

INSTITUTE FOR DEMOCRACY AND ECONOMIC ANALYSIS

PENSION DEBT: THE BURDEN OF THE YOUNG

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Summary

This study analyzes the long-term prospects of the existing pension system in the Czech Republic from the perspective of the implicit pension debt and intergenerational redistribution and compares it with pension systems in Estonia, Hungary, Poland and Slovakia. Implicit pension debt expresses the extent to which future pension benefits are not covered by taxes – concretely, it is the difference between the discounted cash flows of the mandatory pension contributions and the future pension payments for each cohort.

In the Czech Republic, while the implicit debt is relatively small, intergenerational redistribution is high and young generations bear the brunt. On the other hand, countries with a better intergenerational redistribution ratio face higher deficits which will have to be financed by taxes, again borne by younger generations. From the perspective of the young generations, the study lays out a choice between two evils that can no longer be avoided – countries must either face a high implicit debt or significant intergenerational redistributions.

The implicit debts vary significantly among countries, ranging from 55 % of GDP in the Czech Republic and Estonia to 230 % in Poland. That the Czech pension system's implicit debt is comparatively low is due to its high contribution rate and relatively modest pension benefits paid through a well managed and integrated pension system. Raising the retirement age has a significant effect on decreasing the implicit pension debt, and it could nearly eliminate the implicit pension debt in the Czech Republic.

Because of the great degree of redistribution from younger to older generations in the Czech

Republic, the pension system levies a high hidden tax on younger generations. Young people will therefore receive back from the system much less than they contribute to it. A man born in 2008 may expect to pay into the system three times more than he will eventually get back in pension. For a woman the figure is two times more.

Young men will contribute more to the system than they will receive back in Estonia (335%), Hungary (296%) and Slovakia (183%) as well. Additionally, if the retirement age is raised again and the conditions for pension benefits are made stricter, the pension systems will become even more disadvantageous for young generations.

While the pension reform proposal discussed in the Czech parliament in May 2011, which increases the retirement age, would almost do away with the implicit debt of the Czech pension system, it would at the same time deepen intergenerational inequalities. The difference between contributions and pensions would reach 400% for men and 350% for women.

In the conclusion, the study suggests a reform of the Czech pension system through financing today's basic pension by higher consumption taxation. Unifying VAT rates at 21.3% would enable decreasing the contributions to the pension system by 5.5% of wages and thus supporting higher employment. Thanks to higher VAT payments, all generations would participate in the pension system costs, which would in turn reduce intergenerational redistribution. For the youngest cohorts, our reform would reduce by about a quarter the disparity between their pension contributions and their future pensions.

1. Introduction

The social security system – namely the pension system which is the largest part of social security – represents the dominant feature of the European economic model, compared to other world regions. Europe prides itself on its “quality of life” and “social safety net” that prevents most evident symptoms of poverty. At the same time, Europeans watch with despair the high and increasing cost of the social systems they have come to take for granted.

The Czech Republic is a standard European country in this respect. It provides a full set of social benefits to its citizens and levies high taxes to finance them. Despite being still relatively poor in the European context, the Czech Republic finances two major social programs – old-age pensions and health care – almost exclusively from the public funds. This arrangement, reflecting the country’s history as well as its observed social preferences, exposes the country to the aging effects that threaten to undermine the European welfare state all across the continent. The Czech authorities, it seems, are aware of these latent financial pressures and have adopted a series of reforms.

European social security systems are undergoing two parallel transitions that have both accelerated in the last decade. All European countries age, as their life expectancy improves and fertility stays well below the replacement rates. Moreover, during the last several years, the European welfare system has been exposed to a severe economic recession that bloated fiscal deficits in all European countries and forced six of the 27 EU members into some form of the official financial support program.¹ While the recent economic recession was the most severe since the Great Depression in the 1930’s, and it has increased public debt in most European countries by 20-30 percentage points, the demographic factors are much more powerful and longer lasting. European governments

face a difficult and urgent need to rebalance their budgets as quickly as possible, without endangering the fragile recovery, and to move further in their reform of the social security systems in order to guarantee their long-term sustainability.

Several governments, mostly in the new member states, have reacted to the acute fiscal pressures by cutting back on their recently established pension reforms. Slovakia made pension funds voluntary for all workers and the participation – and the public budget costs – fell promptly. Latvia withheld, perhaps temporarily, contributions to private pension funds and diverted them back to the unfunded public system in 2009. Bulgaria, Estonia, Lithuania and Poland followed in 2010, and the Hungarian government even nationalized accumulated pension assets in late 2010. These steps improve the short-term position of the respective countries, but they, at the same time, shift the burden of higher public pensions onto future generations, making their respective fiscal position even less sustainable than it was before.

The recent pension reform reversals underline a need for a more comprehensive set of fiscal sustainability indicators that would capture the long-term effects of fiscal policies and reforms. Several such indicators have been proposed but they have not been widely used yet². Indeed, several ambitious pension reforms have been hampered by the insistence of the European authorities on fully accounting for the reform short-term costs, but completely ignoring its long-term benefits. Similarly, private financial markets reacted positively to the Hungarian reform reversal, even though it has negative effects on the country’s fiscal sustainability.

This study provides estimates of the implicit debt of pension systems in five Central and Eastern European countries (the Czech Republic, Slovakia, Poland, Hungary,

Estonia).³ We compare the discounted cash flow of pension contributions paid by working generations under the current laws with the discounted value of future pension benefits as currently legislated. As the former is lower in all analyzed countries, we may define the implicit debt as the net present value of the unfunded obligations that the current pension system promises in the future but will not be able to finance. Estimates show that these unfunded liabilities are substantial despite the often dramatic pension reforms implemented in the last decade. Indeed, Hungary, Poland and Slovakia, which introduced a private pension pillar in the last decade, all appear to have more substantial implicit pension debt than the Czech Republic with its largely monolithic state pension system.

Our estimates highlight another important aspect of pension systems: in all the countries examined, the current pension rules heavily redistribute from the young to the old, or not so old. Hence, any pension reform should not aggravate the intergenerational redistribution by shielding retired or soon-to-retire generations from the pension reform costs, even though it is likely to be politically controversial. We suggest a pension reform along these lines for the Czech Republic.

When interpreting these results, it is important to keep in mind what this study does and what it does not do.

The pension debt captures exclusively the costs of the pension system and ignores other age-related expenditures, such as health care, which will contribute to the fiscal burden as the populations age.⁴

Our model uses consistent demographic data provided by the Eurostat and applies

formalized pension benefit formulas as to achieve comparable and consistent estimates of the implicit pension debt across several countries. While benefits in several countries are relatively easy to calculate, many countries use very intricate methods for determining pension benefits.⁵ Our formalization preserves the key features of the benefit formulas that drive the evolution of pension spending in response to demographic changes. It thus allows a big picture comparison across countries, at a cost of omitting certain details⁶ that may shift the estimate of the pension debt by several percentage points up or down.

Our calculations also explicitly assume that benefits will always be fully compensated for inflation and any growth in wages will be fully reflected in higher benefits. Also, we disregard wage growth⁷, so we implicitly assume that the current pension formulas will be fully adjusted for higher wages in the future. While this may be an overly general assumption, it allows us to estimate unfunded liabilities of pension systems as they are today, i.e. without second-guessing what authorities may or may not do over the next few decades.

The rest of the study is organized as follows. After a brief overview of the concept of implicit pension debt, we review current pension reforms in the new member countries of the EU. The fourth section discusses the model and the data sources. Results are presented in the fifth section. The sixth section offers our own alternative of the Czech pension reform that would both target the implicit debt and also reduce the current massive inter-generational redistribution. In the seventh section we discuss the pensions reform proposal currently discussed by the Czech parliament.

2. Measuring the Unfunded Obligations

Economic literature became interested in the concept of unfounded pension obligations in the 1980's when the public deficits in both Europe and the US swelled and pension expenditure took a prominent place in the public budgets. The foundation was laid out in the seminal paper by Feldstein in 1974 who defined "social security wealth" as the net present value of future payments to and benefits from the social security system. In 1994 Auerbach, Gokhale and Kotlikoff then built a more comprehensive framework known as generational accounting, allowing Holzmann to define and estimate the pension system implicit debt in 2001.⁸

The concept of implicit pension debt has been gradually incorporated into the European Union's documents. The European Commission referred to "implicit liabilities related to ageing" in its amendments of the EU's Stability and Growth Pact.⁹ After a long and often controversial discussion, the European Commission agreed to exclude (for a few years) from its definition of public deficit the costs of a pension reform that reduces long-term liabilities, as was argued by several scholars/analysts, namely by Boeri and Tabellini who analyzed the Italian pension reform introducing the NDC system.¹⁰

The European Commission publishes a regular Ageing Report¹¹ that takes at least a 50-year horizon in assessing current economic policies in age-related areas, namely in pension systems, health care and in education systems. Similarly, "Economic and Budgetary Projections" and the "Sustainability Report"¹² provide long-term estimates of current economic policies. These reports have been arguing for a comprehensive overhaul of the European welfare states for several years, positing that the costs will become unsustainable as the European populations age. Private market participants have been

slower in grasping the implicit debt concept, but recently Moody's and several international banks¹³ have operated with an implicit debt in their assessment of fiscal policy sustainability.

In the Central European context, the implicit pension debt was first estimated by Gomulka in 2000 who estimated the pension debt in Hungary, Poland and Romania to be between 200 and 400 % of their respective GDPs, depending on assumptions about interest rates. In an accompanying paper in 2000, Schneider estimated the implicit debt of the Czech pension system at 200-320 % of GDP, depending on the macroeconomic assumptions.

Table 1 shows the long-term effects of the ageing process in Europe on government spending as estimated by the European Commission in 2009. It shows that between 2007 and 2060, the average annual expenditures on pensions will rise by 2.4 % of GDP in the EU27. The increase should differ substantially among the EU member countries. Countries that reformed their pension systems, especially Estonia, Italy, Latvia or Poland, should see their public pension expenditures to decline as a share of the GDP. Other members, most notably Spain, Romania, Slovenia, Ireland, and Luxembourg are likely to come under severe pressure as their pension outlays rise by more than 6 percentage points of GDP between 2007 and 2060. The effects of ageing on public spending on health care are more uniform across the EU members, raising expected expenditures by 1/2 - 3 % of GDP for most countries. A small reduction in education expenditures (by 0-1 % of GDP) is unable to counter the large and negative effect of ageing on public budgets of the EU member countries.

Table 1
Age-Related Government Expenditures in 2007 and 2060 (% of GDP)

	Pension		Health care		Long-term care		Education	
	Level	Change	Level	Change	Level	Change	Level	Change
	2007	2007-2060	2007	2007-2060	2007	2007-2060	2007	2007-2060
BE	10.0	4.8	7.6	1.2	1.5	1.4	5.5	0.0
BG	8.3	3.0	4.7	0.7	0.2	0.2	3.3	-0.2
CZ	7.8	3.3	6.2	2.2	0.2	0.4	3.5	-0.3
DK	9.1	0.1	5.9	1.0	1.7	1.5	7.1	0.2
DE	10.4	2.3	7.4	1.8	0.9	1.4	3.9	-0.4
EE	5.6	-0.7	4.9	1.2	0.1	0.1	3.7	-0.2
IE	5.2	6.1	5.8	1.8	0.8	1.3	4.5	-0.3
EL	11.7	12.4	5.0	1.4	1.4	2.2	3.7	0.0
ES	8.4	6.7	5.5	1.6	0.5	0.9	3.5	0.1
FR	13.0	1.0	8.1	1.2	1.4	0.8	4.7	0.0
IT	14.0	-0.4	5.9	1.1	1.7	1.3	4.1	-0.3
LV	5.4	-0.4	3.5	0.6	0.4	0.5	3.7	-0.3
LT	6.8	4.6	4.5	1.1	0.5	0.6	4.0	-0.9
LU	8.7	15.2	5.8	1.2	1.4	2.0	3.8	-0.5
HU	10.9	3.0	5.8	1.3	0.3	0.4	4.4	-0.4
NL	6.6	4.0	4.8	1.0	3.4	4.7	4.6	-0.2
AT	12.8	0.9	6.5	1.5	1.3	1.2	4.8	-0.5
PL	11.6	-2.8	4.0	1.0	0.4	0.7	4.4	-1.2
PT	11.4	2.1	7.2	1.9	0.1	0.1	4.6	-0.3
RO	6.6	9.2	3.5	1.4	0.0	0.0	2.8	-0.5
SI	9.9	8.8	6.6	1.9	1.1	1.8	5.1	0.4
SK	6.8	3.4	5.0	2.3	0.2	0.4	3.1	-0.8
FI	10.0	3.3	5.5	1.0	1.8	2.6	5.7	-0.3
SE	9.5	-0.1	7.2	0.8	3.5	2.3	6.0	-0.3
UK	6.6	2.7	7.5	1.9	0.8	0.5	3.8	-0.1
EU27	10.2	2.4	6.7	1.5	1.2	1.1	4.3	-0.2
EU15	10.2	2.4	6.9	1.5	1.3	1.2	4.3	-0.1
EU10	9.7	1.0	4.9	1.4	0.4	0.6	4.2	-0.8

Source: European Commission – Ageing Report: Economic and budgetary projections for the EU-27 member states”. European Economy (2009)

3. Pension Systems in the EU10 and recent reform reversals

Focusing on the pension systems, the European Union 27 member countries spent 10.2 % of their GDP on public pensions on average with Italy spending as much as 14 %. The EU10¹⁴ countries reacted very differently to the pension challenge in the 1990's. Some enacted bold reforms, earlier seen only in Latin America; other relied on parametric changes of their pension systems. Hungary and then Poland reformed their respective pension systems introducing a funded pillar, based on partially mandatory savings in the late 1990's. Following the relative success of these two reformers, other countries followed suit and by 2006, eight of the EU10 have implemented pension reform based on partial privatization. Estonia and Latvia followed with their reforms in 2001 and 2002 respectively. Most recent reforms were adopted in Bulgaria (2002), Lithuania (2004), Slovakia (2005) and Romania (2008) – see Table 2.¹⁵ Slovenia and the Czech Republic adjusted their pension systems as well, but kept the dominant pay-as-you-go pillar largely intact.

The different approach to pension reform has transformed into different outcomes. For example, public pension expenditures were set to remain stable in Estonia at about 6% of GDP, and they should fall in Poland from 12% of GDP in 2007 to the still high 9% in 2060, as private pension funds would top-up the public pension with a substantial private pension.¹⁶ On the other hand, pension expenditures are set to rise to 18% of GDP in Slovenia. Hungary then demonstrates that an imperfect pension reform complemented by government inconsistency and political maneuvering may even exacerbate the long-term outlook – see Table 1.

Several countries backtracked on their pension reforms during the 2008-2011 financial crisis. First Latvia, engulfed in a dramatic economic recession, reduced contributions rates to its newly established pension funds from 6 to 2 % of wages. Lithuania followed soon with the same reduction and Estonia even (temporarily) froze all of its 6 % transfers to private pension funds. Romania capped contributions to pension funds at 2 % and Bulgaria decided to stop transfers to its occupational pension funds for four years (there are also general pension funds that seem to be unaffected as of now).

The most significant pension reform reversals took place in Poland and in Hungary. The Polish pension reform of 1999, touted as the most successful among the EU10, has been attacked by the centre-right government in 2011 and the transfers to pension funds were reduced from 7.3 % of wages to 2.5 %. Hungary decided to dismantle its private pension system altogether, by forcing people back into the state run (and severely underfinanced) pension system, nationalizing their accumulated assets in the process. The government first cancelled transfers to private pension funds, quoting budgetary concerns, and allowed voluntary return to the state, pay-as-you-go system. Then it threatened to nullify most of the pension contributions to the state system by those staying with the private funds. As a result, roughly 97 % of the private pension fund assets were shifted to the state-run fund by the January 2011 deadline, boosting government revenues by 10.2 % of GDP.

Table 2
Pension reforms in the EU10

Country	Reform started	Total pension contribution (% of wages)	Contribution to the funded pillar (% of wages)	Reform reversal in 2009 – 2011
Czech Republic	n.a.	28	0	n.a.
Estonia	2002	22	6	Yes
Latvia	2001	20	2	Yes
Lithuania	2004	26	5.5	Yes
Hungary	1998-2010	26.5	8	Yes, reform dismantled
Poland	1999-2011	32.52	7.3	Yes, contributions to second pillar decreased to 2.3%
Slovenia	n.a.	24.35	0	n.a.
Slovakia	2005	24	9	No
Bulgaria	2002	18%	5	Yes
Romania	2008	31.3%	2.5	No

Source: OECD Global Pension Statistics, European Commission (2010), national reports. (Annexes to the Interim EPC-SPC Joint Report on Pensions, May 2010)

4. Data and model

We provide estimates of the implicit pension debt for five European countries using a consistent data set and the same algorithm, albeit adjusted for specific pension system details in respective countries.¹⁷ We restrict our model to populations as of 2008, the year for which the most recent Eurostat data are available. By doing so, we take the snapshot of the pension systems as they were in 2008 and what transfers to and from pension systems were legislated at that moment for all citizens of these respective countries. While the

infinite projection horizon might be preferable,¹⁸ we do not attempt to include future new-born (or immigrated) citizens to our discussion and we also ignore the past contributions to the system, as there are no reserves that could be used against the future expenditures.

For each cohort, we construct a sex-specific wage profile according to which wages evolve from year to year. Using the data from Eurostat, we know the number of males and females in each cohort and

Table 3
Implicit Pension Debt (*% of the current GDP*)

Country	Men (PAYG)	Women(PAYG)	Men (Reformed)	Women (Reformed)	Total
Czech Republic	6.1	49.2	n.a.	n.a.	55.3
Estonia	23.1	33.8	-1.9	1.0	56.0
Hungary	0.7	110.0	n.a.	n.a.	110.7
Poland	59.5	161.0	8.6	5.1	234.2
Slovakia	43.0	62.4	-14.7	-3.5	87.2

age group that are working and hence contributing to the pension system, after adjusting for economic non-activity. The product of the wage, number of workers in each cohort, and pension contributions determined by national legislations gives the total contributions by each cohort to the pension system.

Then we calculate the pension received by each cohort upon retirement using the legal retirement age according to the pension benefit formulas for each country formalized for our purposes – see Appendix A for a more comprehensive discussion of our approach.

5. Modeling results

Our results generally confirm earlier studies that identified large and persistent implicit debts in all European countries. As Table 3 shows, Poland has the highest pension debt among the Central European countries, with its total unfunded liabilities equaling almost 235 % of Polish GDP, despite the 1999 reform. The Hungarian and Slovak implicit debts are much lower, close to 100 % of GDP.¹⁹ The pension systems in Estonia and the Czech Republic appear to be the most frugal – their debt only slightly exceeds 50 % of the respective countries' GDP.²⁰

Once the initial pension is determined, we can calculate the net present value of all pensions paid to that cohort, as we have a demographic estimate of the remaining lifetime, specific for both sexes, provided by Eurostat.

Pension debt is then calculated as the difference between the (positive) value of the future pension payments and the (negative) value of the contributions, so a positive outcome signifies an implicit pension debt. The debt is discounted using a 2 % discount rate to estimate its value in today's terms and compared to the nominal GDP as to get an estimate of the implicit pension debt.

All countries in our sample treat women pensioners more leniently than men: while the implicit debt associated with the male part of the population varies from nil to 60 % of GDP, for women it is as high as 160 % of GDP in Poland. The discrepancy is most evident in Hungary and Poland, where the implicit debt generated by women is by 100 % of GDP higher than the one generated by men. The higher implicit debt associated with women is largely a demographic phenomenon – life expectancy of women born in 2008 is 7-8 years longer than of men born in

Table 4
Ratio Contributions/NPV Pension Benefits for Selected Cohorts, PAYG only
(percent)

Country	Men Born 2008	Women Born 2008	Men Born 1975	Women Born 1975
Czech Republic	297.0%	202.8%	205.6%	125.2%
Estonia	334.9%	74.5%	285.5%	54.2%
Hungary	296.0%	161.1%	191.1%	109.3%
Poland	100.0%	100.0%	184.9%	60.0%
Slovakia	183.4%	109.5%	141.5%	89.3%

the same year. Poland, moreover, keeps an old tradition of a lower retirement age for women. Our results also indicated that the implicit pension debt seems to be unassociated with the three-pillar pension system, which is generally introduced in pension reforms.

Table 3 shows the implicit debt for people staying exclusively in the state run pay-as-you-go systems (entire population of the Czech Republic and Hungary, older workers in Estonia, Poland and Slovakia). The three remaining reformers – Estonia, Slovakia and Poland - have introduced private pension funds, but they also maintain a pay-as-you-go pension system, albeit reduced and reformed. The second part of Table 3 shows that these reformed systems generate either very low debts, or should be even in surplus. This phenomenon is caused by extending the retirement age for younger workers and also by reducing their future pension benefits more than proportionally with the reduction in pension contributions.

Table 3 shows that the reformed Polish system has a debt four times higher than the unreformed Czech system or the reformed Estonian system. That is due to Poland's generous treatment of women who can retire at the age of 60 year and on average spend as long as 20 years in retirement, compared to 14

years in Estonia and the Czech Republic. Men in Poland do not get such a good deal, retiring at 65 and spending 7 years in retirement, little less than the Slovaks, but longer than the Czechs and Hungarians.

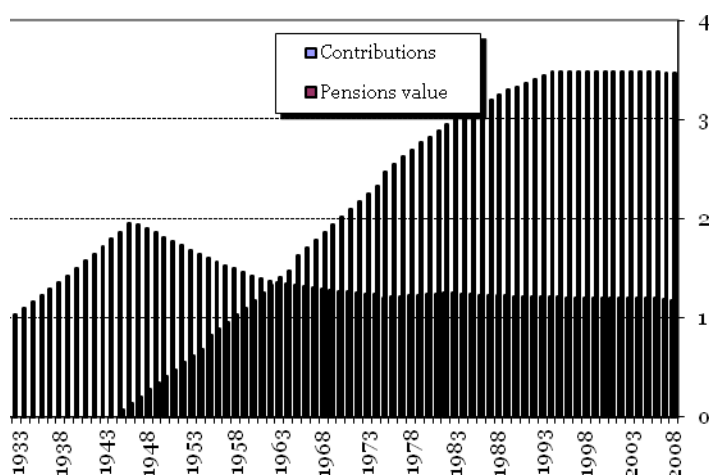
Younger cohorts – those entering labor market now or in the future - do contribute more to the system than they may hope to receive from it, even if we assume that the rules will not change (Table 4). Given the huge implicit debt and frequently a substantial explicit debt of many European countries, it is more than likely that the rules will change for worse and the future cohorts will pay more to the system and/or will receive smaller benefits, further depressing their “return on investment” in the state pension system. The share of pension contributions to pension benefits measures the implicit tax that the system imposes on younger generations.²¹

In order to assess the sensitivity of pension systems to changing lifetime expectancy, we simulated the effects of a one year extension of the (existing) official retirement age. The results are summarized in Table 5. The implicit debt in all four countries was reduced significantly when all workers retire

Table 5
Effects of One-Year Extension of the Retirement Age (% of GDP)

Country	Men (PAYG)	Women(PAYG)	Men (Reformed)	Women (Reformed)	Total
Czech Republic	-19.4	-13.0	n.a.	n.a.	-32.9
Hungary	-16.8	-16.3	n.a.	n.a.	-33.1
Poland	-16.5	-17.2	nil	nil	-33.7
Slovakia	-12.7	-8.8	-1.9	-1.7	-25.1

Chart 1
Net present value of pension contributions and benefits for the Czech males born 2008-1933 (CZK million)



one year later. The effect seems to be rather uniform across the countries: the implicit debt decreases by 25-34% of GDP, as each year of not paying pensions represents a large debt reduction. Increasing the retirement age is thus a powerful instrument to reduce the implicit debt. It is, however, limited by labor

markets (in)flexibility: we assume that the effective retirement age rises in line with the official retirement age, which requires very flexible and dynamic labor markets that will be able to accommodate higher labor supply. As shown by Galuscak in 2001, this is not necessarily the case.

6. How to Reform the Czech Pension System?

The discussion of our results in the previous section shows that the Czech pension system is one of the least indebted in Central Europe. It is, by the same token, one of the most inter-generationally redistributive: young workers may hope to recover only one third (males) or one half (females) of their high contributions to the pension system – see Chart 1 which shows (in nominal terms) the total sum of contributions to the pension system by cohorts and the net pension value of the same cohort.

There are several ways how to alleviate this high redistribution, and reduce at least part of the implicit pension debt. Older generations, however, have their pension rights already accrued, so their pensions are difficult to change.²² A pension reform that targets older generations' contributions may shift a part of pension financing from the current PAYG system onto a general taxation system, namely onto indirect taxes – VAT or excise taxes. By raising VAT rates, the government taxes consumption of all citizens, including the retired generations. However, in most cases, pensioners are protected against increases in price levels by indexation of their pensions. Unless explicitly excluded from indexation – a politically high impossible task – higher VAT rates would reduce pensions of cohorts in pre-retirement age, as their pensions would be determined by their wages.

Below, we compare two versions of a pension reform including VAT rate increases that keep the implicit debt of the Czech pension system unchanged. In both, we assume shifting costs of the current basic pensions – roughly CZK 60 billion – off the pension contributions and onto the general taxation system. Computations based on IDEA's previous work on tax changes suggest that raising CZK 60 billion would require unifying the current VAT rates at 20.3%.²³ Such an

increase would raise the price level by 3%. In the first version we assume, for the sake of argument, that pensioners would not be compensated for this price increase, so the real level of pensions would fall by 3%. As this is highly unlikely, we add another reform in which VAT is unified at 21.3%, as to raise enough funds to generate the CZK 60 billion needed to finance basic pensions and further CZK 10 billion to compensate pensioners for higher prices.

In both versions, the remaining pension system costs – roughly CZK 240 billion, i.e. 6.5 % of GDP – would be financed by social security contributions, rates of which could be cut by 5.5 %, spurring demand for labor and potentially compensating a part of the loss in revenues.²⁴ The average pension financed from the pension contributions would be reduced to CZK 7,250 monthly. Together with the basic pension, the average pensions would remain broadly unchanged at CZK 9,500, i.e. some 41 % of the average net wage.²⁵

The lower pension contributions rate reduces the net present value of accumulated pension contributions over the lifetime of the 2008 cohort by some 13%, while higher VAT payments would represent an additional transfer to the pension system, equal to 3% of the lifetime earnings. The higher VAT burden, however, is not distributed equally across all cohorts. For older people, the effects of the VAT hike are less pronounced, as they have a shorter remaining life-span. All the same, lower pension contributions reduce the gap between the net present value of contributions and future pensions to roughly 220% for men born in 2008 (from 300% in the current system) and to 150% for women born in 2008 (from roughly 200% in the current system).

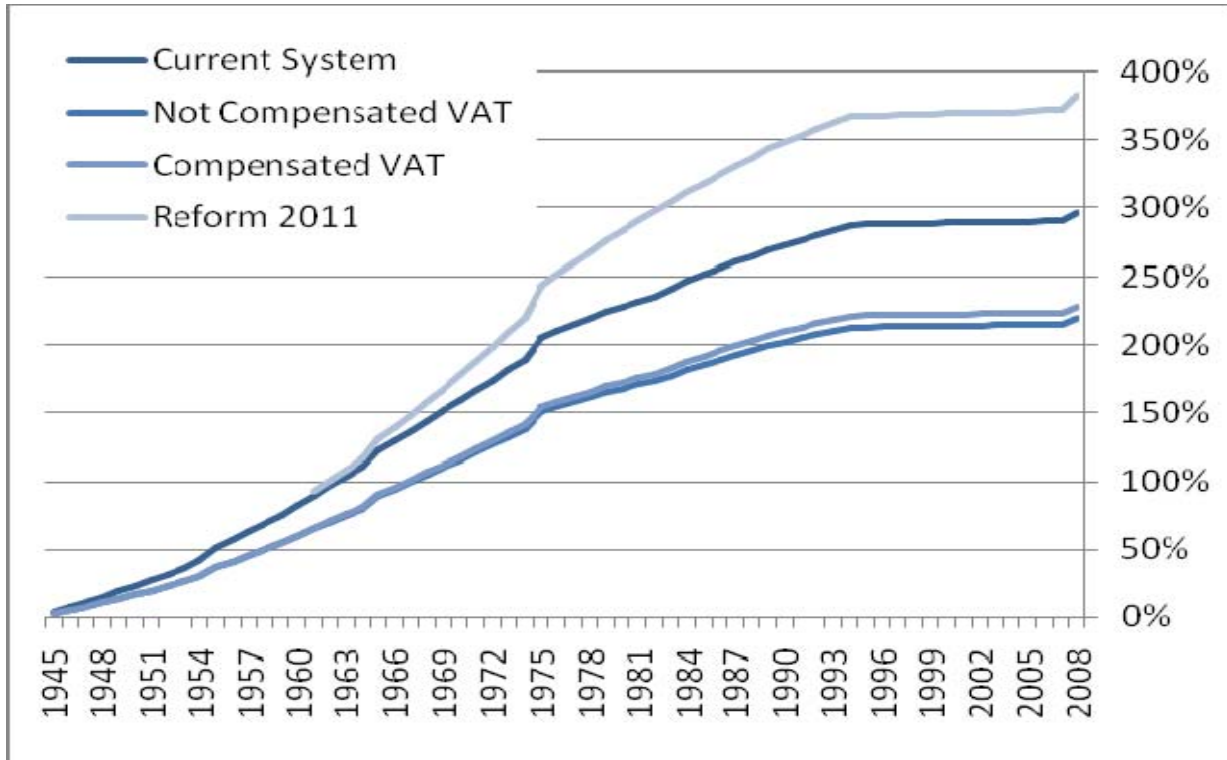
Were the pensioners compensated for higher prices, the effects of the pension reform would

be even less dramatic. The VAT rate would need to be set at 21.3%, increasing prices by 3.8%, according to the IDEA

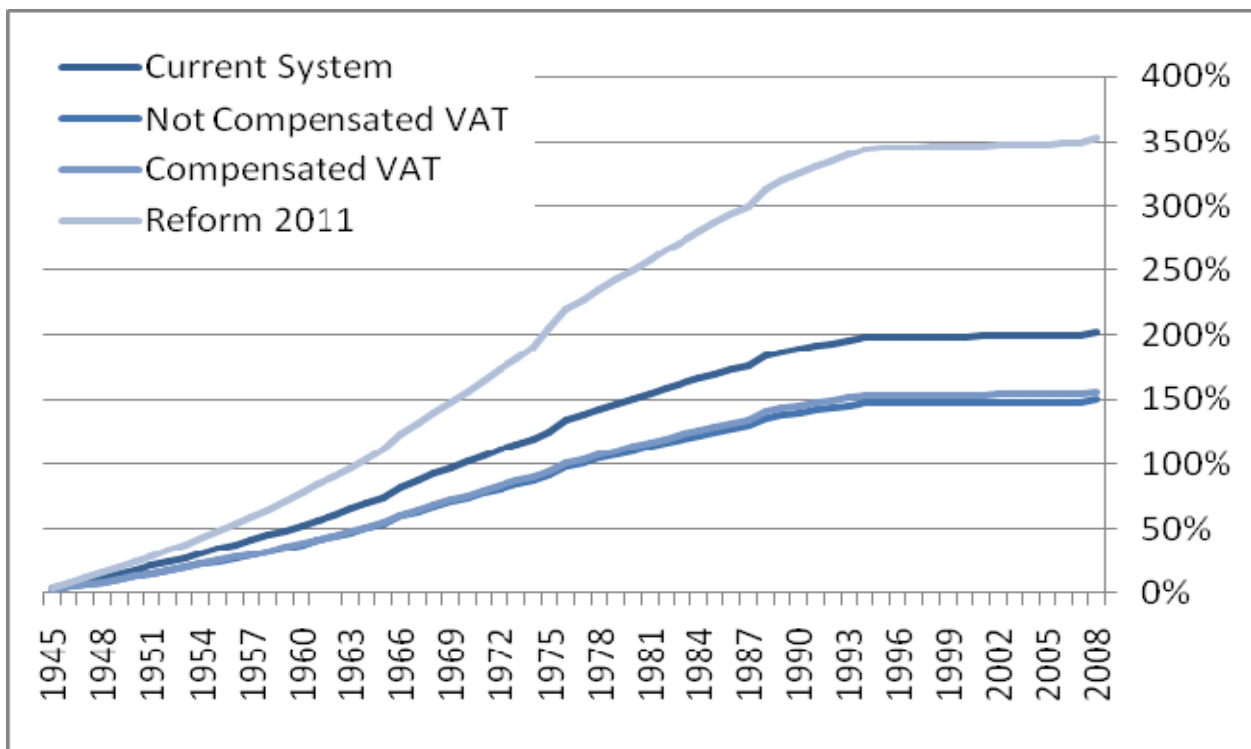
Chart 2

Ratio of pension contributions to pension benefits for 2008-1955 cohorts

Males



Females



model, and raising the lifetime transfers to the pension system by the same amount. The gap between contributions and pensions would decrease less, to roughly 230% for men and to 156% for women born in 2008.

Chart 2 compares both reform alternatives with the current system (and with a 2011 reform that is discussed below). The ratio of pension contributions to pension benefits decreases in both scenarios for both sexes, decrease is slightly more pronounced for men

7. Reform 2011

The Czech government plans to implement a “small” pension reform that would change the pension benefits formula, increase the retirement age and remove the government discretion over pension indexation. The reform reacts to the Constitutional Court’s decision to abolish the existing pension system as excessively “redistributive”. The government plans to change the pension benefit formula so that wages above CZK 11,000 are reflected in the pension benefit formula with a factor of 26% instead of the existing formula that takes 30% of wages in the interval CZK 11,000-28,200 and only 10% of wages above this level (wages below CZK 11,000 are reflected fully). The reform would also extend the retirement age further, to 65 years for both sexes in 2041. After 2041, the retirement age would be increased by 2 months each year, without the final limit. The pension would be indexed to inflation plus one third or the real wage growth automatically, i.e. the government should not manipulate pension indexation as it has been typical in pre-election years.²⁶

who benefit more from lower pension contributions during their working career. The ratio, nevertheless remains above unity for all cohorts born later than 1977 (women) and 1968 (men). The effects of a “compensated VAT reform” whereby existing pensioners are protected by a full indexation of higher prices are slightly lower than of an “uncompensated reform” where higher prices are ignored, so the existing pensioners participate in the implicit debt redistribution.

The reform effects are far reaching. First, it slightly reduces (by 3-4%) the average pension. More significantly, it massively reduces the net present value of pension benefits that cohorts born after 1976 will qualify for when they retire. For a man born in 2008 earning an average wage of his respective age cohort throughout his working career, the net present value of pension benefits will be reduced by 22%. For a man born 1990, the reduction is 20% and for a man born in 1975 it is 15%. Reduction of the pension benefits’ net present value is even more dramatic for women as they spend more time in retirement. The new pension system would reduce the net present value of their pension benefits by 40-45%, depending on age. The ratio of pension contributions to benefits would rise to as high as 382.7% for men and 353.7% for women born in 2008 (Table 6). Chart 2 shows effects of the reform on all cohorts – see the *Reform 2011* line.

Table 6
Ratio Contributions/NPV Pension Benefits for Selected Cohorts

Country	Men Born 2008	Women Born 2008	Men Born 1975	Women Born 1975
Czech Republic current system	297.0%	202.8%	205.6%	125.2%
Czech Republic after 2011 reform	382.7%	353.7%	243.1%	204.9%

Table 7
Implicit Pension Debt: Current System and proposed Reform (percent of GDP)

Country	Men (PAYG)	Women(PAYG)	Total
Czech Republic, current system	6.1	49.2	55.3
Czech Republic after 2011 reform	-3.2	13.3	10.1

The proposed pension reform would also all but eliminate the implicit pension debt: the longer contribution and shorter retirement periods would reduce the net present value of pension benefits and increase the contributions to the system. As Table 7 shows,

the implicit debt would fall to 10% of the Czech GDP. Given the long-term nature of projections and uncertainty about future developments, such a low debt would be best treated with benign neglect.

8. Conclusions

In all the analyzed countries, implicit pension debt is high, ranging from 55% of GDP in the Czech Republic to 230% in Poland. This is most the result of the demographic shock that these countries are just beginning to encounter. High implicit debts could be reduced, as several countries have demonstrated, by rising the retirement age, tightening social security contributions' collection or by reducing future value of pension benefits by switching to price indexation. For example, our simulations show that by rising the retirement age by one

year for men and women, central European countries would reduce their implicit pension debts by 25-33% of GDP.

However, all these measures target mostly younger generations and further aggravate the already ineffective ratio of contributions to future pensions for young generations. Czech men, born between 1980 and 2008, pay more than three times as much as the pension benefits the system currently promises them. This share is similar in Hungary and even higher in Estonia, where relatively low life expectancy of men and high retirement age

cut the expected time spent in retirement by Estonia men born in the 1980's to 5-6 years. Their counterparts in Slovakia may expect to spend twice as long in retirement, provided, though, that their government will not raise the retirement age again.

To reduce the intergenerational disequilibrium, the recent pensioners would need to share at least a small part of the pension debt, and so would those approaching retirement – a politically almost impossible alternative. We examined two reforms of the Czech pension system that would increase VAT rates to finance a fixed part of pensions and showed that while the reform would

maintain the implicit debt level unchanged, it would reduce the gap between pension contributions and pension benefits for youngest cohorts of Czech workers significantly.

We also examined the recent reform proposal that is being discussed in the Czech parliament and we showed that by increasing the retirement age for today's young cohorts, it further reduces the net present value of pension benefits young generations will qualify for. The ratio of contributions to benefits would rise to almost 400% for Czech men born in 2008 and to 350% for women born that year.

Appendix A: Methodology

Our estimates of the implicit pension debt extend the methodology proposed by Holzmann et al. and used by Gomulka and Schneider.

We provide estimates of the implicit pension debt for several European countries using a consistent data set and the same algorithm, albeit adjusted for specific pension system details in respective countries. We restrict our model to populations as of 2008, the year for which Eurostat data are available. By doing so, we take the snapshot of the pension systems as they were in 2008 and what transfers to and from pension systems were legislated at that moment for all citizens of these respective countries. While the infinite projection horizon might be preferable, we do not attempt to include future new-born (or immigrated) citizens to our discussion and we also ignore the past contributions to the system, as there are no reserves that could be used against the future expenditures.

Initial wage distribution across cohorts was imputed from Eurostat and wherever possible further specified by country sources. Throughout the model simulations, we assume zero inflation and we also disregard future aggregate wage growth. We allow cohort's wages to change in line with an age profile, but the aggregate wages in a given country remain unchanged. While this is clearly unrealistic, we believe that it allows us to better estimate the current pension debt, as we can use the current pension benefit formula for determining pensions in the future. By ignoring wage growth, we make an implicit assumption that future governments will adjust pension benefits in line with wage growth. While this may overestimate the future benefits (several countries officially use price indexation only), governments have tended to increase benefits in line with wages, at least for newly retired pensioners.

To estimate the implicit debt, we first calculate the cash flow of pension contributions using the current contribution rate and the wage profile in a given country. Using the data from Eurostat, we adjust the raw demographic data for non-activity and calculate each cohort's contributions to the pension system. As we analyze public pension systems based on the pay-as-you-go principle, contributions are not invested and we can ignore a discount factor to calculate the present value of all contributions. The net present value of future pensions, however, is estimated using the internal interest rate of 2 %, as to capture the time factor: pensions do not need to be paid at once.

The key factor in our model is the pension benefit formula. European countries employ maddeningly different formulas in determining their pensions, but we strive to capture the most relevant aspects of the respective formula. Poland and Slovakia, for example, use pension "point" or "base" that is given in absolute terms and to a large extent determines the pension benefits.²⁷ For the Czech pension determination, we used rules that applied in 2008 and set pension to be equal CZK 2230 per month plus 1.5 % of the pensionable wage for every year of service (above a limit). The pensionable wage itself is a product of the taxed wage where lower wages are reflected in full, with steep discounts applied to higher wages. The recent reform, provoked by the Constitutional Court's decision to declare the pension system unconstitutionally egalitarian and not yet legislated at the time of writing this paper, would simplify this formula only marginally.

Once the initial pension is determined, we can calculate the net present value of all pensions paid to that cohort, as we have a demographic estimate of the remaining lifetime provided by Eurostat.

$$Pension\ Debt = \left(\sum_{i=18}^{ret} w_i ContributionRate (1+t)^{i-17} \right) - \left(\sum_{i=1}^{80} NPV_i \left(\sum_{t=ret}^{80} Pension_{i,t} \right) \right)$$

Pension debt is then estimated by comparing the (positive) value of the future pension payments with the (negative) value of the contributions, so a positive outcome signifies an implicit pension debt. It is expressed in the percentage of current GDP.

The methodology has, admittedly, several limitations. We focus exclusively on pension system costs and ignore other age-related expenditures, as health care or education (see European Commission Aging Report, 2009). We also use harmonized demographic projections published by the Eurostat that may differ from more specific national projections. The most significant contribution of this paper, and potentially its largest flaw, is our formalization of complex pension benefits formulas in each European country. While benefits in several countries are relatively easy to calculate, many countries use very intricate methods for determining pension benefit – see above.

Once calculated, we keep pension benefits unchanged throughout the remaining life-span of each participant: our model is void of any price changes. In other words, we estimate implicit pension debt as it is now (using the most recent benefit formulas available) and assume that any future inflation will be compensated by governments. We also ignore national wage growth, while allowing for wages to change with age of each cohort. This assumption can be easily released. However, once we allow wages to grow in time, we have to estimate how the pension formulas will change with rising wages. As the only workable assumption is that formulas, wherever applicable, will fully accommodate rising wages, we can ignore wage growth with no loss of generality. Our analysis could (and hopefully will be) improved by an extension to other European countries and by a more nuanced simulation of pension benefits. The paper would also benefit from more finely granulated wage data that are often difficult to find.

Appendix B - Data Sources

ISSA Observatory: ISSA Social Security Country Profiles,
<http://www.issa.int/Observatory/Country-Profiles/Regions/Europe/>

Eurostat: Statistical database
(http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database)

National Statistical Offices

National Ministries of Labor and Social Affairs

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¹ Hungary accepted an EU-IMF program in 2008, followed by Latvia and Romania in 2009, Greece in 2010 and by Ireland and Portugal in 2011.

² There is a number of excellent contributions on pension reforms, their economic and political underpinnings and potential effects. Soto: 2011, Boeri and Tabellini: 2004, Holzmann: 2001, Auerbach: 2001 or Feldstein: 1974 are just a few examples, worth reading.

³ Other European countries should follow in next few months, as we formalize carefully often complex pension benefit rules.

⁴ See European Commission Aging Report, 2009

⁵ Pension benefit formulas are often directly derived from wages – pension being X % of past wages. Many benefits include also absolute levels expressed in the national currency – like the fixed part of the Czech pension. Most governments have been increasing these absolute levels with rising wages.

⁶ We, for example, use average wages for determining the pension benefits, thus omitting intra-generational redistribution aspects of pension systems.

⁷ But we allow for wages to change with age of each cohort.

⁸ Other contributions include Boskin (1982) and Buiters (1985) who applied the social security wealth concept to the public pension systems financed on a pay-as-you-go basis. Auerbach et al (2003) estimated fiscal gaps. More recently, Gokhale (2009), Velculescu (2010), Beltrametti (2011) and Soto (2011) all assessed long term (unfunded) obligations of various countries and all came to the same conclusion that the current pension systems are fiscally unsustainable.

⁹ page 5 of the Commission Proposal for a Council Regulation amending Regulation (EC) 1467/97

¹⁰ The exclusion, however, is only partial and lasts for three years only.

¹¹ EC 2009.

¹² EC 2009.

¹³ Zion D. 2010.

¹⁴ Czech Republic, Slovakia, Poland, Hungary, Estonia, Latvia, Lithuania, Bulgaria, Romania, Slovenia.

¹⁵ Three other post-communist countries – Croatia, Kazakhstan and Russia - have implemented similar reforms, but they are not the EU members.

¹⁶ Recent decision by the Polish government to reduce private pension transfers and reinforce the public, pay-as-you-go pillar will again increase future public pension expenditures in Poland, but there is no estimate, yet, that would allow us to calibrate the magnitude of the change.

¹⁷ For details, see Appendix A.

¹⁸ See Gokhale 2009 for a detailed discussion.

¹⁹ As Hungary de facto abolished its three-pillar system in 2010, we estimated the implicit debt assuming that its pay-as-you-go system covers the entire working population. The Polish system, on the other hand, is modeled in its three-pillar form.

²⁰ The lower estimate of the Czech pension debt in this paper, as compared to Schneider (2000) is caused by different methodology and by reforms that have taken place since 2000. The Gomulka approach, used in Schneider (2000) estimated „accrued pension rights” rather than implicit pension debt, as it ignored all future contributions to the pension system. Using the same methodology in our current model would yield estimates of accrued pension rights equal to approximately 230 % of GDP, not far from the original estimate in Schneider (2000).

²¹ The implicit tax concept is well explained in Lindbeck and Persson (2003).

²² Latvian experience, where pensions were cut 10 % in 2009 show that even this cannot be excluded. It should be noted, though, that the pension cuts were later annulled by the Latvian constitutional court.

²³ The current government plans to unify VAT rates at 17.5% as of 2012.

²⁴ In our model, we disregard any potential labor supply effects of lower social security contributions.

²⁵ In 2008 the median pension in the Czech Republic was CZK 9,528.

²⁶ For details see <http://www.mpsv.cz/cs/10590> .

²⁷ The Polish “base amount” is equal to PLN 2716.71, see ZUS (2010). Slovakia uses a “pension point” that was set at €8.9955 in 2008.

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