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Pension Reform in Slovakia: Perspectives of the Fiscal Debt and Pension Level

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1. Introduction

The present unfunded pay-as-you-go system in Slovakia covers old-age retirement, disability and survival pensions. The system has generated deficits mainly because of high unemployment and low contributions paid on behalf of the unemployed by the government, and high contribution evasion, since 1997. The negative demographic development is another reason why the system is not sustainable (Thomay, 2002), (Goliaš, 2003). Evasions are explained by insufficient property rights to the pension savings, low linkage between contributions and benefits, and increased migration of the labor force.

In April 2003 the government passed the *Principles of the Pension Reform in the Slovak Republic*. The goals of the pension reform were to secure a stable flow of high pensions to the beneficiaries, and sustainability and overall stability of the system. Corresponding legislation, as passed in December 2003, establishes a system based on three pillars:

1. mandatory, non-funded 1st (pay-as-you-go) pillar,
2. mandatory, fully funded 2nd pillar,
3. voluntary, fully funded 3rd pillar.

The contribution rates for the 1st pillar were set at 19.75 % (old age 9 %, disability and survival 6 % and reserve fund 4.75 %) and 9 % for the 2nd pillar. The total rate is about 0.75 % higher than the old one.

The new system is obligatory for those entering the labor market, and optional for existing contributors of below the age of 52[1], who would therefore loose the option to return to the old system, but would keep benefits acquired in the old system (they will receive full pension for the years that they participated in the old system, and half a pension corresponding to their participation in the new system). The retirement age was set at 62 for both sexes, and will increase by 9 months every year[2]. Compared to Poland and

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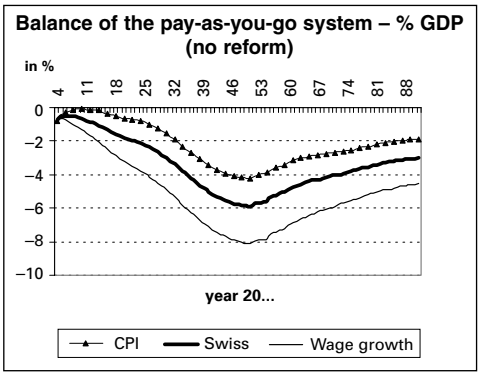
[1] Given the retirement age of 62 and a condition to save at least for ten years in the 2nd pillar.

FIGURE 1 Balance of the Pay-as-you-go System (no reform)



Hungary, the Slovak 2nd pillar is more substantial. Contribution rates are higher in Slovakia – compared to 7.3 % in Poland and 6 % (with possible future increase to 8 %) in Hungary[3].

The transitory financial gap in the 1st pillar, due to the introduction of the 2nd pillar (contributions to the 1st pillar will decrease by the amount paid to the 2nd pillar, while the participants of the old system continue receiving their pensions purely from the 1st pillar) will be covered from public resources (e.g. from privatization). In the next section we estimate the total amount of necessary public coverage. In the third section we estimate the level of old-age pensions in the new system.

2. Balance of the Pay-as-you-go Pillar

Rough calculations of the balance of the 1st pillar (neglecting e.g. disability pensions, unemployment, actual number of old-age pensions) are provided by Thomay (2002), detailed calculations by Ministry of Labor, Social Affairs and Family of the Slovak Republic and Patrick Wiese (mimeo). A great inspiration for our estimations was a paper by Holzmann (1997), which also dealt with the deficit caused by the launch of the second pillar. The calculations of the deficit of the Hungarian pension system could be found in (Palacios – Rocha, 1998).

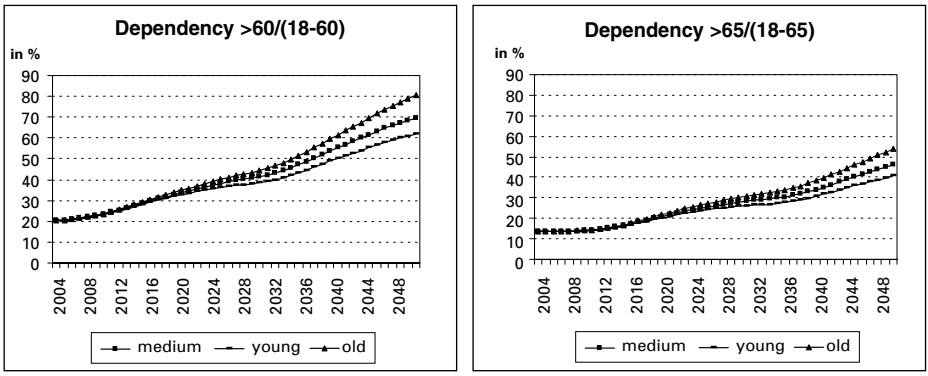
In the following we estimate costs of the Slovak pension system under various scenarios. We base our estimations on macroeconomic forecasts by Martin Barto and Juraj Kotian (see the table in the *Annex*). The estimated balance does not include any state contributions. We do not consider indexation by wage growth because of considerable pressure on public finance.

The balance of the first pillar under no reform scenario (*Figure 1*) depends

[2] The current retirement age for man is 60 and for women 54, depending on number of her children.

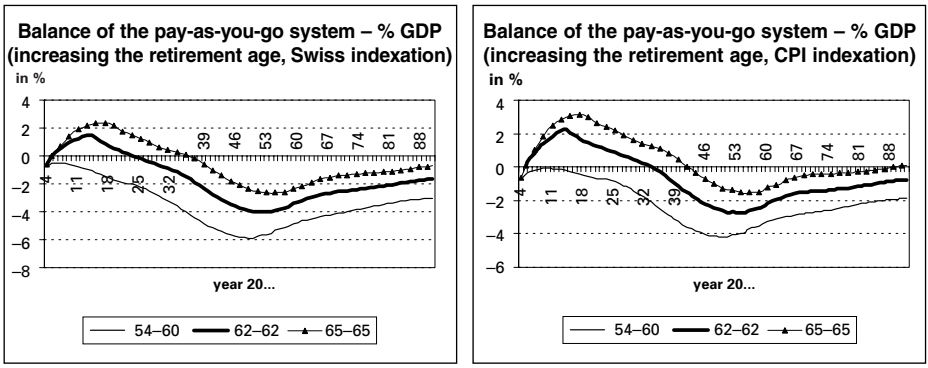
[3] A through description of the pension reforms in Hungary and Poland could be found in (Palacios – Rocha, 1998), (Office of the Government Plenipotentiary for Social Security Reform, 1997), (Benczúr, 1999), (Simonovits, 2000), (Chlon – Góra – Rutkowski, 1999) and (Fultz, 2002).

FIGURE 2 Dependency for >60/18–60 and >65/18–65



Note: young, old and medium options of the demography evolution
Source: (INFOSTAT)

FIGURE 3 Increasing the Retirement Age, Swiss and CPI Indexation



on a method of indexation of pensions. We consider three types of the indexation: by nominal gross wage growth, by inflation, or by an average of the two (Swiss indexation). All indexation methods lead to a considerable deficit, which is lower for indexation by inflation, than for indexation by wage growth. This is because we assume positive real wage growth rate.

A primary reason of increased deficit is that the ratio of pensioners and contributors is rising, while the contribution and the replacement rates are fixed. The ratio of a number of men older than 60 to those 18–60 years old and the ratio of a number of men older than 65 to those 18–65 years old (*Figure 2*) clearly indicates that the fiscal deficit could be significantly decreased by a higher retirement age. On average, a difference in a deficit between a system of retirement age of 54-60 (women-man) and 65-65 is between 2 to 3 % of the GDP.

The effect of the retirement age on the fiscal deficit is evaluated in two types of indexation. The deficit is higher for the Swiss indexation than for the CPI indexation (*Figure 3*), because we assume positive real wage growth.

TABLE 1 Estimation of Increase in Unemployment Rates

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
30 %	0.14	0.29	0.43	0.56	0.68	0.82	0.96	1.10	1.24	1.37	1.47
50 %	0.39	0.78	1.15	1.44	1.73	2.03	2.34	2.63	2.91	3.19	3.38

Note: Under the assumption that 30 or 50 % of those, who would retire in the old system and would not find a job in the new system.

Palacios and Rocha (1998) presented similar results for the Hungarian pension system.

An increased retirement age, especially in a country with high unemployment, may further increase unemployment rate and fiscal costs. We have estimated an increase in the unemployment rate under the assumption that 30 or 50 % of those who would, in the old system retire as 54–60 years old (women-man) become unemployed in the new system (*Table 1*). Clearly, as more people remain in the work force, an increase in unemployment rates becomes more likely (from 0.1 % to 1.5 % if 30 % were unemployed, and from 0.4 % to 3.4 % if half were unemployed).

The balance of the 1st pillar seems not very sensitive to estimated changes in unemployment rates (*Figure 4*): a 1% increase in unemployment rates lowers the balance by roughly 0.1 % of the GDP.

The 2nd pillar will first create deficit pressures, because some contributors switch their contributions from the 1st to the 2nd pillar. However, once pensions will be paid from the 2nd pillar, expenditures of 1st pillar will decrease, as those who switched will receive lower pensions from the 1st pillar (*Figure 5*). It is clear that the higher the level of contributions to the 2nd pillar, the higher the initial deficit. However, later the deficit declines, because fewer pensioners will collect pensions from only the 1st pillar.

Demographic evolution and the number of those who switch to the 2nd pillar are other important determinants of the 1st pillar deficit. To estimate the impact of demography, we consider a contribution ratio of 9/9, a retirement age of 62 years, Swiss or CPI indexation, and three demographic scenarios: the young, medium and old options[4]. Each option has a different dependence ratio[5]. The young option dependence ratio is the lowest (there are less pensioners and more contributors) and the deficit is the lowest too (*Figure 6*).

According to the law, people older than 52 will remain in the old system. It is difficult to assess now how many people will switch to the new system. In general, we assume that young people will be more likely to switch than older people. In our calculations we assume that all between the age of 18 and 25 years old will switch. Then the percentage of those who switch will decline linearly, and only 5 % of 52 year olds switch. The sensitivity of the 1st pillar deficit on the number of switchers is estimated by three scenarios of transition from the old to the new system: slow (30 % of all eligible switch), medium (60 %) and fast (90 % – *Figure 7*).

[4] source of the three options: INFOSTAT

[5] dependence ratio = total number of pensioners / total number of contributors

FIGURE 4 The Sensitivity of the 1st Pillar Balance to an Estimated Increase in Unemployment Rates

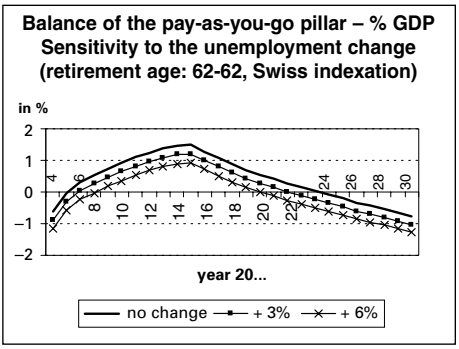
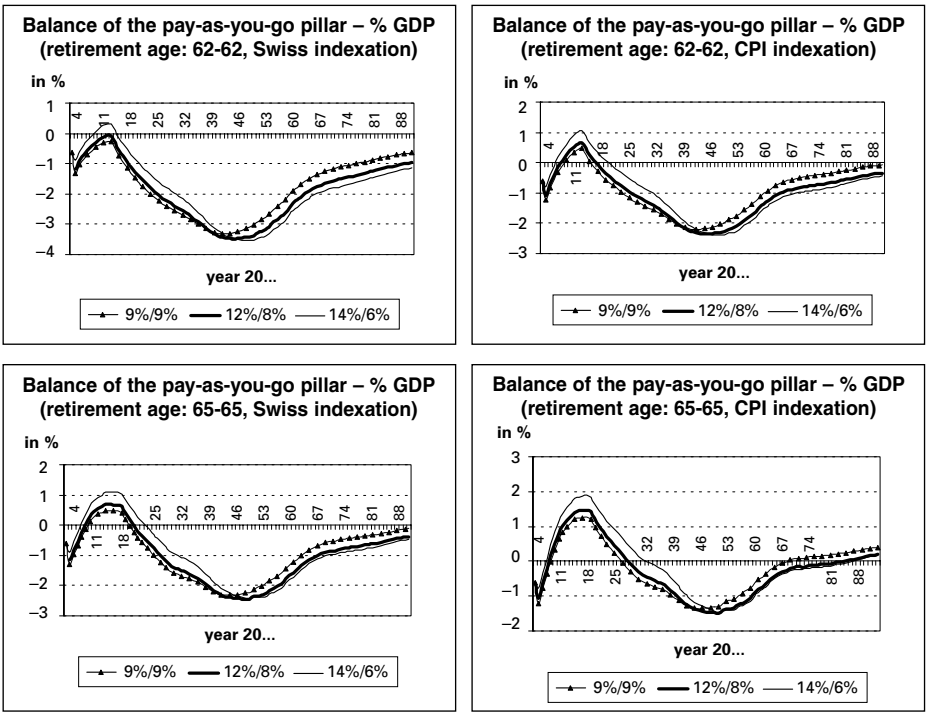


FIGURE 5 The Impact of Introduction of the 2nd Pillar on the Deficit of the 1st Pillar



Note: Retirement age 62-62 or 65-65, Swiss or CPI indexation, and ratio of contributions between the 1st and the 2nd pillar: 12:8, 14:6 and 9:9 percents. Final version of legislation introduced ratio 9:9.

The conclusion of our estimations is: the balance of the old one pillar system will be significantly improved by a change of indexation, an increase in retirement age and the introduction of the second pillar (*Figure 8*). Whereas the change of indexation and the increase of the retirement age have an

FIGURE 6 Different Demographic Scenarios, Swiss and CPI Indexation

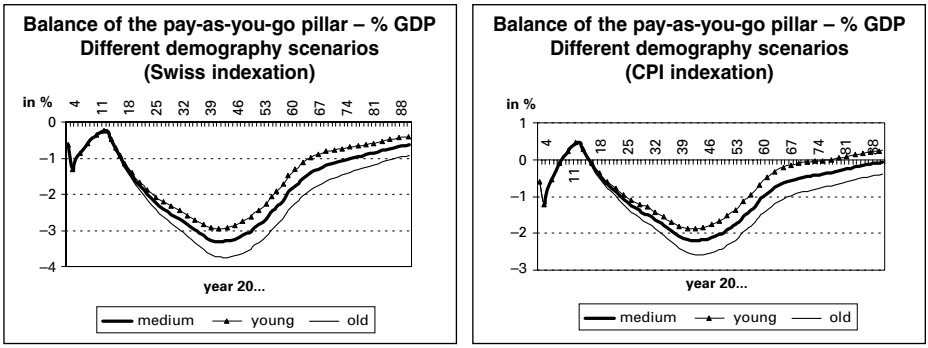


FIGURE 7 Different Scenarios of Transition, Swiss and CPI Indexation

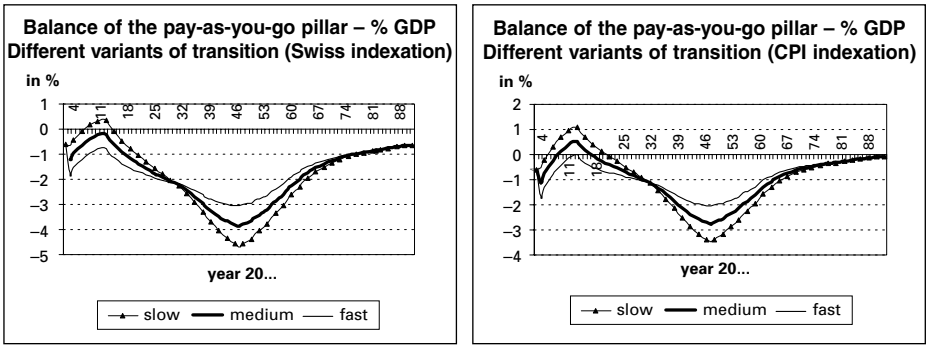
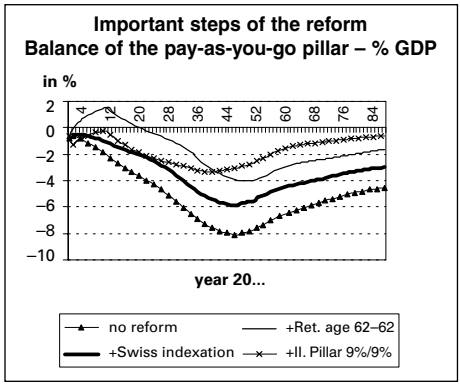


FIGURE 8 Important Steps of the Pension Reform



immediate positive impact on the 1st pillar balance, the introduction of the 2nd pillar will deteriorate the balance until 2044, and only then bring positive results.

3. The Level of Pensions Paid from the Second Pillar

There is extensive literature on the level of pensions, let us mention at least (Bodie, 1994, 1996, 2001) and (Orszag – Stiglitz, 2001). A novelty of our approach is that we also consider the risk of asset returns.

The level of pension benefits is what pensioners care about. To measure it, we calculate the ratio of nominal pensions to nominal gross wages.[6] It seems obvious that a retired person strives to replace wage with pension in order to maintain his or her living standard. The reform of the current pay-as-you-go pillar[7] brings three major innovations: an increase of the retirement age to 62 for men and women, a new pension formula and Swiss indexation of the pensions. According to the law, the initial monthly pension from the 1st pillar is:

$$P = APWP \cdot N \cdot APV$$

where *APV* (*Actual Pension Value*) is set by the law at 183.58 to provide a 50% replacement rate (average initial pension/average gross wage) in the first year of the reform. The law assumes automatic annual valorization of the *APV* by the nominal gross wage growth. The *APWP* (*Average Personal Wage Point*) represents the average of the ratio of the individual gross wage to the average gross wage over a period of 1994 to the last year of employment. *N* stands for the number of years, in which pension contributions were paid.

We assume an average gross wage in Slovakia in 2003 at Sk 14,686[8]. Should the initial pension cover 50 % of the average gross wage (i.e. Sk 7,343), a worker would have to earn the national average wage (*APWP* = 1) for the last 40 years. Because the *APV* is indexed by the nominal gross wage growth, the 50% replacement rate should be preserved.

Participants of the two-pillar system will receive full pensions for the time they participated in the old system and half a pension for the time they participate in the new system. Therefore, workers who participate in the two-pillar system will only achieve a 25% replacement rate. Rights acquired in the old system are recognized differently by different countries: for example in Hungary, the accrual rates of the new first pillar recognize all rights earned under the old system. These rates are the same for all who switch and therefore anyone who switches is effectively forfeiting a part of his/her acquired rights. This grants the government a certain measure of control over the speed of the transition.

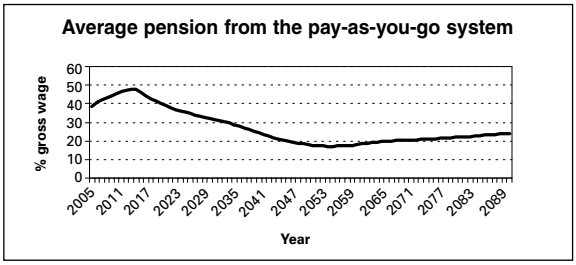
Old-age pensions are annually indexed by the average of nominal wage growth and inflation (Swiss indexation). Since the real wage growth is supposed to be positive, this implies that the average of all pensions is smaller

[6] In Slovakia, pensions are not taxed, so comparison to the net wages may seem more appropriate. However, such approach is in general not used, because of unpredictability of future tax policies.

[7] law no. 43/2004, in effect since January 2005 (some provisions since February 2004)

[8] Average gross wage in the third quarter 2003 was Sk 14,066. Source: Statistical Office of the Slovak Republic.

FIGURE 9 Average Replacement Rate of the 1st Pillar, Assuming Its Zero Deficit



Note: retirement age 62-62

than the average initial pension. Currently, the ratio of the average pension to the average gross wage is approximately 40 %.[9]

The adopted pay-as-you-go pension formula is not sensitive to demographic development. This is different for example in Poland, where the corresponding formula contains the average life expectancy at the time of retirement. However, we can not claim that the demography crisis will actually not affect the pension system. Although demography was removed from the formula, we have showed that it is an important factor in the balance of the 1st pillar. Ignorance of demography thus contains political risks and that in the future the indexation of the *APV* could be changed.

Other ways of controlling deficit is to increase the retirement age (e.g. to 65) or change indexation of pensions (e.g. to CPI indexation). The pension formula sets the replacement rate at 25 % from the 1st pillar, while another 25 % is expected to come from the 2nd pillar. These rates serve as benchmarks for all who are thinking about a switch: if the 2nd pillar will earn more than 25 % replacement, then the switch is optimal.

However, 25 % replacement of the 1st pillar is unfair compared to the 2nd pillar, because the latter does not create deficits to be covered by public finance. The former, based on 62–62 retirement age, will lead to the deterioration of the replacement rate (17 % in 2054 – *Figure 9*) and so will have to be subsidized by public finance.

The law sets administrative costs of the 2nd pillar at 1 % of monthly contributions and 0.07 % of the monthly asset value (i.e., 0.84 % p.a.). Administrative costs are similar to Poland, where the usual charge on monthly contributions is about 5–9 % (not regulated by law) and on monthly asset value 0.05 % (0.6 % p.a.).

In our estimations, we use 9 % contributions to the 2nd pillar and administrative costs. Wage growth estimations are depicted here in the table in the *Annex*. We assume that a retired person buys an annuity for a pension indexed by the level of interest rates. Using these assumptions, the initial replacement rate (initial pension to the last gross wage) is $S/(DW)$, where S stands for total savings, D for duration of receiving pensions (in years) and W for the last (annual) gross wage.

[9] Source: Ministry of Labor, Social Affairs and Family of the Slovak Republic.

TABLE 2 Replacement Rates from the 2nd Pillar under Different Asset Returns

	Asset returns = 4 %			Asset returns = 6 %			Asset returns = 8 %		
	25	20	15	25	20	15	25	20	15
30	8.6	10.7	14.3	11.1	13.9	18.5	14.7	18.4	24.5
35	9.9	12.4	16.5	13.5	16.8	22.4	18.8	23.5	31.3
40	11.2	14.0	18.7	15.9	19.9	26.5	23.5	29.4	39.2
41	11.4	14.3	19.1	16.4	20.5	27.4	24.6	30.7	41.0
42	11.7	14.6	19.5	17.0	21.2	28.3	25.6	32.0	42.7
43	11.9	14.9	19.9	17.5	21.8	29.1	26.7	33.4	44.5
44	12.2	15.2	20.3	18.0	22.5	30.0	27.8	34.8	46.4
45	12.4	15.5	20.7	18.5	23.1	30.9	29.0	36.2	48.3
46	12.7	15.8	21.1	19.1	23.8	31.8	30.2	37.7	50.3

Note: Row labels denote number of years of paying contributions; column labels number of years of receiving pension.

TABLE 3 Replacement Rates from the 2nd Pillar, Assuming Returns Equal Wage Growth + x %

	Asset returns = wage growth			Asset returns = wage growth plus 1 %			Asset returns = wage growth plus 2 %		
	25	20	15	25	20	15	25	20	15
30	10.7	13.4	17.8	12.3	15.4	20.5	14.2	17.8	23.7
35	12.5	15.6	20.8	14.7	18.4	24.5	17.5	21.8	29.1
40	14.3	17.8	23.8	17.2	21.6	28.7	21.1	26.3	35.1
41	14.6	18.3	24.4	17.8	22.2	29.6	21.8	27.3	36.4
42	15.0	18.7	25.0	18.3	22.9	30.5	22.6	28.2	37.6
43	15.3	19.2	25.5	18.8	23.5	31.4	23.4	29.2	38.9
44	15.7	19.6	26.1	19.4	24.2	32.3	24.2	30.2	40.3
45	16.0	20.1	26.7	19.9	24.9	33.2	25.0	31.2	41.6
46	16.4	20.5	27.3	20.4	25.6	34.1	25.8	32.3	43.0

Note: Row labels denote number of years of paying contributions; column labels number of years of receiving pension.

According to the medium option of the demographic scenario, the life expectancy of a person on reaching the age of 62 was 75 for men and 85 for women in 2000. These figures are likely to increase in the next decades. In our estimations we use 15 to 25 years long period of receiving pension. We assume that saving starts in 2004 and will continue to be exempt from taxes.

Finally, we assume three nominal levels of asset returns (minus administrative costs): 4 %, 6 % and 8 %. We estimate that for 8 % asset returns, the 2nd pillar achieves the level of the 1st pillar (*Table 2*; the level of pension from the 1st pillar is not higher than 50 % divided by 2, i.e. 25 %). Also, for 6 % returns, 2nd pillar achieves at least equal results as the 1st pillar. To achieve a 50 % initial replacement rate, let us say that a person would have to work for 40 years. Thus, a university graduate would have to work at least till 65. Currently, this implies a pension would be received on average for 15 years.

The pension level is very sensitive to the relation between nominal growth of wages and asset returns. Therefore, we compute initial replacement rate under three assumptions: that asset returns (minus the administration costs) are equal to the nominal growth of wages +0 %, 1 % and 2 % (*Table 3*). In most cases, performance of the 2nd pillar is as good as, or better than

TABLE 4 Returns and Standard Deviations of the Stock Indices, %

Index	S&P500	FTSE	DAX	SPI
Return p.a.	13.29	13.47	9.53	10.97
Standard deviation p.a.	15.58	15.07	17.40	16.97

TABLE 5 Probabilistic Distribution of Pension Levels, Investment to Different Stock Indices

%	S&P500			DAX			SPI		
	25	20	15	25	20	15	25	20	15
10	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0
20	0.9	1.0	1.0	0.7	0.7	0.8	0.7	0.8	0.9
25	0.9	0.9	1.0	0.4	0.5	0.7	0.6	0.7	0.9
30	0.8	0.9	1.0	0.3	0.4	0.6	0.5	0.6	0.8
40	0.7	0.8	0.9	0.2	0.3	0.4	0.3	0.5	0.6
50	0.5	0.7	0.8	0.1	0.2	0.3	0.2	0.3	0.5
60	0.4	0.5	0.7	0.1	0.1	0.2	0.1	0.2	0.4
70	0.3	0.4	0.6	0.0	0.1	0.2	0.1	0.2	0.3
80	0.2	0.4	0.5	0.0	0.1	0.1	0.1	0.1	0.2
90	0.2	0.3	0.5	0.0	0.0	0.1	0.1	0.1	0.2

Note: Row labels denote initial replacement rate (ratio of the initial pension to last gross wage); column labels number of years of receiving pension.

the performance of the 1st pillar. When growth of wages and asset returns are equal, the result does not depend on the level of asset returns. For equal growth rates of wages and returns, the resulting replacement ratios are also equal.

The above calculations assume constant asset returns and no risk. Suppose, however, that annual asset returns are normally distributed and return is equal to:

$$r = r_e + \sigma.Z$$

where r_e is the expected value of return, Z is a random variable with normal distribution $N(0,1)$, and σ the standard deviation. Then we estimate returns and calculate standard deviations from total returns (including dividends), using the stock indices S&P500 (USA), FTSE (Great Britain), DAX (Germany) and SPI (Switzerland) in January 1981 to June 2003 (*Table 4*).

We repeat the calculations of pension levels with the same parameters, as in Table 3, and with probabilities of reaching particular pension levels, when contributions were paid for 40 years and invested in S&P500, DAX or SPI stock indices (FTSE has a similar average and standard deviation as the S&P500 and therefore the results related to this index are skipped). It is clear that investment to S&P500 (FTSE) and SPI will lead to the 2nd pillar outperforming the 1st pillar (*Table 5*). However, investment in DAX makes the achievement of a 25% replacement rate less likely (probabily 0.71 for 15 years of pension receipt and 0.54 for 20 years of pension receipt).

Bonds yield lower returns for their lower risk. We use yields of 10-year government bonds (January 1996 – June 2002) emitted in Switzerland, USA, Great Britain and Germany. Our estimates of average yields and standard

TABLE 6 Returns and Standard Deviations of Bonds, %

	CHF	USD	GBP	EUR(DEM)
average yield	3.95	6.12	8.24	6.38
standard deviation	5.20	6.90	6.45	5.66

TABLE 7 Probabilistic Distribution of Pension Levels, Investment to Different Bonds

%	USD government bonds			GBP government bonds			EUR government bonds		
	25	20	15	25	20	15	25	20	15
10	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	0.3	0.7	1.0	0.9	1.0	1.0	0.4	0.8	1.0
20	0.1	0.2	0.7	0.5	0.9	1.0	0.0	0.3	0.8
25	0.0	0.1	0.3	0.2	0.5	0.9	0.0	0.0	0.4
30	0.0	0.0	0.1	0.1	0.2	0.7	0.0	0.0	0.1
35	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

Note: Row labels denote initial replacement rate (ratio of the initial pension to last gross wage); column labels number of years of receiving pension.

TABLE 8 Limits for Investment for the Pension Funds

	Stocks	Bonds and Money Market Instruments
Growth Fund	up to 80 %	no limit
Balanced Fund	up to 50 %	at least 50 %
Conservative Fund	no stocks	100 %

deviations are presented in *Table 6*. Neglecting currency risks (CHF, USD, GBP, EUR), we estimate probabilistic distributions of pension levels corresponding to selected bonds (*Table 7*). It is clear that a sufficient level of pension will not be achieved by investment in CHF bonds. Using the same assumptions as for the estimation of returns on the stock indices, we conclude that with the exception of GBP, there is only a small chance of outperforming the 1st pillar.

Pension funds usually hold portfolios comprising of bonds and equities. Limits for their weights in portfolio differs from country to country. In Slovakia, each pension company will manage three funds: Growth Fund, Balanced Fund and Conservative fund, each with different limits for investment (*Table 8*). Savers may hold assets only in one fund at a time. Up to 15 years before retirement, the saver may not hold assets in the Growth Fund and up to 7 years in the Balanced Fund, in order to decrease the risk of the value of savings substantially falling shortly before retirement.[10] From our estimations it is clear that the 2nd pillar (a combination of asset and bond investment) is likely to outperform the 1st pillar.

[10] For valuable analysis of several pension plans see (Blake, 2003).

4. Conclusions

A pension reform was necessary if the country wanted to avoid high deficit of the pay-as-you-go system and ensure decent level of pensions. The reform contains three important steps: a change in indexation, an increase of the retirement age and the launch of the funded pillar. The 2nd pillar will naturally deepen the deficit in the first decades after its introduction, but as more people will start receiving pensions from the 2nd pillar, the deficit of the 1st pillar will decline. The system, then, will be superior to the one pillar system. Replacement of the Swiss indexation by the CPI indexation, and an increase of the retirement age to e.g. 65 for men and women would further decrease the deficit.

For the 2nd pillar to produce a decent level of pensions, a sufficient part of contributions must be invested in stocks. Still, there is a considerable probability that the pure pay-as-you-go system would outperform the two pillar system.

Finally, the adopted pay-as-you-go pension formula and targeted 25% replacement ratio will create a deficit, and thus a pressure on public finance. This could cause political decisions to decrease the replacement target of the first pillar. Therefore, when comparing the level of pensions from the pay--as-you-go and funded pillars one should bear in mind that the pensions from the pay-as-you-go pillar are subject to a political risk.

ANNEX

Macroeconomic Forecasts (percentage growth)

Year	Gross wages (real)	Inflation rate	Unemployment rate	GDP (real)
2004	0.9	7.6	15.2	1.9
2005	3.4	4.6	14.8	4.4
2006	4.0	3.5	14.4	5.5
2007	4.0	3.5	14.0	4.5
2008	4.0	3.5	13.6	4.5
2009	3.5	3.5	13.2	4.5
2010	3.5	3.5	12.8	4.5
2011	3.5	3.5	12.5	4.0
2012	3.5	3.5	12.2	4.0
2013	3.5	3.5	11.9	4.0
2014	3.5	3.5	11.6	4.0
2015	3.5	3.0	11.4	4.0
2016	3.5	3.0	11.2	4.0
2017	3.5	3.0	11.0	4.0
2018	3.5	3.0	10.8	4.0
2019	3.5	3.0	10.6	3.5
2020	3.5	3.0	10.3	3.5
2021	3.5	3.0	10.0	3.5
2022	3.5	2.5	9.5	3.5
2023	3.5	2.5	9.0	3.5
2024	3.5	2.5	8.5	3.5
2025–90	3.0	2.0	8.0	3.0

Source: Forecasts were provided by Martin Barto and Juraj Kotian.

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SUMMARY

JEL classification: C15, E27, G11, G23
Keywords: pension reform – Slovakia – fiscal debt – pension level – asset returns – risk

Pension Reform in Slovakia:
Fiscal Debt and Pension Levels

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This paper considers two aspects of a recent pension reform in Slovakia: the financial balance of the former pay-as-you-go system, and the level of retirement pensions in a newly introduced two-pillar system. Generally, there are three important steps to sustainable pension reform: a change of pension indexation, a raised retirement age, and the launch of a fully funded (second) pillar. With regard to fiscal debt, the two-pillar system is superior to the pay-as-you-go system in the long term. Having considered the risk of returns on savings in the funded pillar, the authors show that while pensions under the two-pillar system should be higher than under a one-pillar system, it is not a certainty.