Pension Reforms; Effects on Intergenerational Risk-Sharing and Redistribution.

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Abstract
Projections show public pensions to take an increasing share of GDP. This has lead to increased activity in the reform area and resulted in a plethora of reforms ranging from marginal to more radical ones. The former kind has often tried to hold back increasing expenditure by decreasing benefit levels, increasing statutory retirement age etc., while the latter may be exemplified by the Italian or Swedish reforms. The marginal reforms implemented give an impression of being rather haphazard. Accelerating expenditures seem to justify all forms of reduction; if the indexing has been by wages, then the change is to price indexing, and vice versa.
In this paper the analysis of reforms will concentrate on the different kinds of risks or threats a pension system is exposed to, notably economic, demographic and political risks and how these risks change with differently designed reforms. The paper will also treat distribution effects of different designs and of the risk exposure.
What does the experience of 30 - 40 years of public pension systems tell us about the effects of different designs? Are there any recommendations to be drawn from economic theory?

Key words: Social insurance; pensions; intergenerational risk-sharing;

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1. Introduction

Projections show that public pensions will claim an increasing share of GDP in the industrialised world. This has led to increased activity in the reform area and resulted in a plethora of reforms ranging from marginal to more radical ones. The former kind has often tried to hold back increasing expenditure by decreasing benefit levels, increasing statutory retirement age etc., while the latter may be exemplified by the Italian or Swedish reforms. The marginal reforms implemented give an impression of being rather haphazard. Accelerating expenditures seem to justify all forms of reduction; if the indexing has been by wages, then the change is to price indexing, and vice versa. What does the experience of 30 - 40 years of public pension systems tell us about the effects of different designs? Are there any lessons to be drawn from economic theory?

There are two or three different stands in the discussion on how to reform social security. One is Feldstein's (1996) who argues in favour of a transition from payg schemes to funded systems. It is claimed to be profitable, as the growth rate, which is the (implicit) rate of return in payg-systems, has decelerated and is assumed to be continuously lower than the rate of return in the capital market, which is the rate of return in a funded system. It is also argued that the loose connection between benefits and contributions in payg systems is costly through the distortions and excess burdens it causes in the labour market. Another stand, and perhaps a more pragmatic one, is to reform within the existing payg systems. Following the World Bank report (1994), suggestions for reforms in Central and Eastern Europe often contain a mixture of funded and payg systems (Holzmann 1997).

Social insurance as compared with market solutions has been shown to be a Pareto-improvement in handling both individual and collective risks (Arrow, 1963, Diamond, 1977, Gordon & Varian, 1988). Thus, privatization of public pensions will not be discussed in this paper. The design of social insurance will, however, have great impact on how the different kinds of risks are handled. In this paper the analysis of reforms will concentrate, not on how individual risks are handled, but on the different kinds of risks or threats a pension system itself is exposed to, i.e. the risk that the system will not sustain or not give the expected benefits (rate of return). Accordingly, the focus

will be on economic, demographic and political risks and how these risks depend on and change with differently designed reforms.

This paper discusses how the design of a system determines the vulnerability to these risks and focuses on how it influences intergenerational risk-sharing and redistribution. A number of specific designs will be analysed with respect to the above mentioned risks. The emphasis will be on payg systems as that is how public pension systems are organised *par preference*. The paper is organised in the following way. Section 2 gives a review of design options and some comments on the reasons behind the unsustainability of today´s systems. In section 3 the economic risk and the redistributional effects of different indexation methods are discussed. Sections 4 and 5 treat the demographic and political risks respectively. Section 6 presents some recent reforms and section 7 concludes the paper.

2. Designs

The objective of a pension system is twofold. Firstly to organise life cycle redistribution, i.e. to even out the unsynchronised earnings-capacity and the desired consumption pattern. This is the saving part of the system. Secondly to insure the individual against some risks, in particular longevity. A pension system can be arranged in a number of ways. In Kruse et al. (1997) the following contrasting characteristics were listed.

Table 1. Combinations of characteristics in pension systems.

Public	Private
mandatory	voluntary
general	selective
basic, means-tested	supplementary
payg	funded
defined benefit	defined contribution
redistributional	actuarial

intra and/or inter generations

indexing by

prices, growth rate and/or interest rate,

during earnings / contribution period

and during retirement / receiving period

It is often argued that a whole menu has to be chosen, i.e. that it is necessary to choose one side of the table. This, however, is a misconception, but some restrictions will have to be put on the mixture for it to be feasible and efficient.

When public old-age pension systems were introduced or expanded, in most OECD countries during the decades after the Second World War, defined benefit payg systems were chosen. A simplified budget restriction for a payg system demonstrates clearly some of its features.

$$q \Sigma_i w_i L_i = \Sigma j\, b_j R_j \qquad \text{where for example } i = 16\text{ -}64,\ j = 65 - D \qquad (1)$$

where q is contribution rate, wL the wage sum or contribution base, b pension benefit and R number of pensioners. If w, L and R are exogenous, q and b are the parameters that can be used to keep the system in balance in response to economic and/or demographic changes.

The equation can be taken to describe either the system in one specific year or the life cycle of an individual. In the first case L is the work force in that year, w the wages and R the number of old-age pensioners. In the second case L is the number of years the individual is in the labour market having pension-carrying earnings, w is his wage in the different years, R is the number of years as a pensioner and b the benefit during these years.

In a pure "Samuelsonian" payg system, the rate of return is the same as the economic growth rate, (1+n)(1+z), where n is population growth and z productivity growth (Samuelson, 1958). In a two-period model eq. 1 can be reformulated

$$qwL_t(1+n)(1+z) = bR_t\ ; \qquad R_t = L_{t-1} = L_t /(1+n) \qquad (1')$$

With a fixed q - i.e. a defined contribution system - the distribution between the working generation and the pensioners is determined. Furthermore, it is a stable system in the sense that economic and demographic changes are shared between the co-living generations (see however further discussion in section 4). Existing payg systems, however, show a number of imaginative designs, making them less robust to exogenous changes and suitable cases for reform. OECD (1988) gives the following picture of how the adjustment of pension benefits to economic changes is handled, nota bene that the indexation of accruing pension rights during the working period can be different from indexation of benefits.

Table 2. Index of pension benefits.

Benefits adjusted to changes in	Country
CPI, retail price index	Australia, Belgium, Canada, Denmark, Greece, Spain, Sweden, UK
Standard of living	Belgium
Cost of living	Finland, Italy, Japan, Luxembourg, Portugal, USA
Earnings, wages	Austria, France, Germany, Iceland, Netherlands, New Zealand
Wages (income) and prices	Finland, Norway, Switzerland, Turkey

Source: OECD (1988).

This was the picture in the mid-80s. Since then, ageing populations and the prospect of increased pension expenditures have given rise to a great number of reforms (see for example EC, 1996). Before commenting on these reforms we will look more closely into designs of payg systems and their effects on risk-sharing and distribution. Table 3 shows a number of combinations of design, including index methods, of payg systems. The list consists of 24 possible combinations; with different indexation methods during the accruing period and during the pension period the number of possible combinations more than doubles. Still, the list is, of course, not complete and only a few of the combinations will be commented on in this paper.

Table 3. Designs of payg systems.

Index / Design	i) prices	growth: ii) wages	growth: iii) (1+n)(1+z)	iv) prices and growth
Defined benefit				
1. fixed benefit	$b = B(1+CPI)$	$b = B(1+I_w)$		
2. earnings related	$b = p(\Sigma w_i / x)$ $(1+CPI)$		$b = p(\Sigma w_i / x)$ $(1+I_g)$	
Defined contributions				
3. all earnings		$b = (\Sigma_i q w_i)/D$ $(1+I_w)$		
except for				
3.1. basic pension				
3.2. floor/ceiling				
3.3. fictive incomes				

CPI = price index, consumer price index; p = a constant, fraction of earnings, I_w = wage (growth) index, I_g = growth index, B = 'original' benefit, x = number of years on which the average wage constituting benefits is based, D = a division number.

3. Risk sharing and redistribution following from the design.

3.1. Payg versus funded systems

In a pure payg (funded) pension system the rate of return equals the growth rate, g (the rate of return in the capital market, r). In equilibrium, g=r. Thus, the two systems are equivalent, cet. par.

(Aaron, 1966). Now, ceteris paribus does not seem to be fulfilled; there is evidence that payg systems have had impact an on savings and capital stock and thus on economic growth. This, of course, is one of Feldstein's main arguments (Feldstein, 1996).

As the growth rate seldom equals the rate of return in the capital market, periodically one of the two will be more profitable. Thus there will always be the risk of having chosen the wrong system. It may be argued that g>r in the 1950s and 1960s is one co-reason for choosing payg systems in so many countries. Today, when r>g we see an increasing interest in and arguments in favour of funded systems. Pension systems are long-run obligations; changing to and fro between payg and funded systems is not done in a trice.

Introducing a payg system means that benefits can be paid out right away, while it takes a full working life to build a funded system. In other words, at the introduction of a payg system there is an initial generation making windfall gains and getting benefits without having made contributions or having done so only to a minor extent. It has been maintained that this is a Pareto-sanctioned change as the initial generation gains but not at the expense of any generation. This is not the case if the payg system has detrimental effects on the economy and/or if it is assumed that r>g for longer periods than the opposite. As this is shown to be the case in many of today's systems, there are arguments in favour of funded systems. To close a payg system is, however, far more difficult than to start one. The risk is that there will be a "terminal" generation only paying without getting corresponding benefits. The transition from a payg to a funded system can be done either by reducing benefits, by raising taxes to pay the terminal generation's benefits, or by making the implicit social security debt explicit, thus increasing the national debt. In the latter case the costs of transition are spread over a number of generations still to come (see Kruse et al. (1997) and Sinn (1999) on transition costs).

Both payg systems and funded ones are exposed to the economic risk of low (even negative) return. To avoid the capital market risk in a funded system the recommendation would be to diversify, to invest in different assets and in different countries. To minimize the economic risk in a payg system the design of the system should be such as to encourage economic growth, for example savings and labour supply. A risk-reducing policy would be to choose a combination of

the two systems.[1] In the discussion of the advantages of funded systems, the magnitude that pension funds would constitute is not taken into account. The advantages of funded systems are discussed as if the rate of return is exogenously determined. This assumption holds if a funded system is introduced in a small open economy, not if introduced in closed economies or on a worldwide basis. Estimates of imputed pension wealth suggest that pension funds in fully funded systems are 3 to 5 times GDP.[2]

Another risk run by a generation which substitutes a payg system for a funded one is that a succeeding generation may grab the gains of introducing a payg system.

3.2. Defined benefit versus defined contributions; price and growth indexing

The simplified budget restriction for a payg system illustrates the difference between a defined benefit and a defined contribution system.

In a defined benefit system, b is fixed. In order to keep the budget restriction, the contribution rate has to change in response to economic and demographic changes. All adjustment is laid on the working generation; there is no risk-sharing between generations concerning the risk of declining economic conditions or deteriorating population structure. With this design, the pensioner is guaranteed a certain amount. This amount is unrelated to the economic and demographic development in society. In good years the pensioners lag behind the active generation, in lean years they will gain compared to the active generation. One reason behind such a design is that pensioners are assumed to be less able to adjust to changing conditions than the younger generations. The distribution between generations (or over the life cycle of an individual) is not determined by equity or fairness considerations. Instead, it is exogenously determined by the growth rate.

Assume z constant: ageing population (fertility $\downarrow$, mortality $\downarrow$) means $L\downarrow$, $R\uparrow$,

[1] This is done in the new Swedish system, where 16 out of the contribution rate of 18.5% will be used in the payg system and 2.5% will be funded.

[2] A wide range is deliberately chosen since the figure, depends, among other things, on the specific age structure in a country.

$\Rightarrow q\uparrow$, i.e. the change is paid by the working generation.

Assume n constant: $z\uparrow \Rightarrow q\downarrow$; pensioners take no part in the economic growth.

The working generation gets increased consumption possibilities from two sides:

i) $(1-q_1)\ w > (1-q_0)\ w$

ii) $w_1 > w_0$

$z\downarrow \Rightarrow q\uparrow$; does not affect the pensioners. The active generation will experience cuts from two sides: decreased wages as z decreases and decreased wages in response to increased q.

A price-indexed system with a defined, fixed benefit (1-i in table 3) is often described as a guarantee to the pensioners of a certain consumption basket. There is no relation between benefits received and contributions paid, apart from the fact that in some systems there is an eligibility condition of a certain numbers of years in the labour market (with contributions paid). In a price-indexed, defined benefit earnings related system (2-i), benefits are determined as a fraction of the average of the earnings during a number (x) of the individual's active years. This is often labelled a standard guarantee system; the individual will get a pension in relation to his/her former income. x is often the last 3, 5 or 10 years before retirement. Certain earnings profiles - career jobs, non blue-collar work - are favoured, giving rise to redistribution within a generation. If the benefits are fixed in nominal terms, the pensioners bear an inflation risk.

The opposite of a price indexed, defined benefit system is a growth indexed, defined contribution system[3]. With a fixed q, a change in growth will change the consumption possibilities of the active generation, it changes the capitalization rate of accrued pension benefits and it changes outgoing pensions to the same degree. With a negative growth rate pension benefits will be lowered and so will wages, but only from one side as q is fixed. Thus, with this design, good years as well as lean years will be shared between the co-living generations. The standard of living of the pensioners is protected in relative terms, but not in absolute terms.

[3] I cannot recall examples of price indexed defined contribution systems. One exception is the Swedish reformed system where the formula for outgoing pensions uses a combination of prices and growth.

In the combination 3-ii, it is assumed that the benefit is determind as the sum of contributions, indexed by wages, divided by D, a division number. This can be taken as a simplified description of the Italian and the Swedish reformed systems. In both systems, all years and (almost) all earnings form pension rights, capitalised at the rate of growth in GDP in Italy and at the rate of growth in average wages in Sweden. D, the division number, is determined by the cohort's life expectancy at the date of retirement; the higher the expected number of remaining years the higher the D. In this way there is a risk-sharing of one of the demographic risks (se below).

3.2.1. Growth indexes

The conclusion of the discussion above is that with growth indexing the risks (gains) of bad (good) economic performance are shared between generations. As shown above this is not the case in a price-indexed system. Growth can be measured in a number of ways and the index chosen will have crucial importance for the long term balance of the payg system. How well different indices "behave" will depend on the emphasis laid on what to stabilize - the pensions as a share of GDP, the pensioners' consumption possibilities compared to the standard of living of the working generation or the financial stability of the system's budget restriction. Some aspects of the choice are discussed below.

GDP vs wages

As we are discussing payg systems, in which wages constitute the contribution or tax base, wages seem to be the appropriate choice. The same follows if we look upon pensions as postponed wages.

Gross vs gross-gross wage

The gross-gross wage includes pay-roll taxes; pay-roll taxes are deducted in the gross wage, in which income taxes are not deducted.[4] Gross-gross wage seems to be the most appropriate measure, i.e. including both pay roll taxes and income taxes. In this way pensions follow the development of consumption possibilities, without any regard to the choices made of how to use

[4] This choice might not be as important in some other countries as in Sweden: ca 23% of the public sector income comes from pay roll taxes (mostly social security contributions); ca 33% on the wage sum. In Germany pay roll taxes are important as well and in the 1992 reform the indexing was changed from gross to net wage. See section 6.

these possibilities, be it public consumption financed by income taxes, increased sickness insurance financed by pay roll taxes or private consumption financed out of net wage.
(An objection to that choice immediately arises: what if the net wage is constant or even decreasing and the gross gross wage increasing due to an increased pension contribution rate, necessitated by increased longevity of the pensioners?[5])

Sum of wages, per capita, per person in working age or per person in the labour force
Should the index be based on the sum of wages or on some average measure? The same change in income can arise from, for example:
i) many persons working short-time
ii) a few working long hours
A sum index will not discriminate between the two, while an average index will have a less favourable effect on pension benefits if i) instead of ii) is the cause of the changes in income. If per capita is used, the index takes account of the dependency ratio including children.

Assume a positive growth rate and that leisure is a normal good with positive income elasticity. Part of the growth will be consumed as leisure time, lowering the consumption possibilities, measured by the wage sum. The increase in leasure time may take the form of reduced working hours and/or early retirement. Anyway, any index not based on hourly wages will make the pensioners pay for part of the leisure time, resulting in reduced growth.

4. Demographic risks

A reformulation of eq. 1 clarifies the importance in a payg-system of demographic structure and development:

$$q = b/w \cdot R/L \qquad (1'')$$

where b/w may be interpreted as the replacement rate and R/L the dependency ratio. R/L is determined by pure demographic factors such as fertility and mortality, but also by labour market factors such as usual age for entrance into the market, male and female participation rates, working hours per week and weeks per year, retirement age. If an ordinary life is assumed to consist of 45 working years (20 to 64 years of age) and 15 years as a pensioner, it results in a R/L of 0.33. In this case a contribution rate of 20% suffices for a replacement rate of 60%. Changes

[5] One, at least partial, solution to increased longevity is the so-called division number in the reformed Swedish pension system.

in L and/or R, caused by the pension system or by exogenous factors[6], will enforce changes in q or b in order to keep the system in balance.

Assume decreases in labour supply:
- In a defined benefit, price indexed system (1-i or 2-i in table 3) pensioners will not be affected. In order to keep the budget restriction, q has to be raised, i.e. the working generation pays for the reduced labour supply. Since there is no, or only a weak connection between contributions and benefits, the increase in q is equivalant to a tax increase inducing further decreases in labour supply.
- In a defined benefit, growth indexed system (2-iii in table 3) the index factor may be affected adversely. The pensioners will pay a minor part of the reduced labour supply.
- In a defined contribution, growth indexed system (for example 3-ii in table 3) the working generations and the pensioners share proportionately the decrease in the wage sum, cet.par.

How this risk sharing of reduced labour supply is evaluated may depend on the reasons behind the reduction. The assessment may differ if the reduction is caused by a decline in fertility or by increases in leisure time. The importance of labour supply, and fertility as one of the determining factors, might be seen as a justification of subsidizing child-rearing, also because of the fact that payg-systems are less favourable to families with many children (see for example Breyer & von der Schulenburg, 1990). So, in many pension systems fictive pension rights are accrued to "home-workers".[7]

Assume an increase in R caused by increases in life expectancy:
- In a defined benefit system, there is no risk-sharing. The burden is entirely borne by the active generation.

[6] Both fertility and retirement age, i.e. number of pensioners, are however influenced by the pension system and the particular way of organising it. See for example Balestrino et al. (1997), Atkinson & Rein (1993), Gruber & Wise (1999).

[7] This is the case in the reformed Swedish system, where each child entitles fictive pension rights for four years. The political arguments used don't mention increased fertility as a goal; instead gender equality is the motive used.

- In a defined contribution system, there is no risk-sharing either. The burden is entirely borne by the pensioners. In actual defined contribution systems the way of handling increased life expectancy is often by adjusting q, i.e. the burden is spread over active and passive years.

The number of pensioners (number of years as a pensioner) may also increase due to reduced retirement age, which is actually an important factor behind the ”ageing” of the populations. Many defined benefit systems subsidize early retirement (see Gruber & Wise (1999) for examples). There might be a reduction in benefits, but a reduction far less than an actuarial one. With this design the cost is entirely borne by the active generation.

5. Political risks

A pension system is a long run commitment; to give the individual a possibility to plan his life-time consumption profile it has to be stable. However, in a democracy[8] there is no way of safeguarding one-self against the risks of changing rules. A necessary although not sufficient condition for non-changing rules is to implement a system that is robust to economic and demographic changes (see previous sections) and which does not give rise to excess burdens. Considering actual pension systems, evidently this is easier said than done, meaning that changes in the rules will occur. Different changes will have different inpacts on the utility of different generations.

Starting in a funded system, every generation experiences the temptation to introduce a payg-system. A generation not introducing a payg-system will suspect that a future generation may grab the fruits of belonging to the initial generation. Thus, there is a strong case to abandon the funded system. The generation doing that and introducing a payg-system will make double gains, consuming out of the fund as well as the proceeds of the payg-system, the latter without paying.

A payg-system has, according to Browning (1975) an inherent tendency to expand beyond its optimal level, defined as the utility maximising level when entering into the labour market / the pension system. In a defined benefit system there will always be a majority gaining from

[8] Of course, this holds to an even larger extent in a dictatorship!

increasing benefits. The closer a person is to retirement, the shorter the period of the resulting higher contributions and the bigger the gain.

Pension systems are not only used for redistribution over the life cycle and for protection against the risk of an extra ordinary long life. They are also used for redistribution within a generation, which means that there is a less than perfect connection between contributions and benefits. A "good" society takes the responsibility for protecting genuinely weak persons. In a life cycle perspective the pensioners as a group can not be considered weak. But within the group there are people who have never earned enough income to accumulate a decent pension. Thus, in most countries there is some sort of basic pension. The risk, however, is that as soon as the connection between contributions and benefits is loosened, the field lies open for rent-seekers demanding benefits for this and that and jeopardizing the viability of the system. Thus, there is a trade-off between the benefits of using the system for redistributive aims and the costs of distortion and excess burden.

6. Some recent reforms

The foreseen ageing of populations has acted as an alarm clock and is often alleged to as the reason for the necessity of pension reforms. The problems in the pension systems can however only to a minor part be attributed to ageing populations. Instead, to a large part the expansion is caused by increases in eligibility and higher benefits. Thus, the increased shares of pensions in GDP[9] and the pressure on the pension systems stem from political decisions. This is in line with Browning´s (1975) conclusions on payg systems: these will expand beyond an optimal level. Whatever the reason, the systems are unsustainable and in many countries reforms are implemented or suggested. Table 4 reviews some of the reforms.

[9] According to Feldstein (1996), p.3, the tax rate in the US pension system has increased from 2% of GDP in 1940, to 3% in 1950, 6% in 1960, 10% in 1980 and to 12% since 1988. In Sweden there was an ongoing expansion from the 1970s and on. Examples are reduced retirement age from 67 to 65 years of age, the introduction of paid part time retirement, the introduction of (and subsequent increases in) a pension supplement to those with no or low supplemenatery pension.

Table 4. A sample of countries, their estimated equlibrium contribution rates and pension reforms.

Country	Equilibrium contribution rate	Reforms
Italy	Private sector: 1992 42%, 2010 ca 50%, 2025 60% Public employees: 1994 40%, 2010 73%	1992: age of retirement raised, period for pensionable earnings lengthened, minimum nb of years of contributions increased, indexation from wages to prices; 1995: pensions related to whole working life, indexing by wages, flexible pensionable age in an actuarial way, life expectancy included in the pension formula. A welfare pension seperated from the ordinary system
France	2015: 27 - 30% 2040: 31 - 42%	1993 (mainly the basic scheme): indexation by prices instead of wages; b based on the 25 best-paid years instead of 10; 40 years instead of 37.5 required for full pension.*)
Germany	1990: ca 23%, 2010: ca 29%, 2030: ca 36%	1992 Pension Reform Act: i) indexation: net instead of gross wages ii) increases in retirement age iii) reductions in the subsidy of early retirement iv) introduction of a "self-regulating" mechanism: q adjusted to give a certain cash reserve.
Sweden	1995: 30%; 2015 34 - 41%; 2035: 33 - 46%.**)	1995: defined contribution, (almost) all income is equally weighted (instead of average of 15 best and with 30 years enough for full pension), indexing by growth during accruing period, by prices and growth during pension period; ca 80% payg, 20% funded; flexible retirement age with benefits acuarially calculated; life expectancy included in the pension formula; a guarantee pension giving 100% marginal effects;
UK a basic flat-rate pension + earnings-related (SERPS)		1980: from earnings to price indexation 1986 Social Security Bill: additional pensions reduced; benefits based on average of whole working life instead of best 20 years; widow(er)s pensions reduced by half; 1995 Pension Act: Female state pensionable age up from 60 to 65 years of age; no accruing of pensions rights in SERPS in respect of contracted-out earnings

*) According to OECD this reform will keep the system in balance until 2010. Thereafter demographic pressure will erode the financial soundness of the system (EC (1996) p 63).
**) The lower figure if 1% average yearly growth rate is assumed,

Source: EC (1996)

Comparing these reforms with the stylized description of pension designs in table 3 establishes that changes in the benefit formulas, e.g. what is included in w, changes in x, are common as well as changes in index. According to EC (1996) the pension reforms already implemented or decided will counterbalance the demographic trends.

Can we from this short description get an idea of who will bear the burden of adjustment, an adjustment nessecitated not only because of demographic changes but also because of earlier ’generous’ expansion of benefits, being an inherent political risk in defined benefit, payg system?

We see that in Italy, France, Sweden and UK the benefit formula has been changed to an increased number of years the benefits are based on. In an intragenerational perspective such a change gives the following effects: short periods for calculating the benefits favour workers with high (long) educations and those in career jobs, often white collar workers. A lengthening of the period thus favours people in non-career jobs with an even earnings profinle. Intergenerationally it gives the following effects: as previously stated increases in payg systems with no or only a loose connection between contributions and benefits mean a windfall gain for an initial generation, i.e. the introducing generation, bigger the closer to retirement. By the same token, decreases cause windfall losses, bigger the closer to retirement since the individal has been paying contributions expecting a higher benefit. The shorter the adaptation period, the bigger the hardship, cet. par.

In France, Italy’s 1992 reform and Uk 1980 the indexation is changed from growth (wages) index to price index. This is done in the purpose of cutting expenditure, but to the price of increasing volatility. At the moment, with modest inflation and rather good growth prospects it is the pensioners who bear the burden of adaptation.

7. Conclusions

There is an intensive reform activity concerning pension systems. This goes for the systems in the industrialised world as well as in the transition economies within the former communist block. The reforms suggested or implemented seem in some respects rather arbitrary, aiming more at

short-sighted cuts in expenditure than at long-run stability. In this paper some aspects of pension systems and reforms are discussed, especially risk-sharing between generations.

A life cycle model with a simplified budget restriction of a payg-system shows how different designs determine the risk-sharing between generations. It shows that in a price-indexed, defined benefit system the distribution between generations is determined by the growth rate, that there is no risk-sharing between generations. Thus, the distribution between co-living generations - workers vs. pensioners - may widen and eventually destabilise and disrupt the pension system. A growth-indexed system does not suffer from this draw back. The level of the pension system determines the distribution between workers and pensioners and the generations share the fruits of good years and the burdens of bad years.

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