving the following propositions (see Appendix A.2 for proofs):

1. *Given the generation t is a winner, the optimal government policy is to set $b^* = 0$.*
2. *Given the generation t is a loser, the optimal government policy is to set $P_{t+1}^* = 0$.*
3. *Given the generation t is neither a winner nor a loser, the optimal government policy is to set $b^* = 0 \wedge P_{t+1}^* = 0$.*

4. The PAYG scheme, i.e. $b^{PAYG} > 0 \wedge P_{t+1}^{PAYG} > 0$, is never optimal.

we conclude that the PAYG scheme is not an efficient pension system in this model. This result is due to the existence of distorting income tax in the PAYG scheme. By creating a government debt and cancelling the income tax as well as the lump-sum pension, agents are better off due to cancelling the excess burden which was caused by the labour-leisure choice distortion.

We ask the reader to note, and it will be emphasized later, that this conclusion does not mean at all that we should abolish the PAYG scheme as whole and replace it by the FF scheme. In this model we did not include possible risks of both schemes which were mentioned in Chapter 1. Moreover, when we discuss pension systems also other than economic arguments should be taken into account - for example some redistribution towards people with low income, which could be seen as socially just even if it is not efficient from the economic point of view.

We have shown that the PAYG scheme is not optimal. The last step is to show that even if the PAYG scheme already exists, it is efficient to convert the pension system to FF scheme. As well as Breyer also Homburg assumes⁴ that the interest rate exceeds the growth rate and therefore every generation is a *loser* except from the first one. He shows that the government debt used to compensate the first generations will be paid off in finite time and all generations afterwards will be gaining from this transition while past generations are not affected.

We introduce b_t for contribution rates used in the transformation period⁵ and we show that b_t is bigger than b_t^* (the contribution rates of the CRCD), but smaller than b^{PAYG} . It can be shown (for the proof see Appendix A.3) that the following holds:

Given that the interest rate exceeds the growth rate and some PAYG scheme already exists there are sequences (b_t) , $(P_t) = (P_1^{PAYG}, 0, 0, \dots)$ and $(\varepsilon_t) \geq \varepsilon > 0$ such that

$$b_t \cdot w_t \cdot l_t = b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG} - \frac{P_{t+1}^{PAYG}}{1+r} + \varepsilon_t \cdot w_t^{PAYG} \cdot l_t^{PAYG}, \quad (3.8)$$

$$V_t(b_t, 0) = V_t(b^{PAYG}, P_{t+1}^{PAYG}), \forall t \leq T. \quad (3.9)$$

In addition such T exists and it holds that $D_t = 0, \forall t \geq 0$.

In such a setting generations alive till the debt is paid off are not affected, while generations alive after the debt is paid off are gaining. The reform can

⁴This assumption cannot hold in the long term.

⁵With a *transformation period* we mean the period which starts with the pension system reform and ends with paying off the government debt D_t .

be also set in such a way that all generations are gaining, i.e. setting the contribution rate between b_t and b_t^* .

3.3 Conclusions from the Debate

We have presented two views on the Pareto efficiency of the pension system reform. Together with other authors (see e.g. Hirte (2003) or Börsch-Supan (1998)) we conclude that the pension system reform can be Pareto improving if efficiency gains are included. Feldstein (1996) computed the dead-weight loss induced by a PAYG scheme in the USA and got the result of annual loss of 1% of the GDP which could be according to Sundén (2002) even higher in case of European countries due to higher contribution rates. If there are no efficiency gains on the other hand, the higher return of the FF scheme is just used to pay off the government debt used to compensate the first generations and no generation gains anything without any other generation loosing.

Nevertheless, it is worth noting that this debate on Pareto improving pension system reform has not one commonly accepted conclusion. According to Börsch-Supan (1998), in the US literature the above mentioned opinion about Pareto efficiency caused by efficiency gains is prevailing. Feldstein and Samwick (1997), even though they propose such a transition to FF scheme, in which the first generations are net losers, also present a possibility of Pareto improving reform. But they do not recommend it, because their original proposal leads to higher net welfare gain compared to the Pareto efficient reform.

This is of course also a relevant approach to the reform (maximizing the overall profit instead of everybody's individual gain), but if we do not set the reform in such a way that even the present generation who is a net loser does not think that the reform is *correct* (or *just*), the reform could be blocked in the political process.

This is due to the fact that the current generation (those who possibly do not sympathize with this reform, because they often loose) is involved in the political decision making process in contrast to those net winners of the reform who are not born yet. Galasso and Profeta (2002) actually comment the political economy models of US social security system reform as follows: *"Although there may be gains from moving to a funded, or mixed system, no social security reform would obtain the required majority, due to transition costs that would have to be imposed on the current (voting) generations."*

On the other hand, many authors do not think that the pension system reform can be Pareto improving. Fenge (1995) shows that a PAYG scheme with intragenerational fairness (contributions are proportional to wages while

pensions are lump-sum payments) is Pareto efficient. In such setting a Pareto improving transition to FF scheme is possible only if (i) the difference in income within one generation is small or/and (ii) the distorting effect of pension system contribution is strong.

Brunner (1996) presents a slightly different model. In his setting there are two representative agents of each generation who differ according to their abilities and therefore according to their income levels. He argues that trying to reduce the dead-weight loss caused by the PAYG scheme leads to intragenerational redistribution and therefore cannot be Pareto efficient.

As Börsch-Supan (1998) sums up: *“It is only possible to resolve this discussion between the advocates of the transformation prevailing among the US authors and those who are indecisive using empirical results.”*⁶

3.4 Recommendations

According to the results presented in this chapter, we recommend the pension system transition from the PAYG scheme to a mixed scheme. The PAYG scheme such as it is now is not sustainable in the long run. Moreover the Czech Republic has one of the highest contribution rates in Europe which leads to high inefficiencies and a transition to the FF scheme would be welfare improving. In addition, a partial switch to a founded scheme would presumably lead to higher savings and investments which would help the overall economic situation in the long run.

Nevertheless we do not think that a pure FF scheme is desirable. One of the main goals of the reform should be also a diversification of possible risks (which has been discussed in Chapter 1), which could not be accomplished by switching to FF scheme only, and replacing the PAYG scheme risks by the FF scheme risks. Moreover the PAYG scheme is a vital tool of government’s social policy, especially for fighting poverty among older people.

This proposal of switching to a mixed pension system would of course mean that pensions of the current old generation have to be secured. In the past years there were suggestions to use the then gains of privatisation to cover the costs of the anticipated pension reform. Unfortunately, these resources were consumed and therefore an increase of the value added tax is being proposed recently. It could be also possible to fund the reform using a government debt, but the current government refused this possibility.

One could argue therefore (which is a common argument against the pension system reform), that the current generation would have a double burden

⁶Author’s translation.

- financing pensions of the current pensioners (via pension system contributions and via higher value added tax) and at the same time saving for their own pensions. But it has to be said that this *double burden* was a common thingall over the history and therefore it is not an argument against the reform. As Sinn (1999) points out the past generations had to bear a *double burden* as well - financing pensions of the then retired generation and simultaneously raising up their children (and thereby securing their own future pensions). So nowadays, where there are many families without children, people have to invest in real capital instead of to the human capital (raising children) and therefore they carry the same *double burden* as previous generations did.

Chapter 4

Political Economy of the Pension Reform

Before we assess the proposed pension system reform in the Czech Republic and compare it to pension system reforms in other countries, we will discuss this topic from yet another point of view. In this chapter we present the findings of political economy.

In Chapter 2 we have shown why the current pension system is unsustainable if no reforms are taken. In Chapter 3 we have discussed the possibility of a reform which is Pareto efficient. It turned out that, according to many authors, this possibility exists if certain assumptions are fulfilled. Nevertheless, such a big reform as the pension system reform cannot be enforced by some social planner. It has to go through democratic procedures and therefore there is a possibility that even the *best* reform¹ could be rejected. This is due to the fact that each system has its beneficiaries and if they are powerful enough they can block the reform in order to maintain their benefits. Katharina Müller (2000) writes: “*Pension systems have long been considered particularly difficult to reform, as they tend to create powerful clientele.*”

As an example let us consider the following case.² Assume that the age of the median voter is sufficiently high, i.e. in extreme case he is already retired or near to the retirement age. Then he would presumably vote for every proposal which increases his pension even though it would mean increasing the contribution rate - if he is already retired, he does not mind about the increased contribution rate and if he is sufficiently near the retirement age, the gains from higher pension in the near future would outweigh the current higher contribution rate.

¹With a *best* reform we mean a reform which maximizes the welfare of the whole society.

²Even though this example is not very realistic it helps us to illustrate the possible political interest of the older generation.

Ribhegge (1999) presents a slightly different example when he shows that even when the rate of return of the PAYG scheme is always lower than the interest rate, i.e. every generation is a *loser*, it is possible that each generation would be in favour of continuous increasing of the contribution rate. As he puts it: “[...] *the more unstable the PAYG system becomes, the larger becomes the pressure to increase pension payments.*”

In his example pensions are increased in the first period by ΔX which leads to higher contribution rate for the current working population, which opposes this proposal. But if the government promises this generation that its future pension would be increased by $2 \cdot \Delta X$ they would probably vote for this proposal. This would also lead to increasing the contribution rate once more in the future, but in order to gain the approval of the third generation the government promises that its pension would be increased by $3 \cdot \Delta X$ and therefore they would not oppose this proposal. At the end, this PAYG scheme can be set in such a way that its rate of return is bigger than the interest rate and therefore every generation is a *winner*. This system can work as long as voters think that their future pensions are not at risk. When they stop believing that, the whole system breaks down - this is basically the well-known Ponzi-scheme.

Using these two examples, we have shown that because of the political system and because of the power of particular interest groups it is possible that even a *bad* reform proposal³ could be put into force. Therefore, in this chapter we would like to present what are the most important variables which influence the type of an enforceable pension system reform.

4.1 Favourable Conditions for Reforms

In modern societies it is not sufficient only to present a good reform proposal which is authorized by a group of experts. In order to be able to implement it one has to be able to persuade the majority of voters of the proposal's advantages. According to James and Brooks (2001) we present in this section which conditions are likely to make the implementation of the pension system reforms easier. In their paper they are addressing three main questions:

- The connection between political and economical forces and the probability of a reform.
- The connection between these forces and the nature of the reform (for example the public-private mix).

³With a *bad* reform proposal we mean a proposal which leads for example to a system which is not sustainable in the long-term like the one presented in Ribhegge (1999).

- How to overcome resistance of interest groups.

We present these results and we assess afterwards the current situation in the Czech Republic.

4.1.1 Pre-existing Conditions and Probability of the Reform

James and Brooks, in order to assess the probability of the pension system reform, have used the following analysis. The dependent variables were *probability of structural reform* and *private sector share*. With the first variable they mean a probability of a reform of a PAYG scheme, leading to establishing either a private funded pillar or changing the PAYG scheme from DB to NDC scheme. The second variable describes how big is the part of one's benefits coming from the privately managed pillar.

The independent variables of the analysis are *implicit pension debt*, *government spending*, *explicit debt*, *level of domestic savings*, *pre-existing funded plans* and *effective number of political parties*.

The *implicit pension debt* variable is the most important one. The authors hypothesis is that large implicit pension debt leads to higher probability of the reform but lower private sector share. This is because high implicit debt forces politicians to reform the system. On the other hand, conducting a large-scale reform is rather discouraging, because it has large transition costs which would even more burden the public expenditures.

The *government spending* variable is here to correct for possible bias caused by the first variable. If high implicit debt is correlated with low private sector share this could be either because of the fact that this causality between these two variables exists or because there is a preference for large public sector in the given country.

As well as the *implicit pension debt* variable, also *explicit debt* variable has an ambiguous influence on pension reform. On one hand, higher explicit debt motivate politicians to conduct the reform and to lower future fiscal obligations. But on the other hand, high government debt discourage them to pursue a large-scale reform, because they cannot finance the transition costs.

Higher debt together with low level of domestic savings could also motivate them, as it did according to James and Brooks in Mexico, to increase the private sector share, i.e. increasing the domestic savings, and therefore making the government debt available to hold in the long term without high dependence on foreign creditors.

The pre-existence of funded plans is presumably making the pension system reform much more probable, because the transition costs are lower and people are used to save in this pillar.

The last variable, the *effective number of political parties*, is a variable derived from political science. It is straightforward that the more political parties can decide upon the pension system reform the less probable it is that the reform will be implemented. And if the reform is implemented one can expect the reform being less radical, i.e. with lower private sector share.

In the original article there is also a variable *Spanish* which was a dummy variable for Spanish being a dominant language in the given country. The idea behind this is that cultural, linguistic and also geographic proximity can help to transmit the reform ideas. They use this variable due to the fact that the first pension system reforms were conducted in Latin America (first in Chile in 1981). But because of expansion of the discussions about pension system reforms and their realisations in many different countries all around the world we do not think that this variable is still important nowadays.

James and Brooks used data from 105 countries and confirmed that the implicit debt was much higher among those countries which have reformed the system. On the other hand, these countries have much lower explicit debt which confirms their hypothesis. It was also true that there is a correlation between previous existence of voluntary funded pillar and the pension system reform. In their data there was not a big difference in other variables among countries with and without reforms.

Their analysis led to following results: the implicit debt strongly influences the private sector share and if the *implicit debt* variable is the only independent variable in the model an increase in the debt from 50 to 100% of GDP causes a decrease of private sector share by 20%. Existence of this relationship was also confirmed by other authors, see for example Müller (2003).

James and Brooks have also come to conclusion in their analysis that previous existence of pension funds increase the private sector share once the reform is implemented and on the other hand this share is lower in countries with more political parties having the right to decide upon the reform. In the second analysis, where they assessed the probability of the structural reform they stated that an increase of the implicit debt from 50 to 100% of GDP doubles the probability of the reform and the increase of the debt from 100 to 200% of GDP doubles it once more. The external debt, savings or the amount of political parties according to James and Brooks do not influence the probability of the reform, on the other hand, pre-existence of a funded pillar increases the probability of the reform.

4.1.2 Interest Groups

With the previous subsection we answered the first two questions James and Brooks asked in their paper. Now we define the most important interest groups and discuss how they influence the discussion about the pension system reform.

The benefits of a reform are not immediate. The reform is implemented to secure a decent retirement for future generations and usually there are no big benefits for the first generation. It is also possible that the first generation (mainly the older ones who are close to retirement age and cannot profit from the reform) pays the cost of the reform and therefore can easily oppose it. It is worth noting that in this case it is not important if they really *pay* the reform. Their opposition to the reform can be due to the fact that they do not trust the politicians and their promises and would rather prefer to have secure current pension than put this at risk.

Also the politicians are in a tough position, because, on one hand, they know that the *status quo* is not sustainable in the long-term, but, on the other hand, they want to be re-elected in next elections. They have to cooperate with many interest groups to secure the implementation of the reform which could lead to a very different outcome than the *optimal* one.

The first strong interest group is pensioners and people near retirement age. These people are usually excluded from pension system reforms and are guaranteed to have their previous public pension. Nevertheless, they could be one of the main interest groups opposing the reform. This is due to the fact that they can bear in some way costs of the reform. In the case of the Czech Republic, as it will be described more thoroughly in the last chapter, a change in the value added tax is proposed to cover the costs of the reform. This tax change would heavily burden older people. The interesting question is if these people will be convinced by the government and trust them that the financial compensation (through pension increase) they get will be enough. Therefore, we can expect that this group would be either against a major pension system reform or without strong preference.

The other strong interest group is the young generation. This group should be presumably in favour of the reform, because otherwise their future pensions are at risk. It is of course important what the actual setting of the reform is and how credible the politicians are, but we may anticipate less opposition from this group. Moreover, in many countries where a reform was implemented younger generations could decide if they want to take part on it, i.e. usually use the privately managed pillar, or if they want to use the old system. This option has also been proposed in the Czech reform, because, on one hand, it ensures higher contributions into the existing PAYG scheme

and, on the other hand, reduces the possible opposition of the reform.

The other important interest groups are the institutional groups such as labour unions or financial institutions. The unions may oppose the reform for many reasons. One of them being according to James and Brooks their mutual loyalty with older members or the other being frightened that because of costs of the reform the government will cut its spendings in other area such as education or health services. In order to overcome their opposition they were allowed to participate on the reform in many countries. For example in Argentina, Hungary or Poland the unions were founders of new pension funds.

The financial institutions, on the other hand, may be in favour of the reform, because they are going to administer the new pension funds. They are often lobbying for the reform. But in many cases also this group can oppose particular setting of a reform such as guaranteed rate of return of the fund. This is for example the case of Switzerland or Uruguay.

4.2 Political Economy and Modelling the Reform

If we look at the arguments of the political economy from a theoretical point of view, we will see that older people's concerns regarding the pension reform might be relevant. Breyer and Stolte (1999) developed a model where they have showed that due to the pension system reform *"[...] the benefit level will be reduced, but not as much as would be required to hold the contribution rate constant at the present level."*

Their model is a typical OLG model with two generations, similar to those presented earlier in the thesis. Because of the low fertility level we assume that the median voter is already retired and therefore the older generation has voting majority in our model and it determines the size of the contribution rate. As the model is based on endogenous labour supply, the younger generation is reacting to the chosen contribution rate by deciding on their labour supply. This means if the contribution rate gets *too high* (pensioners get too greedy), members of younger generation avoid the official domestic labour market and therefore avoid paying the high contribution rate. This could be accomplished in several ways: home production, more leisure, working in underground economy or working abroad. This setting implies that the contribution rate is basically a labour income tax and that there exists no connection between one's contribution and one's future pension. This approach (old-age pension as a lump-sum payment) has already been discussed

in Chapter 3.2. Moreover, in this particular setting there is one extra reasoning - one's future pension depends exclusively on the ability to tax the younger generation which is a key feature of the model. And therefore, there does not have to be any direct link between one's current contribution and one's future pension.

The presented model has following assumptions:

- Population growth rate n_t is given exogenously.
- It is a small open economy, i.e. the interest rate r_t is exogenous.
- There is no technological progress and therefore the wage w grows at rate 1 and is constant over time.
- The representative worker (member of younger generation) decides on his labour supply l_t and savings s_t to maximize his utility function

$$U_t = U(c_t^1, c_{t+1}^2, 1 - l_t)$$

with following constraints:

$$c_t^1 = (1 - b_t^{PAYG}) \cdot l_t - s_t,$$

$$c_{t+1}^2 = (1 + r_t) \cdot s_t + P_{t+1}^{PAYG}.$$

All variables have been already defined in previous chapters.

- In each period t the current retired generation decides on the contribution rate b_t^{PAYG} in order to maximize their pension P_t^{PAYG} :

$$P_t^{PAYG} = b_t^{PAYG} \cdot l_t \cdot (1 + n_t).$$

The current worker (member of young generation) has a following Cobb-Douglas utility function

$$U_t = \alpha \cdot \ln c_t^1 + \beta \cdot \ln c_{t+1}^2 + \ln(1 - l_t).$$

Given the variables b_t^{PAYG} and P_{t+1}^{PAYG} he chooses in order to maximize $U(\cdot)$ optimal savings and labour supply functions:

$$s_t = s_t(b_t^{PAYG}, P_{t+1}^{PAYG}, 1 + r_t),$$

$$l_t = l_t(b_t^{PAYG}, P_{t+1}^{PAYG}, 1 + r_t).$$

Given these response functions the current pensioner maximizes his pension P_t^{PAYG} with respect to the contribution rate b_t^{PAYG} . As a result we get (for computations see Appendix A.4):

$$b^{PAYG*} = 1 - \frac{1}{1 + \sqrt{\frac{(1+\alpha+\beta) \cdot (1+r)}{n}}}, \quad (4.1)$$

$$P^{PAYG*} = \frac{(\alpha + \beta) \cdot (1 + r)}{\left[1 + \sqrt{\frac{(1+\alpha+\beta) \cdot (1+r)}{n}}\right]^2}. \quad (4.2)$$

From here we can see that whenever n declines then the optimal pension P^{PAYG*} declines as well and the optimal contribution rate b^{PAYG*} rises.

This pension system reform model with endogenous labour supply is, in contrary to standard political economy models, able to describe the current situation pretty well. Standard political economy models with median voter cannot explain why there is any discussion about pension system reform in the first place. As long as the median voter is old enough he would be able to decide upon his pension by maximizing the contribution rate and definitely he would not think about reforming the system.

In this model, which also presupposes that the median voter is old enough to be able to decide upon the contribution rate, he is limited in maximizing the contribution rate by the possibility that the young generation refuse to pay its contribution. Therefore, even under these strong assumptions the burden is carried by both generations.

4.3 Conclusions

A reform of a pension system is a very complicated issue. This is not only because the reform itself influences the whole economy, but also because there are many powerful interest groups which can oppose it. They can oppose the reform for many possible reasons, such as lowering pensions, instability of the proposed system or just being scared because of the change of the system. There are also motives which are not directly connected to the pension system reform itself, such as seeking for political power.

In this chapter we have presented the key variables influencing the reform - not only if the reform is likely to be implemented, but also what is likely to be the private sector share. We will see in the next chapter that the analysis of James and Brooks is very suitable for the case of the Czech Republic.

Contrary to these authors we think that the *effective number of political parties* variable is a significant variable at least in the context of the Czech

Republic. In the last years there has not been a government which was not either a coalition government or was without voting majority in the Chamber of Deputies. This was, according to our opinion, one of the main reasons why the pension system reform has not been implemented yet.

In the final report of the first expert committee (2005) we could have seen how different conceptions of the reform each political party has. Social democrats and communists have basically proposed only to make changes of the then pension system. The first proposed a NDC PAYG scheme, the second wanted to do just parametric reforms and increase revenues of the system by increasing the labour taxation. The proposal of the Christian democrats was closest to the current reform proposal - introducing the second optional privately managed funded pillar. Civic democrats had the most radical reform proposal as they proposed to introduce a flat-pension in the amount of 20% of the average income.

These proposals are very different and finding a consensus is obviously a complicated task. Even the current government which is relatively homogeneous and has the biggest amount of votes in the Chamber of Deputies in the last years has not presented the reform laws.

In the last part of the chapter we presented a pension system reform model from Breyer and Stolte. In this model it has been shown that the costs of the reform are shared by both currently living generations. This was due to the fact that the working generation could change its working habits and therefore pay lower pension system contribution rate.

As was presented in Chapter 2 the pension system reform is inevitable. In this chapter we have seen that because of many different interest groups the implementation could be highly problematic. This leads to a pension reform which is probably not the *best* one. Therefore, if assessing the reform we have to take into account also the implementability of the reform and not just the optimality of the proposal.

Chapter 5

The Central European Experience With Pension Reforms

In the previous chapters we have discussed general aspects of the pension system reform. In the upcoming two chapters we would like to discuss concrete pension reforms. We start with reforms implemented in Central Europe, mainly in Hungary, Poland and Slovakia. Afterwards, in the next chapter, we present the Czech pension system reform.

We discuss these topics in this order because we think that due to many similarities these countries share (both economic and historical) we should use the experience we have gained in these countries for assessing the Czech pension reform.

5.1 Historical Overview

In Chapter 2 we have briefly discussed the history of the Czech pension system in order to better understand current problems. We think that knowledge of the history of the system is important, because then it is easier to describe all possible trends the system faces. On the other hand, as long as we want to assess mainly the Czech pension system reform, we are not going to discuss whole pension systems' histories in the CEE region.

Nevertheless, a reform, from its definition, stands always for some change - from the old to the new. In our case the *old* means mainly the pension system in the communist era. Therefore, we start in this section with a brief overview of the pension systems in Hungary and Poland¹ before the year

¹Please note that Slovakia exists since 1.1.1993. Till then there was Czechoslovakia

1989.

5.1.1 Hungary and Poland Before 1989

Due to the political situation, pension systems in the communist countries were similar before 1989 (Müller 1999). These systems were one-pillar PAYG systems² with an almost universal coverage. They were financed predominantly from the employers' contributions (but there existed employees' contributions in Poland between the years 1968 and 1972 and in Hungary since the year 1954) and they were not separated from the state budget. Pensions paid in these systems were almost flat (weak benefit-contribution link), but certain occupations were privileged.

In 1980s economic conditions in the CEE region deteriorated and this has caused problems for pension systems. High inflation in both Poland and Hungary caused lower pensions and one-fifth of pensioners in Hungary was due to these conditions forced to work again in order to gain sufficient income, while in Poland 40% of workers at pension age continued to work instead of retiring (Müller 2000). Although the pension systems began to have severe problems in the end of the communist era, after the year 1989 problems became much bigger.

5.1.2 First Years After 1989

The year 1989 meant for the CEE region not only the end of communist regimes, but it also brought up the awareness of many problems which were kept *hidden* in the last years. The most crucial one was the bad economic situation in this region. According to many authors (see Cerami (2006), Müller (2000) or Rocha and Vittas (2002)) this disadvantageous economic situation brought more problems for pension systems in these countries in the medium time horizon than the adverse demographic problem.

The economic transformation *caused*³ problems such as massive unemployment, high inflation, and therefore substantial rise in poverty. On one hand, restructuring or closing down of many state-owned enterprises caused

and for the history of the *Slovak* pension system before 1989 please see Chapter 2 where we discuss the history of the Czech pension system. After the year 1989 there are already different pension systems in both federal republics. We discuss this in the subsection devoted to Slovak pension system.

²Before the beginning of the communist era, the pension systems in the CEE region were predominantly FF schemes. Most of the funds' property has been destroyed during the war and the remaining property was devaluated after the war due to hyperinflation.

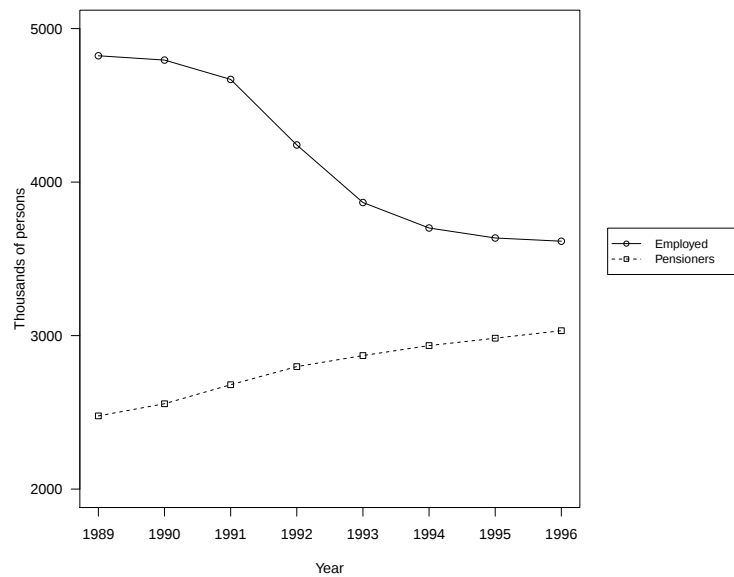
³This transformation did not of course cause these problems *per se*, but due to the transformation these problems became obvious.

higher unemployment and therefore the pension system revenues were substantially lower. On the other hand, many among these newly unemployed persons have rather retired than tried to find a new job.

These people have used either the early retirement scheme or the disability pension scheme (the eligibility criteria were very liberal then) - for example in Hungary (Müller 2000) the number of early pensioners rose by 19% between the years 1989 and 1996 and the number of disability pensioners rose by 49.5% in the same time period. This has caused a substantial rise in pension system expenditures.

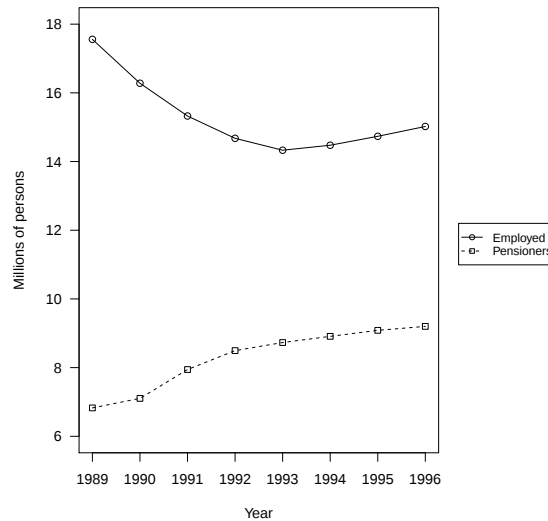
The following two graphs show the numbers of employed persons and pensioners in Hungary and Poland during the years 1989 and 1996. Please note that the population was quite stable in these countries over this period - in Hungary it has decreased from 10.4 to 10.2 million and in Poland it has increased from 38 to 38.6 million.

Figure 5.1: Number of employed and pensioners in Hungary (1989-1996)



Source: Müller (2000).

Figure 5.2: Number of employed and pensioners in Poland (1989-1996)



Source: Müller (2000).

Due to this sudden change of the system dependency ratio (from 28% to 50% in Hungary and from 39% to 61% in Poland), some parametric changes had to be made in the PAYG scheme right after the year 1989 in order to keep those pension systems viable.

5.2 Pension Reform in Hungary

5.2.1 Early Reforms

It has been shown in the previous subsection that there was an urgent need for a change in pension systems right after the year 1989. Yet the first significant change has been made under the communist regime back in the year 1989 - the pension scheme (Social Insurance Fund) has been separated from the state budget. This was a necessary condition for the pension system to become stable. Another important change happened in 1992 when pensions were regularly fixed to wages which has resulted in a significant pension decrease in mid-1990s because of a 15% drop in real wages in years 1995-1996 (Rocha and Vittas 2002). In this year (1992) the Social Insurance Fund was also split into two parts - one for pensions and the other one for the health care system.

Despite of these changes and despite having one of the highest contribution rates (30.5%) in the CEE region, the newly fully autonomous pension system was experiencing deficits right from its beginning (Palacios and Rocha 1998). Due to this fact, the parameters of the benefit formula have been changed which has led to another drop in the replacement ratio (Rocha and Vittas 2002).

In November 1993, the existence of voluntary private pension funds has been allowed. To motivate people to invest in these funds, a 50% tax credit on contributions has been provided. This has been an important fact which has simplified the establishment of the mandatory FF pillar after the pension system reform.⁴ Müller (2000) stresses in her paper the degree of fragmentation on the pension fund market. In the year 1997 there were 221 pension funds in Hungary. It is worth noting that despite the financial motivation only 15.3% (0.6 million people) of the labour force (in 1997) has invested in pension funds which is considerably lower than the threshold of 3 million people which was originally expected by Hungarian experts (in the year 1999 funds had approximately 1 million contributors (Rocha and Vittas 2002)). The average per capita monthly contribution to these funds was only 5% of the average gross wage.

In the following years (till the pension reform in 1997) there were not any other important legal changes. In 1996 after years of discussion it has been decided that the retirement age will be increased to 60 until 2004 and to 62 until 2008 (for both sexes). It is also worth noting that in these years international institutions, mainly the International Monetary Fund and the World Bank (which have both played a very important role in the Hungarian pension reform), were very active and started to press an *actual* pension reform. Ferge (1999) pointed out that first after the year 1992 these institutions' proposals did not copy old proposals made by Hungarian experts, but these institutions tried to influence the discussion with their own proposals. They have used as an inspiration examples of pension system reforms in Latin American countries (particularly in Chile and Argentina), although they did not explicitly mention them: *"[...] it turned out that Chile was ill-suited as an example, because Hungarians tended to associate the 'Chilean model' with Pinochet dictatorship under which the famous pension reform had been conducted. Moreover, in the eyes of Central Europeans, Latin America carried the stigma of being a less developed region. This might have been one of the reasons why both the Hungarian reformers and their World Bank advisors sought to distance themselves from the Chilean precedent and avoid all*

⁴The importance of pre-existence of voluntary private FF scheme for the pension system reform has been discussed in the previous chapter.

reference to Latin American reforms." (Müller 2000).

The World Bank's proposals became relevant, because it has become obvious, that the reforms implemented in last years were not sufficient and more radical reforms had to be pursued in order to safeguard future pensions. According to Rocha and Vittas (2002) in case no further reforms would have been taken (apart from those described above), the Hungarian pension system would generate deficits of 2% of GDP in 2010 and about 6.5% of GDP in 2070 (the projection period of the study was 1997-2070). These authors state that balancing the pension system budget in 2070 would mean increasing the already high contribution rate up to 55% or decreasing the replacement ratio from 60% to less than 35%.

5.2.2 The New Pension System

The pension reform laws have been passed in the Parliament in the year 1997 and came into force on January 1, 1998. The new pension system was a mixed type consisting of PAYG and FF scheme.⁵ This new system consisted of 3 tiers. The first and the dominant one is the PAYG scheme. This tier is mandatory for everybody. The second one is the FF scheme which is partly mandatory. The third tier is fully voluntary and consists of other savings for retirement. These are for example voluntary pension funds from the pre-reform period (which are still operating on the market). As one can anticipate the reform concerns the first two tiers.

After the pension system reform came into force, there was a transition period in which Hungarians could decide if they want to participate on the second tier. The rules were following:

- For all workers who have firstly entered the labour market after June 30, 1998 the second tier is obligatory. Their contributions are divided as follows - 75% goes to the first and 25% to the second tier.
- Workers who have already contributed into the pension system can decide if they want to participate in the second tier or not. In case they do not want to, their whole contribution goes to the PAYG scheme (first tier). They had to meet this decision till August 1999 and till

⁵Please note, that even though the mixed type of a pension system is relatively usual in the pension system reform debate, in Hungary there has been originally very *radical* reform proposals (*radical* compared to other reform proposals in the CEE region). The Hungarian Minister of Finance Lajos Bokros, for example, was inspired by the Chilean example and proposed in mid-1990s a full privatisation of the pension system (Müller 2000). This proposal has been rejected and, as well as in other CEE countries, the inspiration has been found rather in the mixed type Argentinian example.

December 2002⁶ they can switch back to pure PAYG scheme in case they want to. After this date they are obliged to be part of one of the chosen systems (pure PAYG scheme or mixed type) without any further switch option. Nevertheless it is possible to switch the pension fund within the second tier twice a year.

Contributions to the pension system are paid both by employees and employers. In the new Hungarian pension system the entire employers' contributions and a smaller part of employees' contributions (in case they are participating in the mixed scheme) are used to finance the first (PAYG) tier. The second tier is financed only from employees' contributions. The contribution rate (Rocha and Vittas 2002) in the new pension system is 30%, which is either paid whole to the first tier (one does not participate on the new system), or 24% is paid to the first and 6% to the second tier.⁷

In spite of the fact that neither of the schemes is new in Hungary, both tiers differ from their *predecessors* in many ways. In case of the PAYG scheme there are tighter eligibility criteria (Rocha and Vittas 2002): higher retirement age (62 for both sexes, instead of 60 for men and 55 for women); longer working history needed for early retirement without penalties and higher penalties and rewards for early and late retirement, respectively. It has also been decided that from the year 2001 onwards the so called Swiss formula will be used instead of the wage indexation. This means that not only changes in average wage will be taken into account while determining the pension, but also changes in the consumer price index.

New pension funds which are operating within the second tier, although having a similar legal structure as the old voluntary funds, are strictly separated from the old ones. This is because the second tier funds are under stricter supervision. There is, for example, a minimal size of a fund, minimum internal reserve threshold, required risk management (rules in what assets and when can these funds invest)⁸ or duty to report quarterly. These funds also offer guarantees for their members (Müller 2000):

⁶According to the original reform proposal one could switch back from the mixed scheme to the pure PAYG scheme till December 2000. After the elections in 1998 this period has been extended till December 2002.

⁷There should have been a gradual transition according to the original reform proposal - in the year 1998 the contribution composition in case one participates on the new pension system should have been 24% + 6%, in the year 1999 23% + 7% and from the year 2000 onward 22% + 8%. But this was changed by the new government elected in 1998 and the composition 24% + 6% was maintained.

⁸These rules distinguish three types of assets according to possible risk (funds cannot invest more than 30% of their portfolio into the riskiest one. Other rules also regulate possible investments into foreign assets.

- After 15 years of participation in the second tier, annuities must be equal at least 25% of the pension paid from the first pillar.
- Minimal guaranteed rate of return on investments⁹ which is annually specified by the supervising institution.

It is worth noting that according to Simonovits (2011) Hungary was most probably the only country in which there were paid unisex inflation-proof life annuities in the second tier.

The new pension system was constructed in such a way that it motivated workers under the age of 30 to participate in the mixed scheme and for everybody older than that it was favourable to stay in the pure PAYG scheme.¹⁰ This is firstly due to the fact that longer saving period in the second tier yields to higher investment evaluation. Secondly, a new benefit formula used in the reformed first (PAYG) tier caused lower first tier pensions for those who decided to participate on the new system. This was also a government's intention - if *too many* people would switch to the new system, the pension system would not be financially sustainable due to all pre-reform pension liabilities.¹¹ As a result, almost 2 million people (50% workers) have switched to the mixed scheme, 80% of these being under the age of 40.

5.2.3 The End of the New Pension System

The Hungarian pension reform was the first one in the CEE region. Although it seemed promising in the beginning, at the end it was a failure - for example András Simonovits (2011) published a paper with an expressive title: *The Mandatory Private Pension Pillar in Hungary: An Obituary*. Even though in the beginning Hungary was an example to follow for many countries in the region because of the willingness to pursue a pension system reform (compared most notably to Czech republic and Slovenia which were according to Simonovits (2011) the few of the ex-communist countries with no pension reform implemented), the profligacy and unwillingness to cut expenditures together with the recent economic crisis caused a collapse of the second tier. This was due to the fact that the Hungarian government has actually *nationalized* pension funds and decided to use this money to balance the government budget.

⁹The second tier pension funds are obliged to contribute to Guarantee Fund which backs this minimal guaranteed rate of return.

¹⁰In case the contribution division would be 22% + 8% as originally proposed, this age threshold would move to age 36 (Rocha and Vittas 2002).

¹¹According to Müller (2000) the annual budget deficit caused by the pension reform was originally estimated at 0.8-1.3% of GDP.

The ambivalence of politicians, on one hand, passing the reformatory laws in the Parliament, but on the other hand, populism and increasing expenditures, could have been seen right from the beginning. As it has been already mentioned, the first negative move of the government was freezing the second pillar contribution rate at 6%¹². As a consequence, the second tier was dominated by the first one and the relative *insignificance* of the second tier assisted the recent events (the collapse of the second tier) to happen. If the second tier had been relatively stronger (compared to the first tier), the government would have been forced to try to balance the government budget in another way.

Another government's decision that increased the pension system expenditures was the gradual introduction of the 13th pension between the years 2003 and 2006. This practice have not been changed even during the recent crisis.

Nevertheless the main cause of the end of the new Hungarian pension system was a decision of the political representatives. Hungary was hit very hard by the economic crises and desperately needed to balance the state budget. At the same time the Prime Minister Orbán came up with a personal income tax reform - introducing a flat rate tax which would have caused, in the short run, even higher deficit. The Hungarian political elite has decided to solve this problem by using resources from the second tier.

In October 2010 contributions to the pension funds have been suspended and people were enabled to abandon the mixed scheme and return to the pure PAYG scheme (first pillar). Two weeks later the second pillar has been virtually closed down: people were given an option - either return to the pure PAYG scheme or stay in the mixed scheme,¹³ but forfeit all rights to their contributions to the first pillar accrued after 2011. As a result, due to this setting, staying in the mixed scheme was not an real option. According to Simonovits (2011) at the end 97% of workers have decided to switch to the pure PAYG scheme. This has happened without any big protests or demonstrations, which showed the disappointment with the second pillar. The pension fund resources have been used for budget deficit reduction and for enabling the tax reform.

¹²Please not that between the years 2003 and 2006 the second pillar contribution rate was 8%

¹³With the contribution rate 10% into the second pillar.

5.3 Pension Reform in Poland

5.3.1 Early Reforms

After the year 1989 there has been 3 public pension PAYG schemes in Poland. The main one was administered by the Social Insurance Institute and has covered the major part of population. Alongside of this scheme there was a special scheme for farmers and also a special scheme for policemen, soldiers and prison guards. This public system was till the reform in 1999 the only provider of old-age pensions. Until then there were neither mandatory nor voluntary private funds. In the following text we will mainly discuss the scheme covered by the Social Insurance Institute.

The pension system contribution rate was 36.7%. Nevertheless the pension system was experiencing continual budget deficits and high state subsidies were needed - according to Müller (2000) annual subsidies were 1.1-4.3% of GDP, while total pension system expenditures were 14-15% of GDP. We cannot say that these deficits were only because of a *bad* pension system setting. Kluza and Ostaszewski (2003) point out that due to a complicated situation on the job market after the revolution, people were encouraged to retire earlier, which had caused bigger deficits. Main changes in the system in early 1990s were (Golinowska 2006):

- Introducing of automatic wage indexation of pensions
- Early retirement possibilities
- Special scheme for farmers

Some of these changes have been changed later again. Like in Hungary, a mix indexation (by prices and wages) has been introduced also in Poland. As mentioned above, the dependency ratio rose noticeably in early 1990s, while some parts of Polish economy began to grow rapidly. Kluza and Ostaszewski (2003) write: “[...] *many workers retired early, took disability benefits, or become unemployed, the remaining ones participated in a rapidly recovering economy, with real wages showing significant gains.*” This led to pensions which were higher than the Polish society could afford (due to wage indexation) and therefore the mixed indexation has been introduced.

5.3.2 The New Pension System

The new pension system has replaced the old one in 1999. Main goals of the reform were financial stability and risk diversification (before the reform, there was just the public pension system).

At first (in January), the reformed first tier (PAYG scheme) came into force, while the new second tier (FF scheme) started later, in April 1999. Together with the second tier, which was mandatory for certain workers (see below), a third pillar consisting for example of pension plans provided by employers was enabled as well. As in other states in the CEE region, the first tier is a mandatory tier for everybody. The obligation to participate on the second tier depends on the age of the contributor:

- Contributors younger than 30 years are obliged to participate on the mixed scheme.
- Contributors older than 30 and younger than 50 can decide whether to join the mixed scheme or not (there was a one-year decision period).
- Contributors older than 50 years have to remain in the one-tier system.

The first tier has been reformed as follows: instead of a defined-benefit scheme, it has been changed to a notional defined-contribution scheme.¹⁴ This fact has created certain problems, because there were kept no records of individual contributions so far and the *starting capital* has to be computed which will take up to 5 years according to Müller (2000). There is also an increase in pension (up to 10%) for those who retire later. Contrary to other pension reforms in the region the retirement age has remained the same: 65 for men and 60 for women.

The second tier, as well as in other states, consists of private pension funds. These funds are under strict supervision and provide the contributor with variable safety regulations. Apart from those ordering to have separated fund's assets and resources used to operate the fund, there are on one hand investment rules (limiting derivatives and foreign exposures - funds cannot hold more than 5% on each of them (Kluza and Ostaszewski 2003)) and on the other hand contributors are guaranteed to have a certain minimum return on investment - return on investment of a given fund must exceed half of the average of the return on investments of all pension funds or cannot be lower than 4 percentage points than this average. In case the rate does not exceed the lower of these two thresholds the fund has to compensate its contributors. In case of fund's insolvency, the compensation is paid from the Guarantee Fund or directly from the state budget (Müller 2000). There is also a guarantee of pension indexation that covers at least inflation.

¹⁴This means that contributors are virtually investing their money and a virtual interest rate is accrued to their deposits. See Chapter 1.

As well as in other pension systems, contributions are paid both by employers and employees. The pre-reform contribution rate at 36.7% has remained the same (in the old system, contributions were paid only by employers). The entire employers' contributions are now paid to the first tier (19.6% of the standardised gross wage). Roughly half of employees' contributions (9.8% of the standardised gross wage) are paid to the first while the second half (7.3% of the standardised gross wage) to the second tier.

5.3.3 Conclusions

We have seen in the description above that there are many similarities between the new Polish and the new Hungarian pension system. But there are also many differences, one of the biggest being the ratio of a pension paid from the first and from the second tier. We have seen that a prevailing part of a Hungarian pension is paid from the first tier. The Polish reform had different aims. Future pensions of participants in the mixed scheme will be paid in 37.5% from the second tier and in 62.5% from the first tier.¹⁵ In the future the aim is to fix this ratio on 50%-50% (Müller 2000).

First problems of the new system have started right after its launching (Kluza and Ostaszewski 2003). The setting of the pension system ordered participants of the mixed system to pay their whole contribution to the state Social Insurance Enterprise (ZUS) and this institution sent the respective amount to the chosen pension fund. After the economic slowdown in 2000 the ZUS started to have financial problems, which caused a delay in payments to the funds. This was broadly criticized by the media and public and it influenced the public perception of the reform.

We have said that the long-term aim is to have 1:1 ratio between the first and the second pillar. This, apart from advantages mentioned earlier, brings also problems such as financial sustainability in the transition period. According to Wiktorow (2007), in 2006 transfers from the state budget to the pension system reached almost half of the state budget deficit. Even though coping with substantial transition cost while implementing pension system reform is inevitable, as discussed in Chapter 3, these high transfers could be (and were, see below) a motivation for populist politicians to stop the ongoing reform in order to stabilize the state budget in the short term and in this way please their voters.

¹⁵Please not that the discrepancy between the ratio in contributions to the first and to the second pillar and respective pension paid from these pillars is caused by the fact that part of the contribution paid to the first pillar is used for financing the work injury and sickness provision and disability and survivors' pensions.

During the crises in 2009 Poland, like other countries, got into financial problems. Because substantial part of the budget deficit consisted of the pension system transfers it seemed that the *easiest* way how to fix the problem in the short run would be a change in the pension system setting. As a result, in December 2010 the Polish government decided to lower the contribution rate to the second pillar from 7.3% to 2.3% (while the overall pension system contribution rate remained unchanged) with an aim to increase it up to 3.5% in the year 2017. This modification led to higher contributions into the first pillar, lowering the direct budget transfers and therefore stabilizing the public finance.

According to many economists, this system modification is not comparable with the Hungarian case. For example David Marek¹⁶ suggested that this was just a parametric change not comparable with the Hungarian property rights violation and it has solved urgent needs of the Polish government. As an impact the budget deficit should be lower by 0.8% of GDP in 2011 and by 1.7% in 2012.

5.4 Pension Reform in Slovakia

5.4.1 Early Reforms

The independent Slovak Republic was founded on January 1, 1993. Until then, it was a part of Czechoslovakia (see Chapter 2 for pension system description in the time period before the year 1989). Nevertheless, between the revolution in 1989 and the year 1993 pension systems in Czechoslovakia were separated (for further information, see below). In the period between the years 1993 and the pension reform implementation in 2005 the evolution of the system was very similar to other already described pension systems in the region and we will therefore discuss it only very briefly.

The system has experienced substantial deficits due to higher unemployment and early retirements in 1990s. The main changes of the pension system in this time period were the following (Margóč 2009):

- In 1993 social policies such as pensions or health care were newly financed from social contribution instead of from taxes (as in years 1990-1992).
- In 1994 the pension system budget was set aside from the state budget.

¹⁶Interview with David Marek on December 30, 2010 on radio Český rozhlas, <http://www.rozhlas.cz>.

- In 1997 voluntary FF pillar has been introduced.

Contributions to this pillar can be paid either by the employer or by the employee and state provides a contribution as well. The insured person has a guarantee that there cannot be a negative nominal return on investment.

5.4.2 The New Pension System

The new Slovak pension system is, as it is usual in the CEE region, a mixed type. The first pillar is a mandatory PAYG scheme, the second and the third are FF schemes (one mandatory and one voluntary).

Part of the pension system reform was also a reform of the PAYG pillar which came into force in January 2004. One of the main changes was strengthening the link between contributions and future pensions. We have seen this trend also in other countries and it is a natural development after spending many decades under the communist regime. Despite the fact that this step has a strong motivational aspect for contributors, it could be politically unwise to promote such proposal. For many interest groups (such as trade unions) it is already almost unacceptable to introduce a funded pillar to the pension system. Introducing a motivational aspect into the first pillar, one of the main objectives of which is a prevention from poverty, can lead to rejection of a otherwise tolerable reform proposal.

Other important changes in the reformed PAYG pillar were gradual increase of the retirement age to 62 for both sexes, men have reached this retirement age in 2006, women will reach it in 2015 (in the old system it was 60 for men and 53-57 for women - depending on number of raised children). Moreover there is a financial bonus (penalty) for those who retire later (earlier) - in both cases it is 0.5% of the pension for every month, for which one retires later (earlier) (Lesay 2006). In the new system there is also regular pension indexation instead of *ad hoc* indexation made by politicians in the old system.

The second pillar, which is a *mandatory*¹⁷ FF scheme, started in January 2005 (one year after the first pillar was reformed), but Slovaks had one and a half years to decide whether they want to participate (without an option to return back to the one-pillar system). New participants on the labour market do not have the possibility to decide, they have to participate on the mixed scheme. On the other hand, pensioners and people with less than 10 years to retirement age have to stay in the one-pillar system. Regarding the contributions, employers pay 14% of the gross wage (out of which 5

¹⁷Mandatory only for certain group of workers, see below.

percentage points to the first and 9 percentage points to the second pillar) and employees pay 4% of the gross wage to the first pillar.

Every insured person has the possibility to switch a fund once a year without paying any fee. Moreover every pension management company is obliged to offer several types of pension funds:¹⁸

- *Growth fund* - volatile, high-risk investments (up to 80% of the portfolio might be stocks)
- *Balanced fund* - moderate-risk investments (at least 50% of the portfolio must be bonds)
- *Conservative fund* - low-risk investments

As one is getting older there are regulations which specify in which type of fund one can invest. Contributors who are less than 15 years before the retirement age are not allowed to invest into the growth fund and everybody who is 7 years and less before the retirement age must switch to the conservative fund in order to preserve his or her savings. When one retires, there are two possibilities of withdrawing pension money (Lesay 2006):

- Buying an annuity in any life insurance company using the pension fund savings (such saving is than no longer inheritable).
- Buying an annuity as in the example above but using only part of the saved money (there is a minimum value of such an annuity). The rest of the savings can be gradually withdrawn from his account and this part of his saving is part of potential inheritance.

In case a pension fund contributor dies before he retires, his pension fund savings is inherited.

5.4.3 Evolution of the New System

In the beginning of the pension reform in Slovakia it seemed to be a big success. According to Šafář (2010) almost 70% (1.5 million) of working population joined the second pillar. But shortly after the reform implementation there was a government change in Slovakia and the new left-wing prime minister, opponent of the reform, used it to make certain changes. At the end of 2007 the average return on investment from pension funds was 1.5% which was considered unsatisfactory. Therefore in the time period between January and June 2008 people were enabled either to opt out from the second pillar

¹⁸See Ministry of Finance of the Slovak Republic, <http://www.finance.gov.sk>.

or, on the other hand, to join the mixed scheme. Moreover, a promise was made to those opting out from the funded pillar that their first pillar pension would be as if they did not join the second pillar at all. As a result, more than 100 thousand people opted out, while 20 thousand people decided to join the second pillar.

The recent financial crises caused that rate on investment decreased below 0%. The government's reaction was a repetition of the above described scheme. Between November 2008 and June 2009 there was again the possibility to opt out (or join) the second pillar. According to government (Šafář 2010) this move was introduced in order to protect contributors' investments. According to the right-wing opposition this has been done in order to solve deficits in the first pillar budget (savings of those opting out are transferred from the pension fund to the first pillar). Interestingly, on one hand, the left-wing government itself invited people to opt out from the second pillar.¹⁹ And, on the other hand, the Social Insurance Agency, which is managing the first pillar, expected 150 thousand people to opt out and sent a direct mail to 400 thousand people to persuade them to return to the one-pillar system (at the end only 56 thousand people returned, while 32 thousand people joined the second pillar²⁰). It is important to note that enabling people to opt out forces pension funds to keep higher share of liquid assets in their portfolio in order to be able to pay out people who are leaving the second pillar. This decreases the funds' rate of return even more (Hlaváč; Schneider 2011).

Moreover, pension management companies are newly obliged to guarantee non-negative rate on return on a six month basis. This regulation has been widely criticised (see for example the National Bank of Slovakia Finance Sector Analysis, 2009) due to the length of the time period. Pension funds ought to look for long-term investments and such regulations negatively affect their investment strategies. Growth funds with their volatile portfolios are affected most visibly. As a result all types of pension funds followed the conservative investment strategy in order to prevent considerable short-term downswings.

¹⁹See for example <http://www.penize.cz/duchody/64970-penzijni-reforma-na-kolenou-slovaci-si-na-duchod-uz-sami-nenaspori>.

²⁰Finance Sector Analysis (2009), National Bank of Slovakia, available at <http://www.nbs.sk>.

5.5 Lessons from CEE countries

We have described basic parameters of recent pension reforms in Hungary, Poland and Slovakia. What lesson can we learn from these reforms? We have seen that the basic setting of these reforms was very similar.

At first, there were certain changes in the first decade after the fall of communist regimes. This usually included:

- Tightening eligibility rules in the PAYG schemes such as:
 - prolonging the necessary working period
 - increasing the retirement age
 - strengthening the link between contributions and future pensions
- Introducing voluntary FF scheme with a state subsidy

After this *pre-reform* period with more or less parametric changes, there was a period of systemic reforms. These reforms were at least in the regional context path changing. They had usually the following common features:

- Further reforms of the PAYG scheme following the *pre-reform* changes
- Introducing a *partially* mandatory FF scheme
- Recognition of pension rights accrued before the reform

Pension reforms in the CEE region were originally very ambitious. The new second (funded) pillar was supposed to be equal with the traditional PAYG scheme. Such reforms, although promising substantial gains in the long run (see for example Melicherčík; Ungvarský (2004)), were very costly in the short run. This was caused mainly due to the fact that introducing the second pillar causes lower contributions paid to the first pillar while the amount of pensions paid from this pillar remained unchanged in the short run.²¹

Contributors to funded pillar were certainly aware of the fact that this investment is not risk-free. Moreover investing via pension funds is a long term investment and one can anticipate that there will be upswings as well as downswings in the value of the investment. Unfortunately, shortly after implementing pension system reforms, the financial crises started. The performance of the economy decreased and many people have lost their jobs. This has of course influenced also the performance of pension funds (although

²¹For detailed information see Chapter 3.

it has not influenced contemporary pensioners, because at that time, due to the short time of existence of pension funds, there were almost no beneficiaries from the second pillar).

The crisis has also influenced the amount of contributions into the first pillar (PAYG schemes were already in deficit due to the transition costs and consequences of the recent crisis worsened their financial balance even more). The *easiest* and fastest solution of this financial problem was reverting the new pension system into the old one. Pension funds were endowed with resources and many contributors were scared not to lose their investment. Politicians have found a simple and fast populist solution and thereby postpone solving the pension system crises. We have seen this development in all countries in the region, even though the extent of this solution varied in individual countries.

What lesson can we learn from this experience? We have discussed in previous chapters arguments for and against a pension system reform. We have argued that a pension reform is necessary and that a mixed type of pension reform is appropriate. We have shown that in the CEE region many countries have implemented suitable pension system reforms. It has become apparent very soon that the main flaw of these pension reforms were not the reforms themselves, but politicians. These reforms were enforced usually by one party (or a coalition of them) without a broad consensus across all relevant political parties and all important interest groups in the society and right after the next elections, the new winners have considerably changed the new pension system (usually by reverting it back to the old system).

Pension system reform is a long-term project and a full switch from the old system to the new one can last up to 30 years.²² There are usually, before the reform starts, certain resources which are designated for covering the transaction costs of the reform - revenues from a newly introduced special tax or profits from privatizing state property. Unfortunately, especially in the time of crises, these extra resources (and the resources from the newly founded second pillar funds) are usually used to solve contemporary issues instead of something, which can become a really big problem in a decade or more. By effectively cancelling the pension system reform we do not solve the problem, we only postpone it and make it potentially worse. Moreover, when politicians will try to pursue the next pension reform (which will have to happen, as we argued in earlier chapters) they will not have the needed political capital they had before the first reform, which will make things only harder.

²²This figure available at <http://www.profit.cz/clanek/duchodova-reforma-k-nezaplaceni> (downloaded on December 11th, 2011).

Chapter 6

Pension Reform in the Czech Republic

In the last chapter of this thesis we want to use the theoretical background from the first part of this paper and the experience gained from pension reforms in the CEE region to assess the Czech pension system reform. Reform laws have been passed recently, in November 2011, and the new system starts to work in 2013. Due to this fact we cannot evaluate how the system really works in practice, but we will evaluate the structure of this reform and try to predict how functional it is going to be.

6.1 The New Pension System

6.1.1 Political Background

After the elections in May 2010 the new right-wing government came into power. With 118 deputies (out of 200) it was a government with the biggest support in the history of the Czech Republic and this setting, after many years of *weak* governments, was promising due to the government's ability to enforce reforms (pension system, tax system and health care system reforms), which was according to proclamations the main purpose of its existence.

On the other hand, the temptation to ratify far-reaching changes as the above mentioned reforms without thorough discussions with other parties was high. The government was accused by opposition groups that it did not take their reform proposals into consideration at all. Trade unions have organized many demonstration against governmental reforms and the strongest opposition party, social democrats, have protested that the government is not taking their opinions into account. As a result, after passing the re-

form bills in the Chamber of Deputies, the social democrat leader Bohuslav Sobotka announced that his party is prepared to basically cancel one of the main motives of the pension system reform - the second pillar - after the next elections.¹

We are aware of the fact that the essential role of an opposition is to *oppose* governmental proposals and we approve of this. Nevertheless, there is a fundamental difference between a reform with a long-term impact such as the pension system reform and a reform without many long-term implications such as for example a new rules for the Czech Television or for other public institutions. The attitude the opposition has to the reform is not the one we should be looking for. We have seen that in the other countries in the region the opposition basically cancelled the pension reform with the first financial problems they encountered. Announcements such as the one from Bohuslav Sobotka can not only damage the pension reform in case they come true, but they can also strongly influence the success of the reform by discouraging people to take part in it because of the uncertainty they will be facing. If a new labour market entrant has to decide whether to invest in the second pillar for many decades, he has to take into consideration what is the probability the new system will last for such a long time period. With the experience from the region one has and the rhetoric one hears from many Czech politicians one could fear that this probability is not high enough.

6.1.2 The First Pillar Reforms

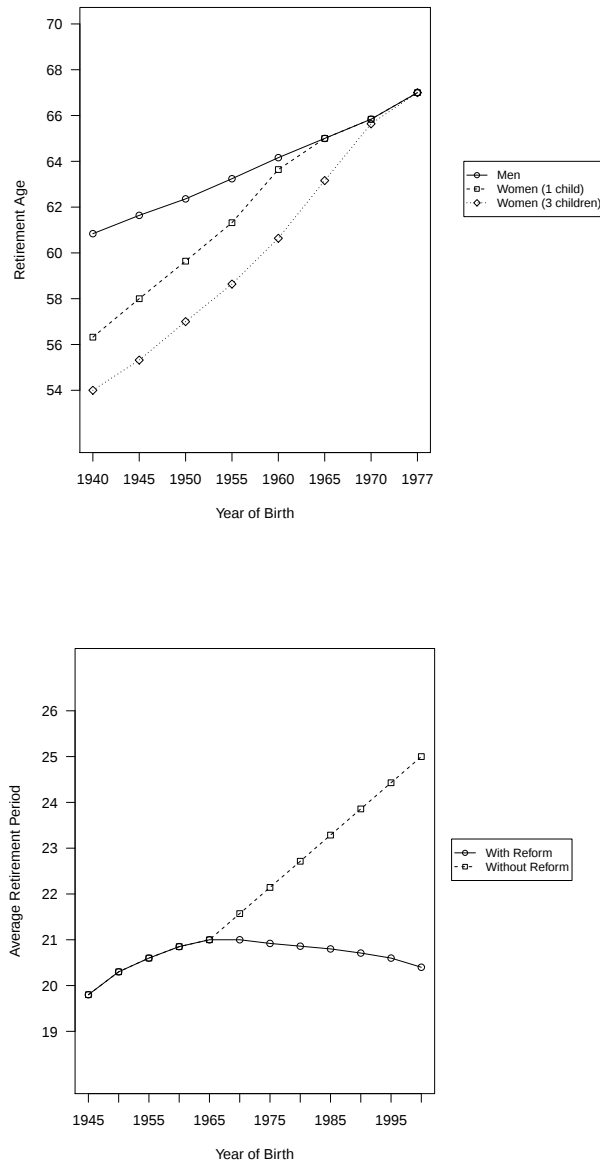
The new pension system in the Czech Republic is similar to those we have discussed earlier in this thesis. The reform consists of two parts - one is reforming the first (PAYG) pillar and the second one is introducing the second (FF) pillar.

The reforms within the first pillar have been passed in the first half of the year 2011 (the so called Small Pension Reform²) and should be implemented within a year. The first change is increasing of the retirement age. In the new pension system there is no restriction on this prolongation which is going to be permanent. For men the retirement age will be prolonged for 2 months every year, for women firstly for 4 months and than from the year 2018 on for 6 months every year. The following charts show the prediction of the retirement age and the impact of this prolongation on the average length of retirement:

¹See <http://www.ceskatelevize.cz/ct24/domaci/152838-cssd-nezrusi-vsechno-treba-zapobyt-v-nemocnici-budeme-platit-dal>.

²It has been already mentioned in the end of Chapter 2.

Figure 6.1: Increasing of Retirement Age



Source: Sněmovní tisk 277/0, Available at ww.psp.cz.

We see that, on one hand, this arrangement makes perfect sense and fixes the length of retirement period which is necessary to balance the pen-

sion budget. On the other hand, despite the longevity we are experiencing, the list of possible jobs for older workers is not very wide (there will be an exception for manual workers such as miners and they can retire earlier) - even undemanding office positions can be due to reduced ability to concentrate inaccessible for people close to 70 not speaking about the necessary re-qualification. Therefore, at the end, this arrangement could cause massive unemployment among people close to retirement age, which would be a substantial burden for the budget either due to more unemployed or due to more early retired. The later solution of the problem of employment of older workers would replicate the situation of 1990s. That means the success of this change strongly depends on the willingness of companies to hire older workers and also on possible state employment politics.

Apart from this, other changes have been made. Due to the Ruling of the Constitutional Court in 2010 the government was obliged to change the pension computation method in order to make the link between contributions and future pensions stronger. As a result, pensions of middle-income workers (with income between CZK 12,500 and 36,000, which is between 50% and 144% of the average wage in 2011) are going to be lower by approximately 4% in order to compensate the increase of pensions of high-income workers. Pensions of low-income workers (with income under CZK 12,500) will not be changed. There is going to be also a lowering of the cap for pension system contributions from six times of the average wage to four times. This arrangement should lead to make the Czech labour market more competitive.

The pension adjustment will be the same as now - pensioners will be compensated fully for inflation and one third of the change of average real wage every time when the yearly sum of these two variables exceeds 2%. But the novelty is, that the government cannot increase pensions more than that - we have seen many increases of pensions or other social expenditures before elections in the past which was always only a big burden for the state budget.

6.1.3 The Second Pillar Reforms

The main part of the pension system reform is, as in other countries, establishing the second pillar with the FF scheme. This part of the reform should be implemented in 2013, but many politicians think about postponing the start of the second pillar to 2014 (prime minister Petr Nečas announced this possibility on November 3, 2011³). This possibility, which is caused mainly by legal issues (not all laws tied together with the pension reform have been

³See <http://zpravy.ihned.cz/politika/c1-53500890-zruseni-stravenek-a-jednotna-dph-budou-asi-pozdeji-necas-zvazuje-odlozeni-reforem-o-rok>.

yet passed in the Parliament), is very disturbing for pension funds. Representatives of current pension funds⁴ are worried that one postponing of the reform could lead to continual postponing and at the end of the day cancelling the reform at all.⁵

The Czech second pillar, contrary to pension systems in the region, is on a voluntary basis. Originally, the government intended to make the second pillar mandatory as in other countries, but they gave in to objections from the opposition and trade unions.⁶ As a result, all workers have to decide until they are 35 years old, whether they want to participate in the second pillar. Workers who are older than 35 years in the time the reform is implemented they have 6 months to decide. This decision is irreversible and one cannot cancel the participation in the second pillar.

The contribution of participants of the second pillar is 5% of the gross wage. 3 percentage points are opted out from the contribution to the first pillar (i.e. one contributes 25% instead of 28%) and the remaining 2 percentage points have to be paid *extra* from the employee. This means the overall contribution rate is 30% of the gross wage plus the voluntary savings in the third pillar.

As in other countries, every pension management company has to offer different types of pension funds (in the Czech Republic there are four of them):⁷

- *Government bonds fund* - this fund can invest only in bonds issued by the Czech Republic (or the Czech National Bank), by any member state of OECD (or its national bank) assuming their rating is premium⁸ or by international institutions such as the World Bank or the International Monetary Fund. These funds can also invest in bank deposits, but this investment cannot exceed 10% of the fund's portfolio.⁹
- *Conservative fund* - apart from the possible investments described above, this fund can also invest in all bonds and money market instruments with premium rating or securities issued by mutual funds

⁴We mean pension funds within the voluntary pillar - the future third pillar.

⁵See <http://byznys.ihned.cz/c1-53562170-fondy-znervoznuji-uvahy-o-odkladu-penzijni-reformy>.

⁶See <http://www.patria.cz/Zpravodajstvi/1829794/drabek-vlada-z-druheho-pilire-neustoupi-ekonomove-se-na-nem-neshoduji.html?culture=en-US>.

⁷See the Pension reform bill, Part 6, Catch III., available at <http://www.psp.cz>.

⁸With premium rating we mean their rating is in one of the five highest categories and is certified by an internationally recognized rating agency.

⁹Please note that such a way of financing pensions (investing solely into government bonds) is not really a FF scheme.

with certain restrictions such as the main aim of the fund being preserving the net value of the investment. The property of the fund has to be secured against the currency risk.

- *Balanced fund* - apart from the possible investments described above (in which case this fund's investments can be within seven highest rating categories), this fund can also invest in stocks traded on a regulated stock market (stocks cannot exceed 40% of the value of the fund's portfolio). 75% of property of the fund has to be secured against the currency risk.
- *Dynamic fund* - apart from the possible investments described above (in which case this fund's investments can be within nine highest rating categories). This fund's portfolio can be compounded with up to 80% of shares. 50% of property of the fund has to be secured against the currency risk.

Every participant of the second pillar chooses his fund type (or a mixture of funds, but within one pension management company) and this decision can be changed over time. Nevertheless, according to the rules of the pension system his decision is restricted depending on the amount of years on has before retirement as follows:¹⁰

- 10 years - one cannot invest in a dynamic fund.
- 9 (8,7,6) years - at least 20% (40%, 60%, 80%) of participant's portfolio has to be in a conservative fund.
- 5 (or less) years - the whole participant's portfolio has to be in the conservative fund.

This regulation guarantees lower volatility of the portfolio when one is closer to the retirement age, which could be useful in case of bigger turbulences on the financial markets such as in recent years.

Regarding paying out the pension, participants have more options to choose. When one retires one can choose between the following:¹¹

- Lifelong pension (no inheritance possibility, once the pension has started to be paid out).

¹⁰See the Pension reform bill, Part 2, Article 11, available at <http://www.psp.cz>.

¹¹See the Pension reform bill, Part 3, Catch II., Article 18, available at <http://www.psp.cz>.

- Lifelong pension with a three-year pension payment to a specified inheritor after participant dies.
- 20 years long pension payment (in case participant dies earlier, the remaining pension is paid out to an inheritor).

There is no possibility of one time withdrawal. In case the participant dies before a pension payment, his investment is a part of his inheritance.

6.2 Objections Against the New System

During the pension reform discussion and after the approval of the reform proposal, many objections have been raised. In this part we want to discuss only the most crucial ones. At this point we do not want to discuss those objections concerning the importance of the reform itself. This topic has been already discussed earlier. We would like to show that all main objections are linked mainly to the politics of the reform and that the main problem of the reform could be the incompetence to explain the reform, unwillingness to successfully defend the reform, and last but not least, the mistrust people have towards politicians (which is often justified).

The first crucial point is the financing of the reform. Unlike in Slovakia no income from privatizing any state enterprise has been saved to finance the reform. The Czech government declared its unwillingness to issue any debt to finance the transition period of the reform. As a result, the government wants to finance the reform with increasing the value added tax. Currently there are two tax rates - the basic one (20%) and the reduced one (10%). The reduced one is applied on food, housing or medical aid. This lowered rate will be continuously increased to 17.5% in year 2013, while the basic one will be lowered to the same rate. As a result there will be one value added tax rate and the income from this change is estimated on CZK 22 billion. Nevertheless, the effective income will be much lower due to promised compensations for low and middle income households.

Although it is obvious that any tax increase or income cut will be perceived very negatively in the society, the way this government has chosen is not the best one in our opinion. Firstly, it had to be apparent for the government that increasing such a socially sensitive tax (despite the promised compensation) will be basically *helping* the left-wing opposition with its election campaign. Moreover, it is very probable that in case the current opposition wins the next election, the value added tax with its two rates will be reimplemented, which would make the new pension system harder to survive. Secondly, there is no guarantee that the money will be really used to

finance the pension reform. We have seen many times in the past that there has been a raise of a particular tax to finance a particular issue (for example the so called “flood tax” introduced in 2010), but at the end it was always impossible to control whether the money really went to solve that particular issue. Thirdly, and this is a pure political misstep, there is the timing of the tax rise. The tax rise is planned one year before the pension reform starts. This fact strengthens the suspicion mentioned above, because why to raise money for a reform, which has not started yet?

The second crucial point is the setting of the second pillar. We would like to discuss two problems here: the second pillar being voluntary (but without option to re-evaluate the original decision) and the problem of effectively having two *third* pillars.

On one hand, making the new second pillar voluntary is a political compromise, because the original reform proposal contained mandatory second pillar. On the other, hand it brings up many problems. The first problem is planning the reform. It is unclear how many people will join this pillar, in other words how many people will opt out from the first pillar and how much will the transition period cost. This posts problems not only on the government when planning the reform, but also on the pension management companies. This uncertainty could lead to higher fees and smaller fund portfolio for second pillar participants (pension fund representatives will take the conservative path assuming lower participation rates).

The other problem with having the second pillar voluntary is the political risk.¹² Due to the weaker link between contributions and future pensions in the first pillar, participating on the second pillar is much more profitable for people with higher income. This could lead to a very unfavourable situation where the majority of society, without having invested much in the second pillar, would elect a politician who would be more than willing to use (i.e. *nationalize*) this funds in order to balance the state budget.

The last problem we wanted to discuss is having effectively two *third* pillars after the reform. From the second pillar description discussed above we can see that the difference between the second and the third pillar is not very big and in fact these pillars could compete for contributors. The third pillar is subsidized from the state and one gets the maximum subsidy if contributing CZK 2,000 a month which is approximately 11% of the average net wage. That means for a contributor to gain the maximum, he has to contribute CZK 2,000 a month into the third pillar and first after than contribute to the second pillar. According to the Czech Banking Association analysis¹³ this

¹²See for example an analysis from Czech Banking Association, <http://www.czech-ba.cz>.

¹³See above.

would most probably lead to a low participation rate in the second pillar, because people are not willing to contribute for their pensions that much on average.

6.3 Evaluation

A pension system reform is always a topic with a lot of controversy. It is a change which will influence living conditions for many decades. Therefore, on one hand, it is very problematic to reach a broad consensus on the setting of the reform (or more precisely on the new pension system), on the other hand, this is the reason why reaching a broad consensus is essential if we want the reform to survive a longer time period. We think that the current Czech reform could be a very good starting point for a debate. We do not think it is the right reform to implement. We have many reasons for this.

The reform as a whole is heading in the right direction. It improves the possibility of long-term financial sustainability of the system, it diversifies risks and it forces people to act more responsibly and not rely that much on help from the state. Moreover, we can assume that there will be an increase in long-term savings which is positive for the economy.¹⁴

Unfortunately, a favourable setting of a reform does not guarantee its successful implementation. We think that the most important variable, when speaking about long-term reforms, is political support and we have shown this in the previous chapter with the experience from the CEE region. This conclusion is consistent with findings of many authors, see for example Schneider (2011). We are aware of the fact that the earlier a pension system reform will be implemented the better - and we have argued why (Chapter 2). However we do not think that any reform is better than nothing. Reform without broad political support, such as the current one, cannot succeed for the following two reasons:

- Firstly, it will be most probably either cancelled or completely re-reformed after the government changes, like in other countries in the region.
- Secondly, because people are aware of the point above, the participation on the reform will be substantially lower simply due to the lack of political support. This will harm the success of the reform regardless of the first point coming true or not.

¹⁴See for example Börsch-Supan; Köke, Winter (2004).

As a conclusion, we think that it is premature to implement the current reform and additional discussion about the reform would be desirable. A reform should bring more certainty about the future of the new system which is necessary to guarantee its success. We think that the Czech pension system reform will follow other pension reforms in the CEE region and will be either cancelled or substantially changed within a decade.

Conclusions

In the introduction of this thesis we have outlined three main points of this paper - *problem identification, theory presentation, solution implementation*. We argued using the example of the Czech Republic that the main problem of the current pension system is the unsustainability of the current PAYG scheme. This scheme has to be reformed for more reasons. Firstly according to demographic prognosis the scheme is going to generate substantial deficits over the future decades and therefore it is not financially sustainable. Moreover, the current pension system is also very vulnerable due to low risk diversification.

In the theoretical part of the thesis we outlined the Pareto efficiency discussion. We have shown that if certain conditions are met, the pension system reform might be welfare improving for all generations. On the other hand, we did not recommend a switch to a pure FF scheme, because on one hand, it would not solve the risk diversification problem and, on the other hand, the PAYG scheme is vital in many areas, for example for the state social policy. We have to be aware of the fact that speaking about any social policy we cannot usually strive for the *first*-best solution, but we have to look for the *second*-best solution (for this, see Barr, Diamond (2008)). We also discussed the political economy of the pension reform and we identified variables which influence the reform the most. The key variable was *influence groups*. These groups, regardless of the optimality of the reform, follow their partial interests and it is vital for the future of the reform to harmonize these interests as far as possible.

In the last third of the thesis we presented pension system reforms made in countries very similar to the Czech Republic - from economic, historical and cultural point of view. We examined their setting, their implementation and also their evolution and found out that the basic setting of all these reforms was very similar. We also found out that these new pension systems did not have a long duration. Reforms in all discussed countries were if not cancelled than heavily *re*-reformed. The main cause for this was the indecisiveness and unwillingness of the political representation to finish the transformation

of the pension system. At the end we have discussed the current Czech pension system reform. Some changes have been made there, compared to the other previously discussed reforms such as the second pillar being voluntary. Unfortunately, we see the same mistakes in the Czech pension reform as we have seen before. Political support of the pension system reform, which we have identified as the most crucial point of a pension system reform, is weak and we do not think that the new Czech pension system will last much longer than the other new systems in the CEE region.

References

1. **Aaron, H. (1966):** *The Social Insurance Paradox*. Canadian Journal of Economics and Political Science, Vol. 32, No. 3.
2. **Barr, N. (2000):** *Reforming Pensions: Myths, Truths, and Policy Choices*. IMF Working Paper, WP/00/139. Washington, International Monetary Fund.
3. **Barr, N.; Diamond, P. (2006):** *The Economics of Pension*. Oxford Review of Economic Policy, Vol. 22, No. 1.
4. **Barr, N.; Diamond, P. (2008):** *Reforming Pensions*. Cambridge, MIT Department of Economics Working Paper Series, Working Paper 08-22.
5. **Bezděk, V. (2000a):** *Penzijní systémy obecně i v kontextu české ekonomiky (současný stav a potřeba reform), I. díl*. Praha, Česká národní banka.
6. **Bezděk, V. (2000b):** *Penzijní systémy obecně i v kontextu české ekonomiky (současný stav a potřeba reform), II. díl*. Praha, Česká národní banka.
7. **Bezděk, V. (2005):** *The Public Pension System in the Czech Republic from the Point of View of Public Finance*. PIE Discussion Paper Series.
8. **Börsch-Supan, A.H. (1998):** *Zur deutschen Diskussion eines Übergangs vom Umlage- zum Kapitaldeckungsverfahren in der gesetzlichen Rentenversicherung*. Finanzarchiv, 55.
9. **Börsch-Supan, A.H.; Köke, F.J.; Winter, J.K. (2004):** *Pension Reform, Savings Behavior and Capital Market Performance*. Mannheim, mea - Mannheimer Forschungsinstitut Ökonomie und Demographischer Wandel, No. 53-2004.

10. **Börsch-Supan, A.H.; Ludwig, A.; Winter, J.K. (2005):** *Ag-
ing, Pension Reform, And Capital Flows: A Multi-Country Simulation
Model*. NBER Working Paper No. 11850.
11. **Börsch-Supan, A.H.; Reil-Held, A. (1997):** *Retirement Income:
Level, Risk, and Substitution Among Income Components*. OECD
Working Paper AWP 3.7, available at [http://www.oecd.org/dataoecd/
21/24/2428934.pdf](http://www.oecd.org/dataoecd/21/24/2428934.pdf).
12. **Breyer, F. (1989):** *On the Intergenerational Pareto Efficiency of
Pay-as-you-go Financed Pensions Schemes*. Journal of Institutional
and Theoretical Economics 145.
13. **Breyer, F.; Stolte, K. (1999):** *The Political Feasibility of Pension
Reform in the Light of Demographic Change*. In: Müller, K.; Ryll, A.;
Wagener H.J. (Eds.): *Transformation of Social Security: Pensions in
Central-Eastern Europe*. Heidelberg, Physica-Verlag.
14. **Brown, J.R. (2002):** *Redistribution and Insurance: Mandatory An-
nuity with Mortality Heterogeneity*. Cambridge, NBER Working
Paper No. 9256.
15. **Brunner, J.K. (1996):** *Transition from a Pay-as-you-go to a Fully
Founded Pension System: The Case of Differing Individuals and Intra-
generational Fairness*. Journal of Public Economics 60.
16. **Cerami, A. (2006):** *The Politics of Reforms in Bismarckian Welfare
Systems: The Cases of Czech Republic, Hungary, Poland and Slovakia*.
Paper presented at the conference "A long good bye to Bismarck? The
politics of welfare reforms in Continental Europe", Minda de Gunzburg
Center for European Studies, Harvard University.
17. **Cubeddu, L. (1998):** *The Intragenerational Redistributive Effects of
Unfunded Pension Programs*. IMF Working Paper WP/98/180
18. **Feldstein, M. (1996):** *The Missing Piece in Policy Analysis: Social
Security Reform*. NBER Working Paper No. 5413.
19. **Feldstein, M.; Samwick, A. (1997):** *The Economics of Prefunding
Social Security and Medicare Benefits*. Cambridge, NBER Working
Paper No. 6055.
20. **Fenge, R. (1995):** *Pareto-efficiency of the Pay-as-you-go Pension
System with Intragenerational Fairness*. Finanzarchiv, 52.

21. **Ferge, Z. (1999):** *The Politics of the Hungarian Pension Reform*. In: Müller, K.; Ryll, A.; Wagener, H.J. (Eds.): *Transformation of Social Security: Pensions in Central-Eastern Europe*. Heidelberg, Physica-Verlag.
22. **Galasso, V.; Profeta, P. (2002):** *The Political Economy of Social Security: A Survey*. *European Journal of Political Economy*, Vol. 18.
23. **Goliaš, P. (2005):** *Pension Reform in Slovakia*. Bratislava, Institute for Economic and Social Reforms. Bratislava, Institute for Economic and Social Reforms. Available at <http://www.ineko.sk>.
24. **Golinowska, S. (2006):** *Pension Reform in Poland*. Lecture given at IPM Research Center Seminar, Minsk: Pension Reform: The Experience of Region Countries and Opportunities for Belarus. Available at: <http://research.by/pdf/Seminars/2006/20060530/01Golinowska.pdf>.
25. **Hirte, G. (2003):** *The Political Feasibility of Privatizing Old-Age Insurance*. *Scottish Journal of Political Economy*, Vol. 50, No. 4.
26. **Hlaváč, J.; Schneider, O. (2011):** *Finanční výkonnost penzijních fondů ve střední Evropě: Proč jsou české fondy nejhorší*. Prague, Institute for Democracy & Economic Analysis, available at <http://idea.cerge-ei.cz>.
27. **Holzmann, R. (1997):** *A World Bank Perspective on Pension Reform*. Available at <http://pensionreform.ru/files/24691/eng11.pdf>.
28. **Homburg, S. (1990):** *The Efficiency of Unfunded Pension Schemes*. *Journal of Institutional and Theoretical Economics* 146.
29. **James, E.; Brooks, S. (2001):** *The Political Economy of Structural Pension Reform*. In: Holzmann, R.; Stiglitz, J.: *New Ideas About Old Age Security*. Washington DC, World Bank.
30. **Kluza, S.; Ostaszewski, K. (2003):** *Pension Reform in Poland*. In: Aspalter, C.: *The Welfare State In Emerging-Market Economies*. Taiwan, Casa Verde Publishing.
31. **Lesay, I. (2006):** *Pension reform in Slovakia: the context of economic globalisation*. Brussels, European Trade Institute for Research, Education and Health and Safety. Available at: <http://library.fes.de/pdf-files/gurn/00282.pdf>.

32. **Marek, D. (2007):** *Penzijní reforma v České republice: model důchodového systému s kombinovaným financováním.* Available at <http://ies.fsv.cuni.cz/work/index/show/id/955/lang/en>.
33. **Margóč, A. (2009):** *Dôchodkový systém v Slovenskej republike.* Banská Bystrica, Matej Bel University, Master's thesis.
34. **Melicherčík, I.; Ungvarský, C. (2004):** *Pension Reform in Slovakia: Perspectives of the Fiscal Debt and Pension Level.* In: Finance a úvěr - Czech Journal of Economics and Finance, No. 54.
35. **Mitchell, O.S.; Zeldes, S.P. (1996):** *Social Security Privatization: A Structure for Analysis.* The American Economic Review, Vol. 86, No. 2.
36. **Müller, K. (1999):** *Pension Reform Paths in Comparison..* Czech Sociological Review, Vol. 7 (No. 1:51-66).
37. **Müller, K. (2000):** *The Political Economy of Pension Reform in Central-Eastern Europe.* Cheltenham, Edward Elgar.
38. **Müller, K. (2003):** *The Making of Pension Privatization in Latin America and Eastern Europe.* In: Holzmann, R.; Orenstein, M.; Rutkowski, M. (Eds.): *Pension Reform in Europe: Process and Progress.* Washington DC, The World Bank.
39. **Palacios, R.; Rocha, R. (1998):** *The Hungarian Pension System in Transition.* The World Bank, Social Protection Discussion Paper Series, No. 9805.
40. **Ribhegge, H. (1999):** *The Controversy Between the Pay-As-You-Go System and the Fully-Founded System in Old-Age Security.* In: Müller, K.; Ryll, A.; Wagener H.J. (Eds.): *Transformation of Social Security: Pensions in Central-Eastern Europe.* Heidelberg, Physica-Verlag.
41. **Rocha, R.; Vittas, D. (2002):** *The Hungarian Pension Reform, A Preliminary Assessment of the First Years of Implementation.* In: Feldstein, M.; Siebert, H.: *Social Security Pension Reform in Europe.* Chicago, University of Chicago Press.
42. **Rosner, P. (2003):** *The Economics of Social Policy.* Cheltenham, Edward Elgar.

43. **Šafář, P. (2010):** *Analysis of the pension system development in the Visegrad group countries. Implications for the Czech Republic.* Brno, Masaryk University, Master's thesis.
44. **Schneider, O. (2011):** *Důchodové systémy v Evropě: Reformují všichni.* Prague, CERGE-EI, Short study No. 6/2011. Available at <http://idea.cerge-ei.cz>.
45. **Simonovits, A. (2011):** *The Mandatory Private Pension Pillar in Hungary: An Obituary.* Hungarian Academy of Sciences, Institute of Economics, Discussion papers, MT-DP-2011/12.
46. **Sinn, H.W. (1999):** *Pension Reform and Demographic Crisis: Why a Funded System Is Needed and Why It Is Not Needed.* CESifo Working Paper No. 195.
47. **Sundén, D. (2002):** *Pareto-improving Privatization of PAYG Old-age Social Security.* In: Sundén, D.: *The Dynamics of Pension Reform.* Dissertation at Stockholm School of Economics.
48. **Wiktorow, A. (2007):** *Pension Reform in Poland.* The Geneva Papers, 32. Available at: <http://www.palgrave-journals.com/gpp/index.html>.

Other sources

1. **Czech Social Security Administration (CSSZ)**, <http://www.cssz.cz>.
2. **Czech Statistical Office (CZSO)**, <http://www.czso.cz>.
3. **Ministry of Finance of the Czech Republic**, <http://www.mfcr.cz>.
4. **Ministry of Finance of the Slovak Republik**, <http://www.finance.gov.sk>.
5. **Ministry of Labour and Social Affairs of the Czech Republic**, <http://www.mpsv.cz>.
6. **Organization for Economic Co-operation and Development**, <http://www.oecd.org>.

Appendix A

A.1 Derivation of the Government Debt from Section 3.1

The government debt is equal to

$$D_t^B = (1+r)^{t-1} \cdot N_0 \cdot b^{PAYG} \cdot \left[1 + n + (n-r) \cdot \sum_{\tau=1}^{t-1} \left(\frac{1+n}{1+r} \right)^\tau \right].$$

We know that a sum of a geometric sequence can be written as follows

$$\sum_{i=1}^n a \cdot q^{i-1} = a \cdot \frac{1-q^n}{1-q}.$$

The sum in the government debt term can be rewritten

$$\sum_{\tau=1}^{t-1} \left(\frac{1+n}{1+r} \right)^\tau = \sum_{\tau=1}^{t-1} \overbrace{\frac{1+n}{1+r}}^a \cdot \underbrace{\left(\frac{1+n}{1+r} \right)^{\tau-1}}_q.$$

And therefore

$$\begin{aligned} \sum_{\tau=1}^{t-1} \left(\frac{1+n}{1+r} \right)^\tau &= \frac{1+n}{1+r} \cdot \frac{1 - \left(\frac{1+n}{1+r} \right)^{t-1}}{1 - \left(\frac{1+n}{1+r} \right)} = \frac{1+n}{1+r} \cdot \frac{-\frac{(1+n)^{t-1} - (1+r)^{t-1}}{(1+r)^{t-1}}}{-\frac{n-r}{1+r}} = \\ &= \frac{(1+n) \cdot [(1+n)^{t-1} - (1+r)^{t-1}]}{(n-r) \cdot (1+r)^{t-1}}. \end{aligned}$$

After substituting this term in the government debt equation we get

$$\begin{aligned} D_t^B &= (1+r)^{t-1} \cdot N_0 \cdot b^{PAYG} \cdot \\ &\cdot \frac{(1+n) \cdot (1+r)^{t-1} + (1+n) \cdot [(1+n)^{t-1} - (1+r)^{t-1}]}{(1+r)^{t-1}} = N_0 \cdot b^{PAYG} \cdot (1+n)^t. \end{aligned}$$

A.2 Propositions 1-4 from Section 3.2

From the following condition

$$P_{t+1} - (1+r) \cdot b \cdot w_t \cdot l_t = P_{t+1}^{PAYG} - (1+r) \cdot b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG},$$

we compute $\frac{dP_{t+1}}{db}$ using the implicit function theorem. Let's set

$$f(P_{t+1}, b) = P_{t+1} - (1+r) \cdot b \cdot w_t \cdot l_t.$$

Then

$$\begin{aligned} \frac{\partial f(\cdot)}{\partial P_{t+1}} &= 1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}, \\ \frac{\partial f(\cdot)}{\partial b} &= -(1+r) \cdot w_t \cdot l_t - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial b}. \end{aligned}$$

Assume that

$$\frac{\partial f(\cdot)}{\partial P_{t+1}} \neq 0.$$

Then

$$\frac{dP_{t+1}}{db} = -\frac{\frac{\partial f(\cdot)}{\partial b}}{\frac{\partial f(\cdot)}{\partial P_{t+1}}} = \frac{(1+r) \cdot w_t \cdot l_t + (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial b}}{1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}}.$$

Differentiating the indirect utility function $V_t(\cdot)$ with respect to b we get

$$\frac{dV_t}{db} = \frac{\partial V_t}{\partial b} + \frac{\partial V_t}{\partial P_{t+1}} \cdot \frac{dP_{t+1}}{db}.$$

Combining this with Roy's identity

$$\frac{\partial V_t}{\partial b} = -(1+r) \cdot w_t \cdot l_t \cdot \frac{\partial V_t}{\partial P_{t+1}}$$

and substituting the result for $\frac{dP_{t+1}}{db}$, we get

$$\frac{dV_t}{db} = \left(-(1+r) \cdot w_t \cdot l_t + \frac{(1+r) \cdot w_t \cdot l_t + (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial b}}{1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}} \right) \cdot \frac{\partial V_t}{\partial P_{t+1}}.$$

We can rearrange the last term as follows

$$\frac{dV_t}{db} = \frac{-(1+r) \cdot w_t \cdot l_t \cdot \left[1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}} \right] + (1+r) \cdot w_t \cdot l_t +}{1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}}$$

$$\begin{aligned}
& \frac{+(1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial b}}{\partial P_{t+1}} \cdot \frac{\partial V_t}{\partial P_{t+1}} = \\
& = \frac{[(1+r) \cdot w_t \cdot l_t] \cdot \left[(1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}} \right] + (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial b}}{1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}} \cdot \frac{\partial V_t}{\partial P_{t+1}}.
\end{aligned}$$

So finally we get

$$\frac{dV_t}{db} = \frac{(1+r) \cdot b \cdot w_t}{1 - (1+r) \cdot b \cdot w_t \cdot \frac{\partial l_t}{\partial P_{t+1}}} \cdot \left[(1+r) \cdot w_t \cdot l_t \cdot \frac{\partial l_t}{\partial P_{t+1}} + \frac{\partial l_t}{\partial b} \right] \cdot \frac{\partial V_t}{\partial P_{t+1}}.$$

We know that

$$\begin{aligned}
\frac{\partial V_t}{\partial P_{t+1}} &> 0, \\
\frac{\partial l_t}{\partial P_{t+1}} &< 0.
\end{aligned}$$

The second is due to the fact that leisure, i.e. $(1-l_t)$, is a normal good in our model. Because the utility function $U(\cdot)$ is strictly quasi-concave, it holds

$$\frac{\partial l_t}{\partial b} < 0.$$

Therefore we have

$$\begin{aligned}
b > 0 &\Rightarrow \frac{dV_t}{db} < 0, \\
b < 0 &\Rightarrow \frac{dV_t}{db} > 0.
\end{aligned}$$

This results in $b^* = 0$ being an optimum which proves the Proposition 1.

In case a generation is a *loser*, the condition $b^* = 0$ would imply $P_{t+1}^* < 0$ (see the condition (3.7)), which is not possible. Therefore b must be increased until we get $P_{t+1}^* = 0$. This proves the Proposition 2.

The proof of the Proposition 3 follows from the previous propositions and the condition (3.7). All these three propositions together imply the Proposition 4.

QED

A.3 Pareto Improving Transition from Section 3.2

There is $b_t > b_t^*$, because from the Proposition 2 we know that for a generation t which is a *loser* there is b_t^* such that

$$V_t(b_t^*, 0) > V(b^{PAG}, P_{t+1}^{PAG}).$$

Therefore it is possible to find b_t (by taxing the labour a little more) such that

$$V(b_t, 0) = V(b^{PAYG}, P_{t+1}^{PAYG}).$$

It is also straightforward to show that $\varepsilon_t > 0$. From the Proposition 2 and the condition (3.7) we know that the following holds

$$b_t^* \cdot w_t \cdot l_t = b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG} - \frac{P_{t+1}^{PAYG}}{1+r}.$$

And therefore from

$$b_t \cdot w_t \cdot l_t = b^{PAYG} \cdot w_t^{PAYG} \cdot l_t^{PAYG} - \frac{P_{t+1}^{PAYG}}{1+r} + \varepsilon_t \cdot w_t^{PAYG} \cdot l_t^{PAYG}$$

immediately follows $\varepsilon_t > 0$. From the first constraint of the maximization problem (3.6) we have

$$D_1 = P_1^{PAYG} - b_1 \cdot w_1 \cdot l_1.$$

The equation (3.8) together with $P_2^{PAYG} = b^{PAYG} \cdot w_2^{PAYG} \cdot l_2^{PAYG}$ gives

$$D_1 = b^{PAYG} \cdot \frac{w_2^{PAYG} \cdot l_2^{PAYG}}{1+r} - \varepsilon_1 \cdot w_1^{PAYG} \cdot l_1^{PAYG}.$$

For the government debt D_2 we have

$$D_2 = (1+r) \cdot D_1 - b_2 \cdot w_2 \cdot l_2$$

and

$$D_2 = b^{PAYG} \cdot \frac{w_3^{PAYG} \cdot l_3^{PAYG}}{1+r} - (1+r) \cdot \varepsilon_1 \cdot w_1^{PAYG} \cdot l_1^{PAYG} - \varepsilon_2 \cdot w_2^{PAYG} \cdot l_2^{PAYG}.$$

For the government debt D_T we therefore have

$$D_T = b^{PAYG} \cdot \frac{w_{T+1}^{PAYG} \cdot l_{T+1}^{PAYG}}{1+r} - \sum_{t=1}^T (1+r)^{T-t} \cdot \varepsilon_t \cdot w_t^{PAYG} \cdot l_t^{PAYG}$$

and

$$D_T = \frac{w_{T+1}^{PAYG} \cdot l_{T+1}^{PAYG}}{1+r} \cdot \left(b^{PAYG} - \sum_{t=1}^T (1+r)^{T+1-t} \cdot \varepsilon_t \cdot \frac{w_t^{PAYG} \cdot l_t^{PAYG}}{w_{T+1}^{PAYG} \cdot l_{T+1}^{PAYG}} \right).$$

We have assumed that the interest rate exceeds the growth rate, i.e.

$$(1+r) > \frac{w_{t+1}^{PAYG} \cdot l_{t+1}^{PAYG}}{w_t^{PAYG} \cdot l_t^{PAYG}},$$

and therefore it holds

$$(1+r)^{T+1-t} \cdot \frac{w_t^{PAYG} \cdot l_t^{PAYG}}{w_{T+1}^{PAYG} \cdot l_{T+1}^{PAYG}} > 1.$$

In the beginning of this proof we have shown that $\varepsilon_t > 0$. Therefore there exists a finite T for which it holds that

$$\sum_{t=1}^T (1+r)^{T+1-t} \cdot \varepsilon_t \cdot \frac{w_t^{PAYG} \cdot l_t^{PAYG}}{w_{T+1}^{PAYG} \cdot l_{T+1}^{PAYG}} \geq b^{PAYG}.$$

This shows that the government debt can be paid off in finite time T .

QED

A.4 Derivation of the Model from the Section 4.2

We solve the following maximization problem:

$$\max_{s,l} U_t = \alpha \cdot \ln c_t^1 + \beta \cdot \ln c_{t+1}^2 + \ln(1-l_t)$$

subject to

$$\begin{aligned} c_t^1 &= (1 - b_t^{PAYG}) \cdot l_t - s_t, \\ c_{t+1}^2 &= (1 + r_t) \cdot s_t + P_{t+1}^{PAYG}. \end{aligned}$$

We substitute in the $U(\cdot)$ for c_t^1 and c_{t+1}^2 :

$$\max_{s,l} U_t = \alpha \cdot \ln [(1 - b_t^{PAYG}) \cdot l_t - s_t] + \beta \cdot \ln [(1 + r_t) \cdot s_t + P_{t+1}^{PAYG}] + \ln(1-l_t).$$

From here we derive the first order conditions:

$$\begin{aligned} \frac{\partial U_t}{\partial s_t} &= \frac{-\alpha}{(1 - b_t^{PAYG}) \cdot l_t - s_t} + \frac{\beta \cdot (1 + r_t)}{(1 + r_t) \cdot s_t + P_{t+1}^{PAYG}} = 0, \\ \frac{\partial U_t}{\partial l_t} &= \frac{\alpha \cdot (1 - b_t^{PAYG})}{(1 - b_t^{PAYG}) \cdot l_t - s_t} - \frac{1}{1 - l_t} = 0. \end{aligned}$$

From the second condition we have

$$s_t = (1 - b_t^{PAYG}) \cdot l_t - \alpha \cdot (1 - b_t^{PAYG}) \cdot (1 - l_t). \quad (\text{A.1})$$

Substituting this for s_t into the first first order condition we get

$$\begin{aligned} & \frac{\alpha}{(1 - b_t^{PAYG}) \cdot l_t - (1 - b_t^{PAYG}) \cdot l_t + \alpha \cdot (1 - b_t^{PAYG}) \cdot (1 - l_t)} = \\ & = \frac{\beta \cdot (1 + r_t)}{(1 + r_t) \cdot [(1 - b_t^{PAYG}) \cdot l_t - \alpha \cdot (1 - b_t^{PAYG}) \cdot (1 - l_t)] + P_{t+1}^{PAYG}}. \end{aligned}$$

From here rearranging this equation we get the labour supply function the member of the young generation would choose

$$l_t^* = \frac{\alpha + \beta}{1 + \alpha + \beta} - \frac{P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})}. \quad (\text{A.2})$$

We rearrange the equation (A.1) and get

$$s_t = (1 - b_t^{PAYG}) \cdot [-\alpha + (1 + \alpha) \cdot l_t].$$

We substitute for l_t from the equation (A.2):

$$s_t = (1 - b_t^{PAYG}) \cdot \left\{ -\alpha + [1 + \alpha] \left[\frac{\alpha + \beta}{1 + \alpha + \beta} - \frac{P_t^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})} \right] \right\}.$$

From here rearranging this equation we get the savings function the member of the young generation would choose

$$s_t^* = \frac{\beta \cdot (1 - b_t^{PAYG})}{1 + \alpha + \beta} - \frac{(1 + \alpha) \cdot P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t)}. \quad (\text{A.3})$$

The member of the old generation given the equations (A.2) and (A.3) maximizes his pension with respect to the contribution rate b_t^{PAYG} :

$$\max_{b_t^{PAYG}} P_t^{PAYG} = b_t^{PAYG} \cdot l_t \cdot (1 + n_t).$$

The first order condition is

$$\frac{\partial P_t^{PAYG}}{\partial b_t^{PAYG}} = l_t \cdot (1 + n_t) + b_t^{PAYG} \cdot (1 + n_t) \cdot \frac{\partial l_t}{\partial b_t^{PAYG}} = 0.$$

Rearranging this equation we get

$$\frac{\partial l_t}{\partial b_t^{PAYG}} \cdot \frac{b_t^{PAYG}}{l_t} = -1. \quad (\text{A.4})$$

From the equation (A.2) we compute

$$\frac{\partial l_t^*}{\partial b_t^{PAYG}} = \frac{-P_{t+1}^{PAYG} \cdot (1 + \alpha + \beta) \cdot (1 + r_t)}{[(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})]^2} =$$

$$= \frac{-P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})^2}.$$

We plug this into (A.4):

$$\begin{aligned} \frac{-P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})^2} \cdot \frac{b_t^{PAYG}}{l_t} &= -1 \\ \frac{-b_t^{PAYG} \cdot l_t \cdot (1 + n_t)}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})^2} \cdot \frac{b_t^{PAYG}}{l_t} &= -1 \end{aligned} \quad (A.5)$$

From here we get

$$b_t^{PAYG} = (1 - b_t^{PAYG}) \cdot \sqrt{\frac{(1 + \alpha + \beta) \cdot (1 + r_t)}{1 + n_t}}.$$

After several rearrangements we get the equation (4.1).

In order to derive the equation (4.2) we use the equation (A.5) once more and substitute l_t^* from (A.2) for l_t :

$$\begin{aligned} \frac{-P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})^2} \cdot \frac{b_t^{PAYG}}{\frac{\alpha + \beta}{1 + \alpha + \beta} - \frac{P_{t+1}^{PAYG}}{(1 + \alpha + \beta) \cdot (1 + r_t) \cdot (1 - b_t^{PAYG})}} &= -1 \\ P_t^{PAYG} \cdot \left(1 + \frac{1 - b_t^{PAYG}}{b_t^{PAYG}}\right) &= \frac{(1 - b_t^{PAYG})^2}{b_t^{PAYG}} \cdot (\alpha + \beta) \cdot (1 + r_t) \\ P_t^{PAYG} &= (1 - b_t^{PAYG})^2 \cdot (\alpha + \beta) \cdot (1 + r_t) \end{aligned}$$

Substituting b^{PAYG*} from (4.1) into this equation leads to

$$P^{PAYG*} = \left[\frac{1}{1 + \sqrt{\frac{(1 + \alpha + \beta) \cdot (1 + r)}{n}}} \right]^2 \cdot (\alpha + \beta) \cdot (1 + r),$$

which gives the equation (4.2).

Abstracts

This thesis aims at pension system reform. On the example of the Czech Republic it examines the current pension system and identifies its weaknesses. The paper investigates both theoretical concepts of reforming a pension system and their implementation. It assesses recent pension system reforms in Hungary, Poland and Slovakia and based on this evaluation it comments on the upcoming Czech reform. Das Thema dieser Magisterarbeit ist die

Reform des Altersvorsorgesystems. Am Beispiel der Tschechischen Republik werden das gegenwärtige System und seine Schwächen untersucht. Diese Arbeit studiert einerseits theoretische Konzepte der Reform des Altersvorsorgesystems, aber auch ihre Implementierung. Gegenwärtige Reformen in Ungarn, Polen und in der Slowakei werden bewertet und entsprechende Empfehlungen für die tschechische Reform hergeleitet.

Curriculum Vitae

Name: Petr Kratochvíl

Date of Birth: 12.08.1985

Nationality: Czech

Education: Gymnasium and Sport Gymnasium Přípotoční, Prague, Czech Republic (2000-2004)

Bachelor's degree in Economics, Charles University in Prague, Czech Republic (2005-2009)

Master's degree in Philosophy and Political Science, Charles University in Prague, Czech Republic (2004-2010)

Master's degree in Economics, University of Vienna, Austria (2009-2012)