Demographic Pressure on the Public Pension System

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The combination of low fertility, decreasing mortality and the baby-boom generation entering retirement will dramatically increase the share of elderly people in Slovenia in future decades. Without further changes in the pension system this will bring about strong pressure on the public pension system. In the analysis we use a cohort-based model to project the share of public expenditure on pensions in gross domestic product. This model enables us to analyse the long-term effects of the forthcoming demographic changes in connection with the current public pension system. The projected rise in pension expenditure will have to be mitigated at some point in the future and reducing pension benefits is one of the options. The Slovenian pension legislation provides equity among pensioners who retire at different points in time. An equal reduction of pension benefits suggests an equal distribution of burdens arising from the ageing population. However, the model reveals very different effects of this measure in relation to different cohorts. The analysis tackles increasingly relevant topics of intergenerational relations and questions the distribution of fiscal burdens and benefit among cohorts and generations.

Povzetek: Članek predstavi predviden prihodnji pritisk spremenjene starostne strukture prebivalstva Slovenije na javnofinančni pokojninski sistem in učinke njegove blažitve na posamezne kohorte.

1 Introduction

For decades the research community has warned the public via demographic projections concerning forthcoming radical demographic changes. However, this did not actually receive much general attention until developments started to influence current generations and caused problems associated with the long-term sustainability of the public finance system. Resolving population-ageing pressures on the public finance system means elevating the tax burden or cutting benefits to individuals. Of course, these measures do not appeal to the public and politicians are trying to delay them as long as possible. Lately, this is hardly possible any more and population ageing is becoming one of the central issues facing the European Union and many other institutions and countries around the globe.

The pressure on public expenditure stems predominantly from three systems: health care, long-term care and the pension system. In the paper we concentrate on public pension expenditure. We present projections of this expenditure in the future. It is unlikely that Slovenia's present public finance system can absorb such a large increase in pension expenditure. An adjustment in the direction of a sustainable path raises questions about distributing burdens over different cohorts and generations. The current pension legislation provides horizontal equity between existing and new pensioners. We argue that this seemingly fair arrangement is only one possibility which brings about a different impact on different cohorts when introducing the time dimension to the analysis, as our estimations created by the cohort-based model reveal.

In Section 2, the latest demographic projections for Slovenia are given; presenting forthcoming demographic changes. In Section 3 the cohort-based model used in the analysis is explained. Section 4 includes projections of public pension expenditures in Slovenia expressed as a share of GDP. Section 5 presents the effect of limited pension spending on different cohorts. The conclusions are given in Section 6.

2 Future demographic development in Slovenia

The Slovenian population belongs to the modern demographic regime with low levels of fertility and mortality. In 1981 the total fertility rate[1] ('TFR') dropped

[1] The total fertility rate is the average number of children that a woman gives birth to in her lifetime, assuming: 1) that the prevailing rates remain unchanged; and 2) she will survive from birth through to the end of her reproductive life.

below 2.1, which represents the replacement fertility rate for developed countries. Since then, the TFR has been continuingly falling and in the last few years it has stabilized at a level somewhat above 1.2. Since 1960 mortality has also been declining. Life expectancy at birth increased in the 1958/59 – 2005/06 period from 65.6 to 74.8 years for males and from 70.7 to 81.9 years for females.

During the 1960s Slovenia transformed from a traditional emigration country to an immigration destination. The most important here was the Balkan South-East to North-West immigration stream. In the 1970-1990 period, all net migration flows between Slovenia and other federal parts of Yugoslavia were positive for the then north-west developed Yugoslav republic [11]. Since 1990 this pattern has not changed in spite of the several new state borders which have emerged after the breakdown of Yugoslavia. In the last decade the net migration has amounted to 2,000 to 3,000 people per year, with higher values being seen in the last two years (6,400 in 2005 and 6,200 in 2006).

These trends of fertility, mortality and net migration formed the basis of the Eurostat demographic projections [6] published in 2005. Figure 1 to Figure 3 present the assumptions about fertility, mortality and migrations on which those projections are based.

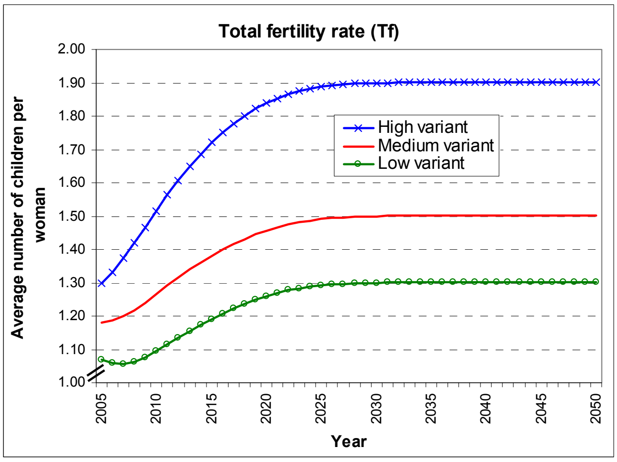


Figure 1: Demographic assumption: fertility

The results for the low, medium and high variants of the demographic projections are summarised in Table 1. According to the medium variant, the size of the population decreases by about 100,000 inhabitants by 2050. Because of an assumed substantial positive net migration, a fertility increase (compared to the current level) and increased longevity the projected drop in the total population is only moderate. However, the share of elderly people (aged 65 years and over) is projected to double in the period up until 2050: from the current 16% to 31%.

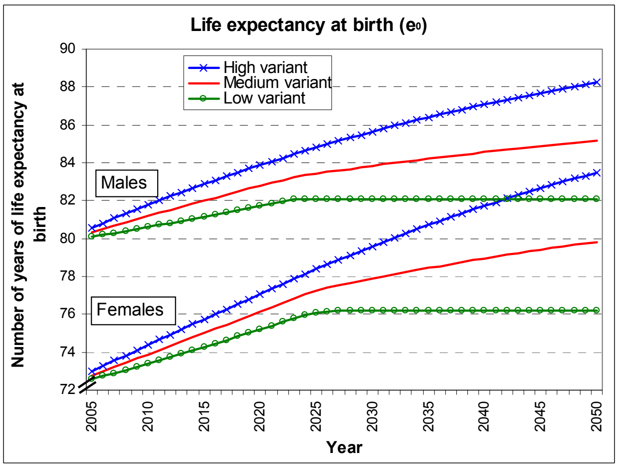
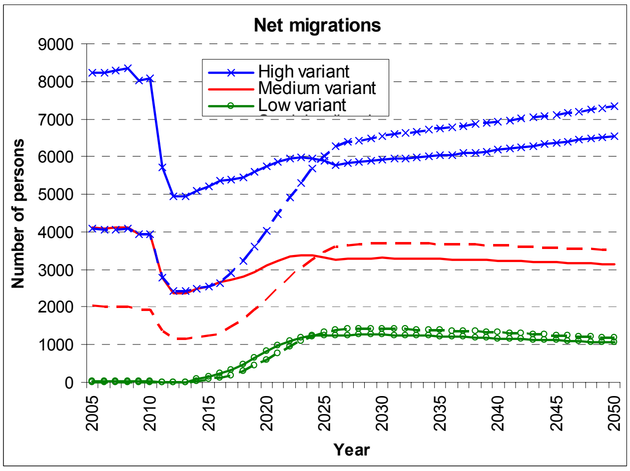


Figure 2: Demographic assumption: mortality



Note: A dashed line denotes values for females while a full line denotes values for males.

Figure 3: Demographic assumption: migration

The high (low) variant projects much higher (lower) number of inhabitants since it combines optimistic (pessimistic) assumptions regarding all three dimensions: fertility, mortality and net migration. Despite the big differences in those two variants compared to the medium variant, the share of people aged 65 years and over is very similar.

To achieve further information, two additional variants are simulated by rearranging the assumptions relating to fertility, mortality and net migration to obtain a range of extremes regarding the share of elderly people (65 years and over). In the ‘favourable’[2] variant we combine fertility and net migrations from the high variant with the mortality from the low variant, while in the ‘unfavourable’ variant we combine fertility and net migrations from the low variant and mortality from the high variant. However, even with the very optimistic combination of assumptions the projected share of people aged 65 years and over increases from the current 16% to 24% by 2050, while the pessimistic combination of assumptions even yields an increase to 38%.

	1. 1. 2005*	1. 1. 2010	1. 1. 2020	1. 1. 2030	1. 1. 2040	1. 1. 2050
Low variant	1,997,590	1,963,853	1,890,415	1,801,674	1,663,014	1,490,760
Aged 65 years and over (%)	15.3	16.7	20.8	25.8	29.4	32.7
Medium variant	1,997,590	2,014,802	2,016,694	2,005,999	1,965,314	1,900,839
Aged 65 years and over (%)	15.3	16.5	20.4	25.1	28.4	31.1
High variant	1,997,590	2,069,175	2,170,058	2,271,619	2,383,601	2,520,801
Aged 65 years and over (%)	15.3	16.3	19.7	23.8	26.5	28.0
'Favourable' variant	1,997,590	2,063,048	2,143,299	2,216,623	2,276,009	2,355,838
Aged 65 years and over (%)	15.3	16.1	19.0	22.4	23.7	23.9
'Unfavourable' variant	1,997,590	1,969,808	1,916,117	1,853,220	1,760,870	1,634,846
Aged 65 years and over (%)	15.3	16.9	21.6	27.4	32.6	37.7

* Actual number of inhabitants.

Table 1: Eurostat's demographic projections for Slovenia, published in 2005

Besides these assumptions, the age structure of the population also affects the results. The large baby-boom generations born after World War II are approaching their retirement. In the next decade these people are going to shift from employment to retirement status, rapidly expanding the share of the elderly population.

These processes are also reflected in Figure 4 where a population pyramid[3] graphically represents the projected demographic development of Slovenia. The pyramid in solid colour is for the year 2020, while the shades are outlines presenting demographic developments in the years 2005 to 2050. Shading in the lower age groups depicts the number of people in those age groups in the time period 2005-2019, while the shading in the higher age groups represents the number of people in those older cohorts for the projected period 2021-2050. The figure presents an intermediate stage (the situation in 2020) i.e. the 'emptying' of the number of people in lower age groups and the 'filling in' of higher age groups during the period of the projections.

Europe and many other countries around the world, especially developed ones, are also facing a similar process of population ageing so Slovenia is no exception in this regard. However, longevity in Slovenia is increasing relatively rapidly compared with other developed countries and fertility is among the lowest in the world and therefore the process is especially intensified.

3 Cohort-based model

The analysis used in this section derives from a cohort-based model which simulates pension expenditures for different cohorts. It is based on a pension profiles matrix, population matrix and a coefficient matrix.

The pension profile matrix includes average pensions by age. It builds on the situation from the base year (2006).

[3] The population pyramid is a graphical presentation of the population age structure in a presented year. On the vertical axis are age groups and on the horizontal axis is the number (sometimes the share) of the population (males on the left-hand side and females on the right-hand side) by those age groups.

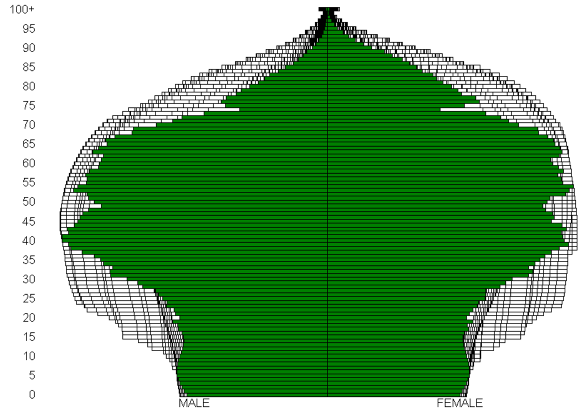


Figure 4: Population pyramid for projected Slovenian population in 2020

The population matrix is based on the Eurostat demographic projections presented earlier. Where a longer time span is required, we extend the medium variant of the projections. We thereby use the same data set and software as Eurostat, holding demographic assumptions at the level for 2050.

The coefficient matrix summarises the effects of the Pension and Disability Insurance Act introduced in 1999 (PDIA-1999) and gradually coming into effect after 2000. The PDIA-1999 will thus be fully effective in 2024. The transition period is taken into account along with further changes to the pension legislation from 2005. With detailed data about individuals retiring before introducing the PDIA-1999 we simulated the retirement behaviour, wage level etc. – amidst the new conditions.

Technically, the matrices have age (a) in their rows and calendar years (t) in their columns. The matrix of pension profiles (*PROF*) has the pension levels in its cells; the population matrix (P) has the number of people in its cells; and the coefficients matrix (C) contains the coefficients of adjustments. Pensions paid to individuals aged k in year t are thus calculated as:

$$PENS_{a,t} = PROF_{a,t} P_{a,t} C_{a,t} G_t \quad \text{(Eq. 1)}$$

where G contains coefficients of the cumulative growth of wages from the base year (in our case 2006) to time t. Namely, according to the Slovenian pension legislation the growth of pensions is fully indexed in line with the growth of wages (but in practice in the period up until 2024 pensions will grow more slowly due to certain provisions of the pension legislation which are captured by the coefficient matrix (C)). Pension expenditures in year t are calculated as the sum of projected pension expenditures by all age groups:

$$PENS_t = \sum_{a=0}^{D} PENS_{a,t} \qquad \text{(Eq. 2)}$$

where index a runs from 0 to D; with D denoting the maximum length of life (in our model it is the age group 100+).

This pension module is linked to the GDP module. Pension expenditures are namely expressed as a share of GDP. GDP growth is calculated as the sum of the labour productivity growth rate and the labour input growth rate. Further, the labour input growth is defined as the growth of employees in the 16–64 years age group. The same procedure is also used by the European Commission (Ageing Working Group) when projecting public expenditures related to the ageing population [5].

In our model various demographic projections thus affect public pension expenditures expressed as a share of GDP through the pension expenditures and GDP. Labour productivity growth enters into the calculations exogenously, neglecting any possible dependence on the number and age structure of the population (employees).

In our analysis we are interested in the effects on pension benefits of currently living cohorts on the assumption that the government caps pension spending at some point. Depending on the chosen ceiling level (cap) the extent of the pension cuts differs. Thus we calculate the reduction in pension benefits that representatives of different cohorts will receive in their remaining lifetime, i.e. the reduction of their *pension wealth*. For a detailed explanation of the pension wealth definition and empirical results, see, for example [2] and [7]. Technically, pension wealth is obtained by performing a diagonal aggregation of the expected pension benefits in the future, discounted back to the base year t_0 (in our case 2006).

$$PENS_a^W = \sum_{i=a}^{D} PENS_{i,t_0+i-a}(1+r)^{-(i-a)} \qquad \text{(Eq. 3)}$$

4 Projecting pension expenditures

Slovenia inherited a PAYG system from former Yugoslavia after gaining its independence in 1991. The transition to a market economy and loss of markets in other Yugoslav republics caused high unemployment and other labour-market problems. Mass early retirements in the early 1990s was used to mitigate them. Consequently, the share of pensions in GDP rose from 9.6% in 1989 to 14.4% in 1994. The Pension and Disability Insurance Act of 1992 (PDIA-1992) introduced a gradual increase in the retirement age and some other measures to cope with rapidly growing pension expenditures. In 1999 the share of pensions in GDP was 13.4% but the projections simulated a sharp increase in the future if no further measures are introduced.

In 1999 a new Pension and Disability Insurance Act (PDIA-1999) was adopted. It tightens retirement conditions and decreases benefits deriving from the mandatory pension system (for details, see [3] and [12]). The effects of this pension reform have been analysed by several researchers using different models, assumptions and partial simulations of the complex Slovenian pension system. However, all of them concluded that, despite the positive effects of the pension reform starting in 2000, further measures will be required in the future to maintain the system's long-term fiscal sustainability (see, for example, [3], [4], [13], [15] and [16]).

In the analysis we present results of the projections stemming from the cohort-based model, presented earlier in the text.

Apart from the methodology and assumptions described earlier, we applied assumptions about macroeconomic variables (like productivity growth, activity rates etc.) provided by the European Commission [5]. For linking employment rates with the retirement rates the sub-model of the *Institute of Macroeconomic Analysis and Development* [10] is used. Without going into further details about the assumptions and calculations in Figure 5 we present the results by different demographic variants. In the analysis we excluded some categories of pension expenditure which predominantly or exclusively have a social function (e.g., state pensions).

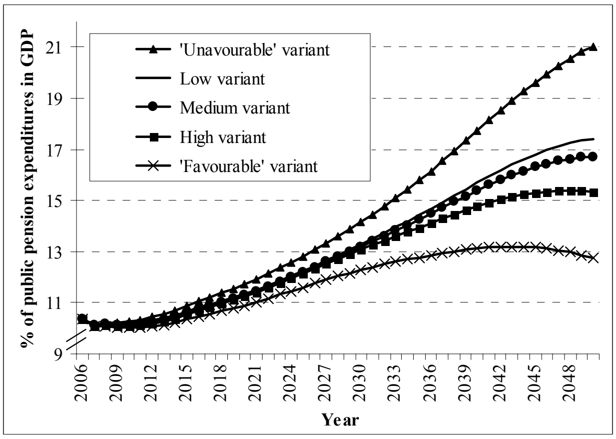


Figure 5: Projections of pension expenditures in GDP

It is projected that, without further measures in the next decade, demographic pressure of increased longevity and low fertility, further enhanced by baby-boom generations entering retirement is transmitted into public pension system.

5 Distributing the fiscal burden

One of the cornerstones of the Slovenian pension legislation is the principle of equal benefits for individuals with the same pension conditions, regardless of the time they retired. The first item in Article 151 of the latest PDIA (adjusted in 2005) explicitly states that upon the February[4] adjustment of the growth of pensions in line with the growth of wages an adjustment for existing pensioners relative to new pensioners is also taking place '… to assure equal rights for pensioners, who have retired at different time points'. That is to say, someone who will retire 10 years from now will have for the same retiring conditions the same net replacement rate[5] as someone who is already retired.

According to the current pension legislation, the replacement rate for people entering retirement is decreasing up until 2024, but the pension growth of existing pensioners will also lag behind the growth of wages to keep pace with the conditions for new pensioners. This arrangement suggests fairness in the light of growing questions about the positions of different generations to engage in the problems (or *challenges* if we employ the word used by politicians) of an ageing population. If we ignore payments and benefits into/from the public system that individuals faced in the past, it seems reasonable and fair to distribute future burdens equally across all generations. In the rest of the paper we contrast this view with the results of the cohort-based model.

With the model for each cohort we follow all taxes/benefits that it will pay/receive to/from the public finance system. In this paper we concentrate on public pension benefits only. We calculate pension wealth by cohorts by discounting projected future pensions to the base year, which in our case is 2006. The present value of future pensions is very sensitive to the assumed discount rate. A 5% discount rate was used. This value, for example, is also used as a default value in the generational accounting method for discounting future flows to the base year. However, since we do not analyse absolute values this effect is much smaller as we analyse the *relative* position regarding the present value of future pension benefits (by cohorts). The range from 2 to 7 percent has been tested without having a significant effect on the results and without altering the conclusions of the analysis.

Estimating the effects of the pension legislation on an individual's pension benefits is undertaken by following the parameters of the pension system and the life expectancy of the individual. For an individual with full pension conditions the scale of the projected net replacement rate is presented in Figure 6 – until 2008 there are actual values, thereafter followed by projected values.

On the other hand, a calculation at the cohort level has to take into consideration the heterogeneity of the cohort in terms of service years, the future mortality of the cohort members etc.

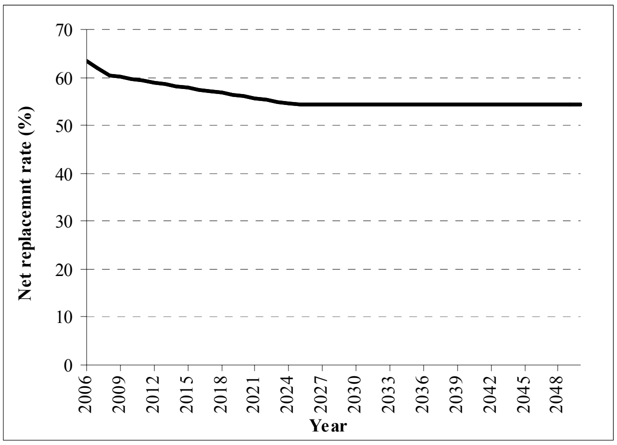


Figure 6: Net replacement rate (in %) for an individual with full pension conditions

We believe that the government will not allow an increase in pension expenditures as a share of GDP to the levels presented in Section 4. In the analysis we thus assume that at a certain point the government will limit any further rise in public pension expenditure. This could be done in various ways, among which we analyse the option of cutting pensions. We set the tolerated maximum share of pensions in GDP, alternatively, at rates of 11, 12, 13, 14 and 15 percent; i.e. we assume that after reaching this 'tolerated' maximum the government would cut all pensions simultaneously in order to achieve this goal. We concentrate only on medium variant of demographic projections.

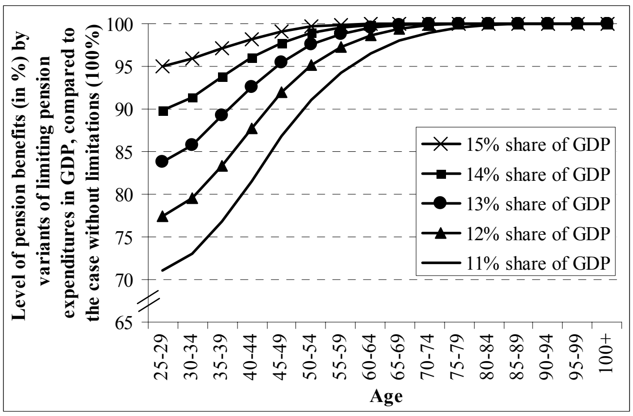


Figure 7: Reduction of pensions by age when limiting pension expenditure

Figure 7 compares: 1) the present values of pensions that representatives of a certain age group would receive in their remaining lifetime when limiting pension expenditure with 2) the case without limitations.

[4] The growth of pensions is adjusted in line with the growth of wages in February and in November.

[5] The net replacement rate for pensions is defined as a person's net pension divided by their net wage before retirement. This includes an assumption about non-extreme high or low values which are limited by maximum and minimum values etc.

	Limiting share of pensions in GDP to:				
Age	15%	14%	13%	12%	11%
20-24	94.7	89.4	83.5	77.1	70.7
25-29	95.0	89.8	83.8	77.5	71.1
30-34	95.9	91.4	85.8	79.5	73.0
35-39	97.2	93.8	89.2	83.3	76.8
40-44	98.2	96.0	92.6	87.8	81.5
45-49	99.1	97.8	95.5	92.0	86.8
50-54	99.6	98.9	97.6	95.1	91.1
55-59	99.9	99.6	98.8	97.2	94.3
60-64	100.0	99.9	99.5	98.6	96.6
65-69	100.0	100.0	99.8	99.4	98.0
70-74	100.0	100.0	100.0	99.8	99.0
75-79	100.0	100.0	100.0	99.9	99.6
80-84	100.0	100.0	100.0	100.0	99.9
85-89	100.0	100.0	100.0	100.0	100.0
90-94	100.0	100.0	100.0	100.0	100.0
95-99	100.0	100.0	100.0	100.0	100.0
100+	100.0	100.0	100.0	100.0	100.0

Table 2: Reduction of discounted pension benefits by age when limiting pension expenditure

Figure 7 and Table 2 should be read as follows: if the government were to limit pension expenditures in GDP to 15%, then a representative of the 20-24 years age group (i.e. being on average 22.5 years old) would receive in their remaining life time 94.7% of the amount of pension benefits (discounted to the base year) compared to their remaining lifetime had the government not posed such limitations. This cut would thus reduce the discounted value of expected pension benefits for a person aged 22.5 years by 5.3%. However, the same measure would reduce the discounted value of expected pension benefits of someone aged 52.5 years by just 0.4%.

The key factor driving this part of the results is the timing of a cut in pension benefits. According to the projections, the share of public pension expenditure exceeds the 15% limit in 2039. A cut in pensions would follow thereafter; therefore the 50-54 years cohort would be only slightly affected. It would namely collect pension benefits until then at an unchanged rate and only a few of them would still be living to collect benefits at the reduced rate. Further, people aged 80-84 years in 2006, for example, would not be affected at all since according to demographic projections none of them will still be alive in 2039. On the contrary, those aged 20-24 years in the base year would receive reduced pensions for their entire period when retired.

If the government were to decide on a much tougher limitation of public pension expenditure – e.g. to 11% of GDP, the effect would be much greater. The cutting of pensions would have to start already in 2018 so practically all cohorts except those aged 85 years and more would be affected. But the magnitude of the reduction for different cohorts would be very different. For those aged 70-74 years this measure would reduce the discounted value of their pension benefits collected in their remaining lifetime by only 1%, while for those aged 20-24 years the reduction would be 29.3%. This can be explained by virtue of the fact that at the beginning only minor pension reductions would be required to stay within the 11% limit. This cohort would thus not be strongly affected by this measure. On the other hand, when cohorts currently aged 20-24 years collect pension benefits, a strong cut of pensions will be required to stay within the 11% limit.

The results of the analysis reveal that the timing of measures for mitigating the pressure of an ageing population on pension expenditures decisively determines the distribution of burdens across different cohorts. It is evident that pensioners and people approaching retirement will prefer delaying measures in the form of cutting pensions as long as possible. Ideally for them, they should not be implemented while they are still alive. On the contrary, younger cohort/generations would prefer (or at least they should) prompt actions to distribute the burden over all generations instead of only turning the burden on to them.

These opposite aspirations are confronted in the political field since decisions are made by politicians who are elected by people with a right to vote. Positions in this intergenerational 'battle' are thus very unequal. Children do not have voting power; nor do generations that have still to be born, which is especially emphasised by the method of generational accounts (see, for example, [1]), have representatives in these 'negotiations'. On the contrary, there is a rapidly growing number of older people who have voting power and participate at elections over-proportionally (compared to those aged 18-30 years, for example) and who have very clear and unified criteria – the level of benefits they expect to receive from the government. 'In democracies, one-issue voters have a disproportionate impact on the political process, since they don't split their votes because of conflicting interests on other issues' [14]. Some authors see this as enormous issue in the future, employing expressions like 'war between generations' [8] and the 'coming generational storm' [9], while some of them even see this as a threat to democracy in the future [14].

6 Conclusions

According to population projections published by Eurostat in 2005, drastic demographic changes are forthcoming. The share of elderly people aged 65 years and over is expected to about double from the current 16% to about 31% by 2050 in Slovenia. Other European countries and many other countries around the world face the same process of rapid population ageing. In Slovenia it is especially emphasised because of the still rapidly increasing longevity and the very low fertility which is among the lowest in the world.

This strong demographic pressure will effect public systems, especially the public pension system which is the focus of this article. It includes simulations of future public pension expenditures as a share of GDP using the cohort-based model. The effects of the pension reform passed in 1999 are expected to almost neutralise demographic pressure during the next decade. Thereafter, the share would increase rapidly from about 11% to almost 17% in 2050 if no further measures are implemented. Our results are in line with earlier results using different models.

However, the message is not to postpone measures for a decade. On the contrary, the results speak in favour of acting in a timely fashion since the necessary measures will have to be more drastic if they are delayed. Further, as the analysis reveals there is a huge difference in distribution of the burden across cohorts depending on when the measures are implemented. In the pension legislation the proclaimed equity of replacement rates for pensioners retiring at different times thus does not mean equal burdens on all cohorts and generations.

Younger generations would prefer immediate action while older generations would benefit from delaying them for as long as possible. In this 'conflict' the older generations are in a much better position since they have voting power, they over-proportionally participate at elections and their political preferences are much more straightforward and therefore more powerful.

7 References

[1] Auerbach, A. J., Gokhale, J., Kotlikoff, L. J. (1991). *A Meaningful Alternative to Deficit Accounting*. Working Paper no. 3589. National Bureau of Economic Research.

[2] Brugiavini, K., Maser, A., Sundén, A. (2005). Measuring Pension Wealth. LWS Workshop "*Construction and Usage of Comparable Microdata on Wealth: The LWS*". Banca d'Italia, Perugia, Italy, 27–29 (January 2005).

[3] Čok, M., Sambt, J., Berk, A., Košak, M. (2008). Long-Term Sustainability of the Slovenian Pension System. *Economic and Business Review*, vol. 10, no. 4., forthcoming. University of Ljubljana, Faculty of Economics.

[4] European Commission (2006). The Impact of Ageing on Public Expenditure: Projections for the EU25 Member States on Pensions, Health Care, Long Term Care, Education and Unemployment Transfers (2004–2050). *European Economy,* Special report no. 1/2006. Office for Official Publications of the European Communities.

[5] European Commission (2006). The 2005 Projections of Age-Related Expenditure (2004–50) for the EU-25 Member States: Underlying Assumptions and Projection Methodologies. *European Economy,* Special report no. 4/2005. Office for Official Publications of the European Communities.

[6] Eurostat: Population projections. http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/popul/popula/proj/proj_trend/proj_tbp&language=en&product=EU_MAIN_TREE&root=EU_MAIN_TREE&scrollto=358

[7] Feldstein, M. (1974). Social Security, Induced Retirement, and Aggregate Capital Accumulation. *Journal of Political Economy*, vol. 82, no. 5, 905–926. The University of Chicago Press.

[8] Gokhale, J., Kotlikoff, J. L. (2001). *Is War Between Generations Inevitable?* NCPA Policy Report no. 246. National Center for Policy Analysis.

[9] Kotlikoff, J. L., Burns, S. (2004). *The Coming Generational Storm: What You Need to Know about America's Economic Future*. MIT Press.

[10] Kraigher, T. (2005). *Middle- and log term projection of demographic development of Slovenia and its socio-economic components* (in Slovene). Working Paper no. 10/2005, pp. 78. Insitute of Macroeconomic Analysis and Development.

[11] Malačič, J. (2000). The Balkan migration stream South-East to North-West. *Studi emigrazione*, vol. 37, no. 139, pp. 581–594. Centro Studi Emigrazione Roma.

[12] Pension and Disability Insurance Act (PDIA-1999), revised in 2005. http://www.uradni-list.si/_pdf/2005/Ur/u2005104.pdf

[13] Sambt, J. (2004). *Generational Accounts for Slovenia* (in Slovene). Master's thesis. University of Ljubljana, Faculty of Economics.

[14] Thurow, C. L. (1999). Generational Equity and the Birth of a Revolutionary Class. In the book: Williamson, B. J., Watts, M. D., Kingson, R. E.: *The Generational Equity Debate.* Columbia University Press.

[15] Verbič, M. (2007). Varying the Parameters of the Slovenian Pension System: an Analysis with an Overlapping-Generations General Equilibrium Model. *Post-Communist Economies*, vol. 19, no. 4, pp. 449–470. Routledge.

[16] Verbič, M., Majcen B., Van Nieuwkoop, R. (2006). Sustainability of the Slovenian Pension System: An Analysis with an Overlapping-Generations General Equilibrium Model. *Eastern European Economics*, vol. 44, no. 4, pp. 60–81. M.E. Sharpe Inc.