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COUNTRY STUDY: REPLACEMENT RATES IN SLOVAKIA

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ABSTRACT:

Replacement Rates in Slovakia

The underlined paper is a part of the research project of the Institute of Economic Research, conducted in the framework of the European Commission Project: the Adequacy of Old-Age Income Maintenance in the EU (AIM), as Work Package 9. The project briefly characterizes the fundamental changes linked to the pension system in the Slovak Republic that started in 2004, and discusses the impact of these changes on the sustainability of financing the pension system mainly in reference with the establishment of the so-called „second pillar". The paper also brings up the discussion about the challenges linked with the replacement rates from various perspectives. The analysis of replacement rates of income after retirement was based on data on wages and pensions statistics and on the EU SILC database for the years 2005 and 2006. The replacement rates have been computed based on the templates agreed upon for the new EU countries that were part of this research, i.e. cross-sectional replacement rates based on both individual and household data. –Our aim for publishing the paper is to disseminate to the wider public in Slovakia both the results of our study and methodology that can be utilized employing the EU SILC database.

KEYWORDS:

Income – replacement rates, cross-sectional replacement rates, SILC.

ABSTRAKT

Miery náhrady v Slovenskej Republike

Štúdia predstavuje príspevok Ekonomického ústavu SAV do WP (Work Package) 9 Udržanie životnej úrovne po odchode do dôchodku do projektu ***the Adequacy of Old-Age Income Maintenance in the EU (AIM)***. Stručne charakterizuje zmeny v dôchodkovom systéme v Slovenskej republike, ktoré nastali od roku 2004, a ktoré majú dopad na udržateľnosť financovania dôchodkového systému v súvislosti so zavedením kapitalizačného dôchodkového piliera. Vlastná analýza mier náhrady príjmov po odchode do starobného dôchodku bola založená na dátach z EU SILC za roky 2005 a 2006. Miery náhrady boli vypočítané po dohode riešiteľských výskumných ústavov jednotnou metodikou pre nové členské krajiny EÚ; vypočítali sa prierezové miery náhrady založené tak na individuálnych dátach ako aj na dátach za domácnosti. Cieľom vydania tejto štúdie v edícii Working Papers je informovať ekonomickú komunitu na Slovensku tak o výsledkoch výskumu v danej oblasti ako aj o metodológii, ktorá môže byť aplikovaná pri využití databázy EU SILC.

KĽÚČOVÉ SLOVÁ:
Príjmy – miery náhrady, prierezové miery náhrady, EU SILC

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INTRODUCTION

Between May 2005 and October 2008, a consortium of 14 research institutions from the European Union participated in the 6th research framework programme under the title –Adequacy of Old-Age Income Maintenance in the EU (AIM). The Project was coordinated by the Centre for European Policy Studies (CEPS) in Brussels. The Institute of Economic Research (IER) participated in 2 of the 12 work packages, namely work packages 8 and 9 (the list of Work Packages of the AIM project is in appendix 1).

The overall objective of the AIM Project was formulated as follows: "The project aims at developing a new approach and new methods for assessing the performance and adequacy of the pension systems with full respect of the sustainability constraint. The project will not go deeply into the sustainability issues but will in general analyse the methodology for assessing the capacity of pensions to deliver adequate old age income maintenance under the condition of overall sustainability of public finance." (CEPS, 2005).

The main results of the Project have been published in various studies and are available at CEPS portal (www.ceps.be). A detailed summary of the results of the project can be found in the work of Mortensen and Daxler (2009). The results of the WP8 have been summarized in the AIM study paper (Vrooman et al., 2008). As far as WP9 is concerned, only selected countries from the new EU countries have been considered (Hungary, Poland, Slovakia). The results revealed the development of replacement rates in these countries and served as a sound basis to verify the input data to the CeRPSAM[1] model (Ferrare, Monticone, 2008), and used by CeRP (Centre for Research on Pensions and Welfare Policies, Italy) to compute the values of CORE (comprehensive replacement rates) until the year 2050 (Borella, Fornero, 2009). Computing replacement rates based on statistical data for selected new EU members was necessary due to the absence of these countries in the study of the European Community Households Panel (ECHP) Survey. Until that period, computed replacement rates for Slovakia were compiled by "Indicators Sub-Group of the Social Protection Committee

[1] The semi-aggregate simulation model.

(SPC), (2006)" and they were also published by in the study of Adequate and sustainable pensions – Synthesis report (European Communities, 2006). It is important to underline that both studies computed replacement rates for Slovakia used data from Microcensus for the year 2002 and therefore, it was necessary for the AIM project to use the latest available data from the EU SILC[2].

The Institute for Economic Research publishes this analytical study on replacement rates for Slovakia in the "Working Papers" to offer researchers and the wider public information about the short-term dynamics of replacement rates after the pension reform. During 2010, the results will be updated in the context of the ongoing research Project (VEGA[3]) based on the database of EU SILC for the years 207-2009 and in doing so, the paper –contributes to the ongoing discussion on the factors that influence the future replacement rates in the context of the needed changes in the pension system (mainly, the first pillar).

1. A BRIEF CHARACTERISTICS OF THE PENSION SYSTEM IN SLOVAKIA

The growing pressure arising from unfavourable demographic dynamics forced many countries in the world to undertake pension reforms. This was also the case for Slovakia where the long-term implications of the pay-as-you-go (PAYG) pension system looks gloomy and therefore, the former government launched a pension reform that came into force in 2004. Before the reform, the PAYG system functioned in a manner where each worker had a guaranteed old-age income provided that the person worked for at least 25 years and reached a minimum age of 60 for men and 53-57 for women depending on the number of children raised. In the PAYG system old-age income was dependent on two factors: the number of years spent at work and the average income earned (measured as the best five years during the previous ten years right before exiting the labour market). The PAYG was known for its redistributive function and was therefore considered as a mechanism for guaranteeing some degree of social solidarity.

[2] EU Statistics on Income and Living Conditions.

[3] VEGA – Scientific Grant Agency of the Ministry of Education of the Slovak Republic.

The reform was basically handled in two phases. In the **first phase** (as of January 2004), the government followed the parametric concept by keeping people to work longer years in order to be granted a retirement option, which was extended to 62 years for both men and women. When it comes to gender disparity, women seem to be disadvantaged as their statutory age was prolonged from the average 55 in the PAYG to 62 in the new system. This is so because, on average, women stay out of the labour force due to pregnancy and child care longer than men and therefore, "PPI" in the pension formula would be shorter leading to smaller amount of pension at old age. For some exceptions in the system see (Vrooman et al., 2008). In addition to retirement-age extension, the reform modified the formula for old-age pension income, which is computed as follows (OP):

$$OP = APEP * PPI * CPV$$

Where,

APEP (Average Personal Earnings Point) = the proportion of multiplication of personal points achieved during particular calendar years (during decision period) to the period of pension insurance. The earnings points are determined as a proportion of the gross yearly income of the insurer to the average yearly wage in the national economy. The maximum (upper limit) of APEP is the value 3, but only 1.95 for the year 2004.

PPI = period of personal insurance (+years remaining to retirement age in case of invalidity benefit).

CVP = current pension value = 1.25 % of monthly average wage in the Slovak economy in the year prior to retirement.

During the transition period APEP has been somehow modified by law. For instance, the value 1.00 indicates the person has an average income in the economy and 0.5 would mean he/she has only 50 % of the average salary in the economy. One aspect of ensuring solidarity of this system was guaranteed in such a way that full values of APEP below 1.00 and above 1.25 will be employed gradually during the transition period (2004 – 2014). However, the average personal wage point above the value of three should be disregarded. In contrast, the average personal wage point that is lower than 1.25 should be included in the entire amount. These restrictions are supposed to

assure the degree of solidarity of the pension system (see table 1). However, this might not hold after January 2015, which makes projection of the entire system difficult and making the system significantly less redistributive afterwards.

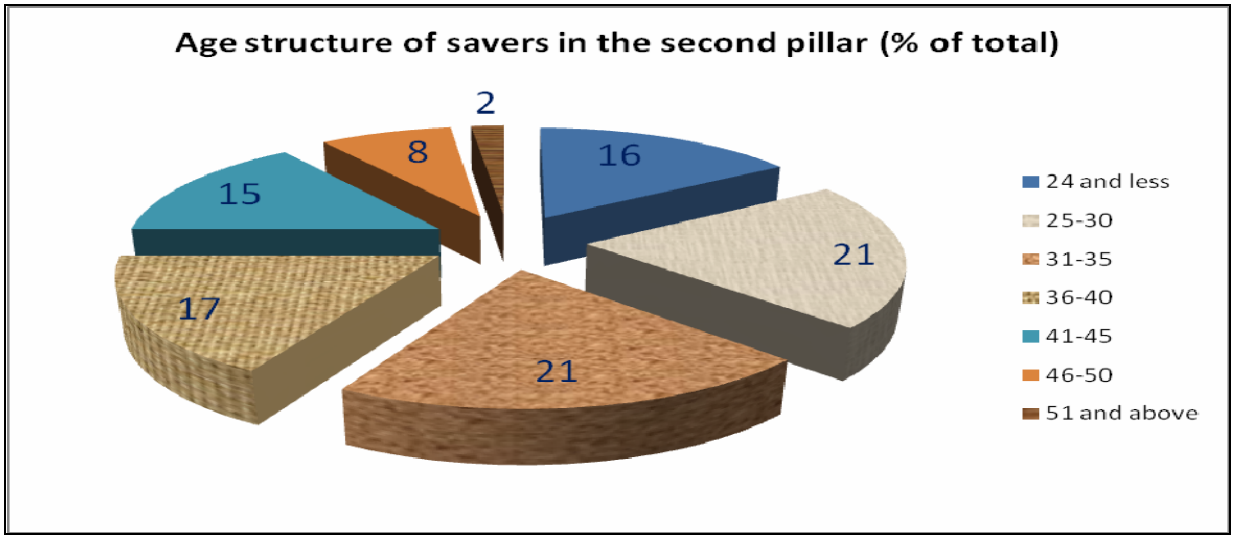
T a b l e 1
Computation of average personal wage point during the transition period
(2004 – 2014)

Years	Average personal wage point in the range between 1.25 and 3	Average personal wage point below 1
2004	40 %	60 %
2005	60	40
2006	64	36
2007	68	32
2008	72	28
2009	76	24
2010	80	20
2011	84	16
2012	88	12
2013	92	8
2014	96	4

Source: Act on Social Insurance – Collections of Laws No. 513/2006.

The **second phase** of the pension reform started in January 2004 and came into effect in January 2005. As part of the second phase, the so-called mono-pillar (also known as the first pillar) was reformed and decomposed into a three-tier system: the ***defined benefit*** (first pillar), which accounts 50 % of the employees contribution; **defined contribution** (**second pillar**), which shares the remaining 50 % of employees contributions and managed by six private fund management companies, and the third pillar, which is a voluntary saving scheme. A total of about 1.5 million of the 2.6 million insured persons transferred to the new system (Ministry of Labour, 2007). Apparently 25 per cent of the people were changing systems even though their remaining savings period till retirement age was too short to make that switch financially worthwhile (Golias, 2005). The age structure of savers in the second pillar is characterized by data in graph 1 and the income distribution of savers in graph 2.

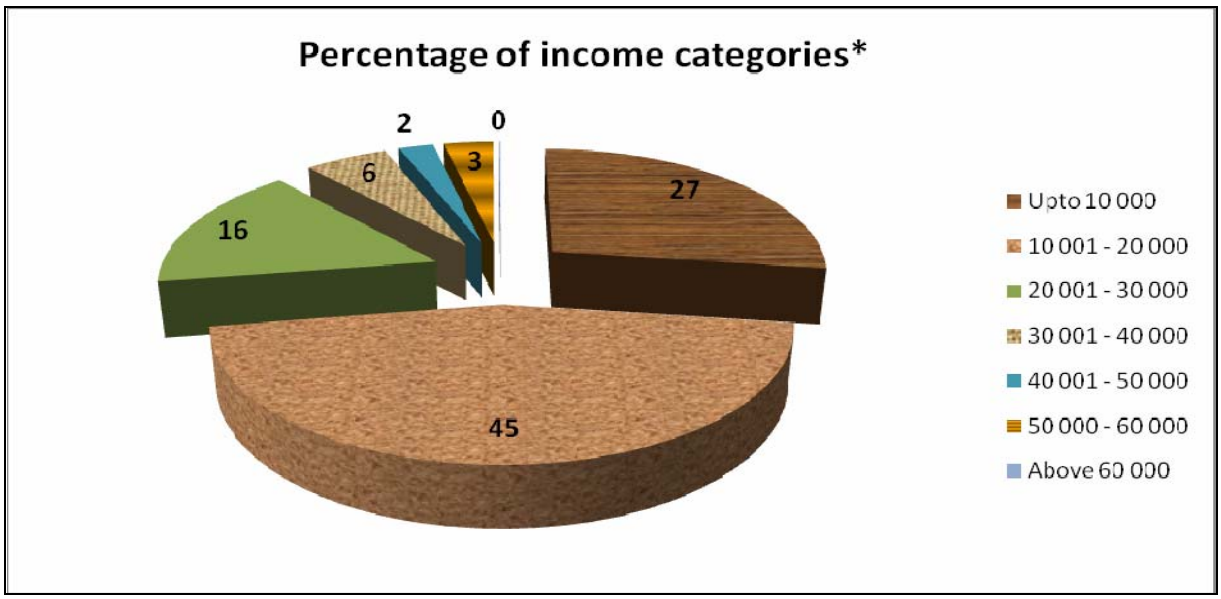
Graph 1
Age structure of savers in the second pillar



Source: authors processing based on data from the Ministry of Labor, 2007.

In terms of the role of income class on the second pillar, the vast majority of savers are from the income class between 10 000 to 20 000 SKK followed by those with the average income per moth of less than 10 000 SKK.

Graph 2
The percentage of savers in the second pillar according to income distribution[1]



[1]Incomes are measured in Slovak Crowns (SKK, where 1 Euro is equivalent to 30.126 SKK).
Source: authors processing based on data from the Ministry of Labor, 2007.

The new pension system faces a number of constraints since it came into effect in 2004. The first serious problem is linked to the deficit the public social insurance has been facing, which is estimated to be around 30bn SKK (an equivalent of 1bn Euro).

Table 2
Financial requirement of the Social Insurance Agency
(Socialna poistovna, in bn. SKK)

Year	2008	2009	2010
Deficit	24.7	27.1	29.7
Amount covered from the privatization	24.7	3.6	0
Difference	0	23.5	29.7

*The Slovak gas company, which was privatized in 2004.
Source: Ministry of Labour, Social Affairs and Family of the Slovak Republic, 2006.

In order to mitigate financial problems arising from the introduction of the second pillar, the government has undertaken some modifications. The first modification was to reopen the system to allow people who wish to exit and/or enter between January 2008 and June 2008 and November 2008 until June 2009. In the first wave, around 106 574 people decided to exit from the second pillar and returned to the first pillar. In contrast, almost 22 805 new entrants registered. In the second wave, 65 977 people left the second pillar, while 15 549 new clients got registered (date from The Social Insurance Agency). The second modification is linked to the change in the minimum number of years of contributions in the system to be eligible for old-age pension that has been prolonged from 10 to 15 years. The dynamics on the labour market is also a bit unfavourable thanks to the migration of mainly qualified labour force, which accounts around 7 % of the labour force although a reverse migration has been recorded recently due to the pending financial and economic crisis.

The private pension fund management companies on their side are unsatisfied with these changes and modifications. First, because the government is changing the rule of the game after the system was successfully running. Second, pension fund management companies also argue that if too many people decide to return to the first (pay-as-you-go) pillar and the new entrants into the labour market will not be obliged

to enter automatically into the second pillar, the whole pension system might be in jeopardy.

However, as we have indicated, so far there are no indications about any massive switch from the second to the first pillar. Nonetheless, with the possibility of new entrants (those who did not manage to enter when the system had started in 2004) may neutralize the impact of those who might potentially decide to exit. Whatever the outcomes might be there is clearly uncertainty for all participants of the pension system.

2. DESCRIPTION OF DATA FOR COMPUTING REPLACEMENT RATES

Slovakia (the member of the European Union since 2004) never participated in statistical survey on household incomes (in the 1990s and the first years of the new millennium) of the European Community Households Panel that brought data on which it was possible to characterize the decrease of income after retirement on comparable basis. In order to at least partially describe the relationship between wage income and income at retirement before 2004, we used replacement rates. The development of pension incomes in relation with the dynamics of wages in Slovakia in the 1990s and current period would help to explain why the country started the pension reform in 2004.

The detailed computation for the empirical **replacement rates** were based on statistical survey on income and living standards of the EU SILC for the year 2005 and 2006, which is fully in line with the methodology of the EUROSTAT. For this purpose, cross-sectional data were used.[4]

[4] We also have tried to use a longitudinal sample from the EU -SILC database for the years 2005 and 2006. The main precondition to calculate replacement rates was to select individuals who were included in the 2006 survey and exit from permanent job to retirement. However, only 46 persons (pensioners) fulfilled all the underlined criteria in order to calculate replacement rates. Putting the small sample problem aside, for most of the sample who turned from active employment to pensioners their pension incomes were higher than their average wages where the replacement values could be even higher than 1 (more than 100%). The only explanation we have for this opposite development is that after retirement (when retirement pension incomes exceed work-related incomes) there were some extra payments (some lump sum type of retirement benefits). However, since it is difficult to make a difference between regular pension incomes from lump sum benefits, it is necessary to check the development from a longitudinal data at least for 2007. Then it should be possible to compare the incomes from retirement (pension) for 2007 and work-related incomes in 2005 (adjusting for inflation), which is nothing other than the replacement rate. Otherwise, the results would have been deformed. This also seems to suggest that a minimum of three years data (ranging from 2005 to 2007) is required in order to calculate the accurate values for replacement rates based on longitudinal sample of EU SILC.

2.1. Data from the statistics of wages and pension incomes

In order to compute **gross replacement rates**, which measures the relationship between total wages and old-age pension incomes, we used average wage values (from the wage statistics compiled by the Statistical Office of the Slovak Republic) and average pension income values paid by the Social Insurance Agency (Socialna poistovna).

To compute the net replacement rates, given the number of changes that have occurred in the tax system, which affected income of physical persons, in the first step we took only selected years (1995, 2000 and 2005). In the second step we computed income tax from the recorded average wages according to the given tax codes for the respective year. We also paid particular attention to the implications of the change in the pension system since January 2004, which affected the replacement rates of each income group. In this respect, one of the peculiarities of the new pension system is that those who are currently contributing to the second pillar will only receive pension income after 15 years of saving up on the personal accounts. Up until that period all new pensioners should be paid from the first pillar but according to the new system, which is inferior in terms of solidarity compared to what used to be until December 2003 (i.e., before the introduction of the new pension system **in the first pillar**). This then implies that replacement rates will be higher for high-income groups while lower for their low-income counterparts. In order to investigate this, we used data from the Social Insurance Agency (Socialna poistovna) for 2003 and 2005.[5]

2.2. Data from the cross-sectional survey of SILC

In order to maintain consistency with other new member states of the EU in the framework of WP **9 maintaining living standards after retirement,** two age categories have been chosen: productive age group (55 – 59) and post-productive age group (65 – 69). Moreover, in the case of Slovakia it was necessary to compute replacement

[5] We excluded the year 2004 since it is the first year used as a base year to compute retirement income according to the new rule. Assuming that people who are on the verge of getting out of the labour force could be affected by the new rules, we used the year 2005 as a reference year.

rates also for the age groups 50 – 54 and 60 – 64 because retirement age up until the pension reform was shorter mainly for women (53 – 57 years depending on the number of children). In order to adjust for changes in income before and after the transition into the retired age, we opted for **average replacement rates** based on:

a) Individual income.
b) Average household income. For the purpose of AIM project the OECD scale was modified – first adult household member has a value of 1, followed by a value of 0.5 for every other adult member and 0.3 for those household members below the age of 18.

For the purpose of defining the economic activity status, we have chosen the **PX 050** variable[6] from the P category – personal data for the cross-sectional survey, which helps to define „working person" (code 1 – of variable **PX 050**) or „pensioner" (code 3 of variable **PX 050**). In order to compute the numerator, persons in the age group 65 – 69 (60 – 64) in category P were excluded (specified with **PX 010** – age at the end of the income reference period), while persons in the age group 55 – 59 (50 – 54) were included as a denominator of the replacement rate. For the years 2005 and 2006, 12 879 and 12 630 people, respectively were included in the EU SILC survey. Further information about the data for computation of the replacement rates are in table 3 and in table 3a.

[6] Description of variables from EU SILC is described in „EU SILC 2006, on survey of income and living standards, The Statistical Office the Slovak Republic, version 15.5.2007" and „EU SILC 2005, Survey on income and living standard from the Statistics Office of the Slovak Republic, version, version 12. 7. 2006".

T a b l e 3
Characteristics of the sample age groups 55-59/65-69[7]

	2005		2006	
	No. individuals in the sample	Representing number of habitants[8]	No. individuals in the sample	Representing number of habitants
Individuals with ages 55 – 59 and „working“ status				
Total	402	137461	448	160147
Men	282	96485	291	104624
Women	120	40976	157	55523
Individuals with ages 65 – 69 and „pensioner“ status				
Total	575	201650	619	206713
Men	250	83829	259	84555
Women	325	117821	360	122158

Source: Own calculation based on data from EU SILC 2005, 2006.

T a b l e 3a
Characteristics of the sample age groups 50-54/60-64

	2005		2006	
	No. individuals in the sample	Representing number of habitants	No. individuals in the sample	Representing number of habitants
Individuals with ages 50 – 54 and „working“ status				
Total	942	314618	893	317163
Men	428	141979	420	146425
Women	514	172638	473	170739
Individuals with ages 60 – 64 and „pensioner“ status				
Total	600	209682	622	211253
Men	224	77786	259	73972
Women	376	131896	360	137282

Source: Own calculation based on data from EU SILC 2005, 2006.

[7] The number of the population in Slovakia at the end of 2004 was 5 384 822 (Statistical Office of the Slovak Republic).

[8] The figures in all columns named „Representing number of habitants“ of all tables presented were computed as „No. of individuals in the sample“ multiplied by the variable PB 040 Personal weight.

In order to compute the number of persons in the Slovak Republic, who are represented by a given sample of persons in the SILC category, we used weights, i. e., PB 040 variable from the category P (personal data for the cross-section survey). The same variable (PB 040) was also used to compute both weighted arithmetic mean as well as weighted median for work-related income and income from old-age pension.

2.2.1. Average and median values for individual incomes

In order to deeply characterize the changes in income after exiting from work (hence at retirement), we computed two types of average values: arithmetic and median, where both weighted and unweighted values have been considered. These approached could help to compute four types of aggregate replacement rates. The absolute values of incomes from pension (in SKK) are in table 4 (table 4a) and absolute values for work-related incomes (in SKK) are in table 5 (table 5a).

T a b l e 4
Absolute values of pension income for the age group 65 – 69 (SKK)*

	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005[1]			
Total	85786	83718	85565	83907
Men	92139	89979	91909	89882
Women	80899	76582	81051	76991
	2006[2]			
Total	95058	92076	94858	92244
Men	101472	97488	100760	97278
Women	90443	85203	90773	86016

Source: Own calculation based on data from EU SILC 2005, 2006.

[1] the exchange rate between SKK and EUR (2004) = 40 SKK/EUR.
[2] the exchange rate between SKK and EUR (2005) = 38.5SKK/EUR.

* The exchange rates were taken from one year earlier because the EU SILC data for 2005 was from 2004 and the data for 2006 was from 2005. This exchange rate is valid for all the computed values on EU- SILC data.

Table 4a
Absolute values of pension income of age group 60 – 64 (SKK)

	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005			
Total	83312	83800	83415	84029
Men	92655	92974	92327	92940
Women	77746	76997	78159	77147
	2006			
Total	92973	92850	92948	92772
Men	101716	99700	101543	99510
Women	88322	88236	88316	88266

Source: Own calculation based on data from EU SILC 2005, 2006.

Table 5
Absolute values of work-related income of age group 55 – 59 (SKK)

	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005			
Total	173562	151426	172000	150001
Men	177846	152126	176604	151500
Women	163494	146173	160526	145501
	2006			
Total	197084	161892	199083	162000
Men	214861	168400	216221	168400
Women	164135	150000	166788	150000

Source: Own calculation based on data from EU SILC 2005, 2006.

Table 5a
Absolute values of work-related income of age group 50 – 54 (SKK)

	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005			
Total	174405	155401	173552	153921
Men	196323	174001	196554	174000
Women	156154	144000	154636	138001
	2006			
Total	187035	156000	186137	156000
Men	220362	177400	219340	174050
Women	157443	150000	157661	150000

Source: Own calculation based on data from EU SILC 2005, 2006.

The results in tables 4 and 5 (4a and 5a) seem to suggest that for both work-related income and old-age pension income, the median values are lower than the arithmetic mean (both weighted and unweighted), which is consistent with the evidence from other statistical data.

Apart from gender, we also used the level of education as potential explanation for having different level of income at retirement. In order to identify the difference according to the level of education, we used the variable PE 040 (the highest level of person´s education according to ISCED[9]). The necessary mean and median (both weighted and unweighted) values of income for computing replacement rates according to the level of education are in table 6 and table 6a (pension incomes, i. e. age group 65 – 69, 60 – 64) and in table 8 and table 8a (for work-related incomes, i. e. age group 55 – 59, 50 – 54).

T a b l e 6

Pension incomes of age group 65 – 69 according to the level of education (SKK)

Level of education	No. individuals in the sample	Representing number of habitants	Non-weighted		Weighted	
			Mean	Median	Mean	Median
			2005			
2	173	62170	76912	74792	77225	75966
3	330	114770	87911	85250	87679	85323
5	65	22271	98908	96320	98333	96320
6	5	1684	94563	93700	94936	93700
			2006			
1	14	4691	85315	83256	85376	83405
2	170	58373	83612	80174	84410	81252
3	362	119022	99333	94125	98793	94200
5	69	23198	103211	102726	103343	102726
6	2	712	94272	94272	94272	94272

Source: Own calculation based on data from EU SILC 2005, 2006.

Note:
Level of education
1 – primary education
2 – lower secondary education
3 – (higher) secondary education
5 – first degree of tertiary education
6 – second degree of tertiary education

[9] ISCED – The International Standard Classification of Education.

Table 6a

Pension incomes of age group 60-64 according to the level of education

(SKK)

Level of education	No. individuals in the sample	Representing number of habitants	Non-weighted		Weighted	
			Mean	Median	Mean	Median
			2005			
2	158	56299	73408	73262	73828	73650
3	370	128380	84723	884692	84855	84793
5	68	23597	97828	94565	97615	94600
6	3	1037	110823	91060	112032	91060
			2006			
2	147	49317	83028	80790	83383	80808
3	402	137426	94941	94398	94630	94050
5	62	21133	102455	99342	102757	99348
6	3	940	121156	126156	120511	126156

Source: Own calculation based on data from EU SILC 2005, 2006.

Table 7

Work-related income of age group 55-59 according to the level of education

(SKK)

Level of education	No. individuals in the sample	Representing number of habitants	Non-weighted		Weighted	
			Mean	Median	Mean	Median
			2005			
2	19	6497	108877	96000	107577	96000
3	293	100472	157517	144001	156325	144000
5	85	28904	224644	220000	222288	216001
6	5	1588	491202	634168	495703	634168
			2006			
2	27	9685	122431	96000	142332	96000
3	323	114748	175321	150000	176195	150000
5	92	33622	280353	210000	279365	210000
6	5	1737	484600	333000	484706	333000

Source: Own calculation based on data from – EU SILC 2005, 2006.

T a b l e 7a

Work-related income of age group 50 – 54 according to the level of education (SKK)

Level of education	No. individuals in the sample	Representing number of habitants	Non-weighted		Weighted	
			Mean	Median	Mean	Median
			2005			
2	83	28631	116603	102069	116813	102069
3	665	222640	162725	147126	162373	146250
5	181	59177	239984	213000	239488	213000
6	12	3801	236843	219614	234402	206426
			2006			
2	67	24593	111330	101800	113113	101800
3	652	231940	171474	150098	170753	150000
5	158	54825	275169	223400	274575	223000
6	13	4999	315077	300000	306702	300000

Source: Own calculation based on data from EU SILC 2005, 2006.

The unweighted arithmetic mean values for groups according to levels of education seem to suggest that there was a substantial growth in both pension and work-related incomes (with the exception of level of education 5). The data do not capture all education structures (for instance, groups 0, 1 and 4 are missing in EU SILC database for Slovakia) and replacement rates were therefore computed from the recorded data.

2.2.2. Average and median values of per head income based on household data

Individuals who were selected according to the variable PX 050 **(**the most frequent status of economic activit**y)** from the category P (personal data for cross-sectional survey) belong to the age groups 55 – 59 and 65 – 69 (also for age groups 50 – 54 and 60 – 64) in line with variable PX 030 (household identification) and they were given some characteristics from category H (household data for cross-sectional survey), which were necessary to compute average income for each household member (HY 020 – total household disposable income; HY 022 – total household income before social transfers including old-age pension and survivors' pension; HX 070 – number of persons in the household; and HX 080 – number of adult persons in the

household). Average and median (weighted and unweighted) incomes per household member are in table 8 and table 8a.

Table 8
Average values of pension income per household member for the age groups 65 – 69 and 60 – 64 in SKK

Age group	Indicator	No. Individuals in the sample	Representing number of habitants	Unweighted		Weighted	
				Disposable income	Disposable income before social transfers	Disposable income	Disposable income before social transfers
		2005					
65 – 69	Mean	575	201650	114860	110112	113602	108757
	Median			108279	106051	107413	105270
60 – 64	Mean	600	209682	121485	112983	120536	111964
	Median			115974	109882	114181	109500
		2006					
65 – 69	Mean	630	210332	129351	124157	128696	123555
	Median			120119	116735	119408	116604
60 – 64	Mean	622	211253	133371	128384	133618	128499
	Median			126885	123396	127460	123638

Source: Own calculation based on data from EU SILC 2005, 2006.

In case of weighted average and median values, the variable PB 040 (personal cross-sectional weight) was used.

Table 8a
Average values of work-related income per household member for the age groups 55 – 59 and 50 – 54 in SKK

Age group	Indicator	No. Individuals in the sample	Representing number of habitants	Unweighted		Weighted	
				Disposable income	Disposable income before social transfers	Disposable income	Disposable income before social transfers
		2005					
55-59	Mean	402	137461	171419	163705	170248	162561
	Median			156701	147900	156083	147764
50-54	Mean	942	314618	156059	147474	155178	146539
	Median			145066	138554	144746	138554
		2006					
55-59	Mean	458	163710	187339	181050	188012	181700
	Median			167457	161589	167888	162323
50-54	Mean	893	317163	178059	168333	178181	168571
	Median			159352	151478	159876	151784

Source: Own calculation based on data from EU SILC 2005, 2006.

3. DESCRIPTION OF INDICATORS

The central focus of our computation is to figure out replacement rates, which help to estimate the likelihood of a fall in disposable income at old-age. In order to capture these movements, we used the following replacement rates:

- Gross replacement rates that compare the development of average wages with average old-age income (from 1989 to 2006) and show how gross replacement rates of work-related income for pensioners in the Slovak Republic (table 9).
- Gross replacement rates that indicate the changes in the pension system (PAYG), which came to force in January 2004 (table 11 and Graph 3).
- Net replacement rates that indicate the development wages and old-age income (after tax deduction from gross wages) so far (table 1),
- Gross cross-sectional aggregate replacement rates based on individual data; where replacement rate (RR) is defined as follows based on data taken from SILC 2005, 2006):

$$RR = [PY\ 100 + PY\ 110]/[\ PY\ 010 + PY\ 020 + PY\ 050]$$

Where,

RR = Replacement rate
PY 100 = Old-age benefit
PY 110 = Survivors´ benefit.
PY 010 = Employee cash or near cash income
PY 020 = Non-Cash employee income
PY 050 = Cash benefits or losses from self-employment.

The replacement rates are computed for both genders and for each gender (table 12 and 12a) and for each sex according to education standard (table 13 and 13a).

Net cross-sectional replacement rates based on the average individual income in a household where per capita income was defined as follows:

HY 020 = Total disposable household income, which captures the gross average household income after regular income taxes are being deducted (HY 120G), regular monetary transfers between households (HY 130G) and income tax and transfers to the social insurance (HY 140G);

HY 022 = Total disposable household income, before social transfers other than old-age and survivors benefits.

Replacement rates were defined as follows:

RR = HY 020/ average number of household members according to Modified Scale OECD for the purpose of AIM (column 1 and – 3 in table 13 a 13a);
RR = HY 022/ average number of household members according to Modified Scale OECD for the purpose of AIM (column 2 and – 4 in table 13 and 13a).

4. RESULTS

4.1. Replacement rates based on average wages and average pensions

Gross replacement rates based on average gross wages and average pensions are in table 9. From this table, it is apparent that for the last 15 years (on average) gross replacement rates have been declining, which suggests that growth in average pension incomes did not catch up with that of average wage growth.

Table 9
Gross replacement rates

Year	Average monthly wage gross (SKK)	Average monthly pension net (SKK)	Gross replacement rate (percent)
1989	3142	1544	49.14
1990	3278	1673	51.04
1991	3770	2025	53.71
1992	4543	2199	48.40
1993	5379	2532	47.07
1994	6294	3049	48.44
1995	7195	3320	46.14
1996	8154	3727	45.71
1997	9226	4124	44.70
1998	10003	4490	44.89
1999	10728	4878	45.47
2000	11430	5382	47.09
2001	12365	5782	46.76
2002	13511	6104	45.18
2003	14365	6503	45.27
2004	15825	7046	44.52
2005	17274	7713	44.65
2006	18761	8226	43.85

Source: Statistical Office of the Slovak Republic and own calculations.

Table 10 presents net replacement rates for selected years.

Table 10
Net replacement rates

Year	Average monthly wage gross (SKK) (1)	Average monthly wage net (SKK) (2)	Average monthly pension net (SKK) (3)	Net replacement rate (per cent) (3)/(2)
1989	3142	2310	1544	66.84
1995	7195	5686	3320	58.39
2000	11430	9228	5382	58.32
2005	17274	13509	7713	57.10

Source: Statistical Office of the Slovak Republic and own calculation

From the development of net replacement rates, which compares pension income with average net wages, it also implies that replacement rates were declining. The decline between 2000 and 2005 was registered despite the introduction of the flat tax policy and reduction of tax burdens on income for physical persons, and the implementation of the pension reform in 2004.

Table 11
Gross replacement rates based on the amount of wage before and after changes in the first pillar of the pension system (from the 1st of January 2004)

2003			2005		
Gross wage (SKK) (1)	Pension (SKK) (2)	Replacement rate (per cent) (3)	Gross wage (SKK) (4)	Pension (SKK) (5)	Replacement rate (per cent) (6)
4050	4887	120.67	4 748	4686	98.69
5400	5360	99.26	6 330	5170	81.67
6750	5974	88.50	7 913	5655	71.46
8100	6554	80.91	9 495	6140	64.67
9500	6753	71.08	11 078	6624	59.79
10800	6937	64.23	12 660	7109	56.15
12200	7107	58.25	14 243	7594	53.32
13500	7107	52.64	15 825	8079	51.05
14900	7107	47.70	18 990	9694	51.05
16200	7107	43.87	22 155	10825	48.86
16900	7107	42.05	26 903	12127	45.08
18800	7107	37.80	31 650	13563	42.85
22000	7107	32.30	33 233	14042	42.25
25300	7107	28.09	36 398	14999	41.21
27000	7107	26.32	39 563	15825	40.00
28700	7107	24.76	42 728	15825	37.04
32000	7107	22.21	47 475	17070	35.96

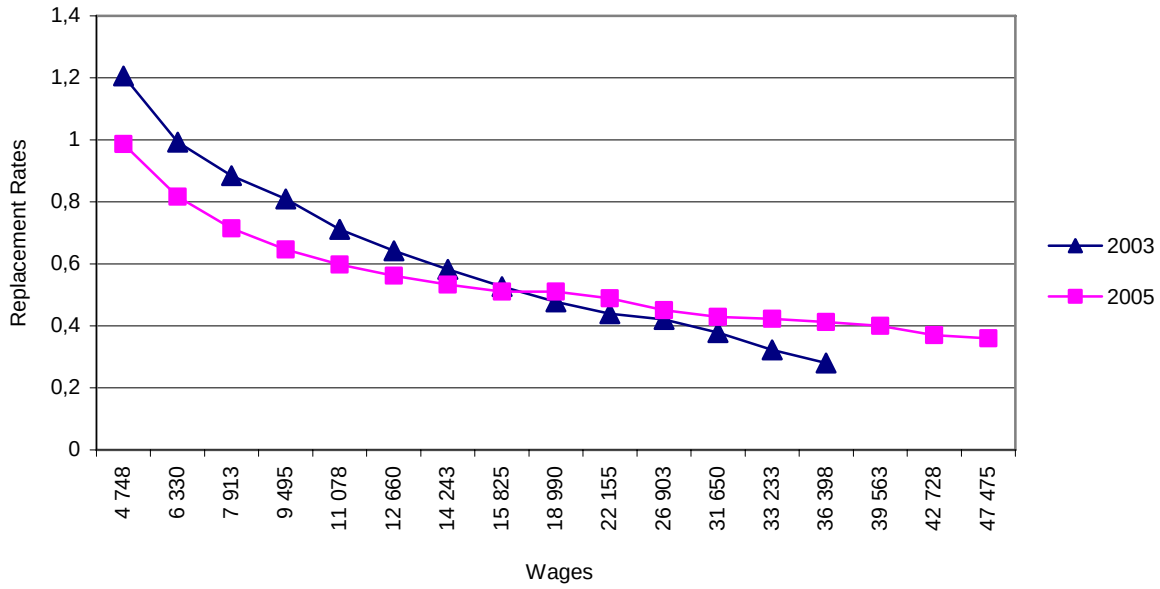
Source: The Social Insurance Agency of the Slovak Republic and own calculations.

Note: In the old pension system until 2003 it was possible to increase retirement pension (column 2, where maximum amount is 7107 SKK) only by working longer.

Table 11 presents data on the amount of declared pension income for 2003 and 2005, corresponding to a hypothetical level of wages for the last preceding years (2002 and 2004) before the assignment of the pension[10]. The data on pensions in table 12 are computed based on the average number of years spent at work (38.00 years). The average true value for the number of years worked in 2005 for new pensioners were 38.38, of which 36.23 for women and 42.97 for men (Socialna poistovna, 2005). One of the consequences of the new pension system was reflected in the declining rate of solidarity, where after the new system has been put in force, those with higher pre-retirement income were better off than those with lower pre-retirement income. This is reflected in the growth of replacement rates for high-income pensioners and a decline in the replacement rates for low-income pensioners (see graph 3).

G r a p h 3

Change in the slope of replacement rates based on wages before and after the change in the first pillar of pension system (from the 1st January 2004)



Source: Own calculations based on data from Social Insurance Agency of the Slovak Republic.

[10] This is, therefore, a hypothetical level of wage simply because the amount of pension income in both first and second pillars doesn't depend on the previous period wage, which was not the case in the old pension system, where, for instance, out of the previous ten years, five years with the highest wage would have been taken into account in order to determine the retirement pension.

The essence of the change in relation to the dynamics in replacement rates is reflected in the shift in the slope of the graphs (moderate decline in replacement rates in 2005 compared with 2003). With the gradual changes in the rules of computing average wage points (as indicated in table 1) until 2014 when the transition period that started in 2004 terminates, the slope of the first pillar will have a more smooth dynamics (graph 1). This is mainly due to the effect of a gradual fall in the rate of solidarity and adjustment of replacement rates for all income groups.

4.2. Replacement rates based on data from EU SILC (cross-sectional)

4.2.1. Replacement rates based on individual data

Table 12 presents average replacement rates (for 2005 and 2006) computed for average individual data on income after and before retirement.

Table 12
Average replacement rates based on individual data for age groups 65-69/55-59 (per cent)

		Unweighted		Weighted	
		Mean	Median	Mean	Median
		2005			
Total	(1)	49.43	55.29	49.75	55.94
Men	(2)	51.81	59.15	52.04	59.33
Women	(3)	49.48	52.39	50.49	52.91
		2006			
Total	(4)	48.23	56.87	47.65	56.94
Men	(5)	47.23	57.89	46.60	57.77
Women	(6)	55.10	56.80	54.42	57.34

Source: Own calculation based on data from EU SILC 2005, 2006.

The most significant information from table 12 is that the weighted median value for replacement rates for men and women altogether (total) has increased. However, since we only have two years for the age group 65 – 69 (most of who are assumed to have retired during the old pension system, valid until 2003), the results would rather have better implications for international comparison purposes. This is particularly significant for women as their statutory retirement age in the old pension

system was 53 – 57 (depending on the number of children). In this respect, despite of shorter number of years spent at work for women compared to their men counterparts; their replacement rates did not lag too far behind the replacement rates of men.

The highest decline for men was recorded in the replacement rate expressed like the weighted mean, which declined from 52.04 % in 2005 to 46.60 % in 2006. The most likely explanation is the growth rate of wages in 2005, which rewarded more the age group 55 – 59 compared to the growth of pensions in the age group 65 – 69. Replacement rates for the age groups 50 – 54 and 60 – 64 are in table 14a.

T a b l e 12a
Average replacement rates based on individual data for age groups 60-64/50-54 (per cent)

		Unweighted		Weighted	
		Mean	Median	Mean	Median
		2005			
Total	(1)	47.77	53.93	48.06	54.59
Men	(2)	47.20	53.43	46.97	53.41
Women	(3)	49.79	53.47	50.54	55.90
		2006			
Total	(4)	49.71	59.52	49.94	59.47
Men	(5)	49.16	56.20	46.29	59.17
Women	(6)	56.10	58.82	56.02	58.84

Source: Own calculation based on data from EU SILC 2005, 2006.

The results in table 12 and 12a (calculated for different age groups) indicate that the differences in replacement rates are significant, mainly for men based on the type of age group.

In addition to gender comparison, we also looked at the impact of the level of education on replacement rates for both age groups (65-69/55-59 and 60-64/50-54). The aggregate replacement rates based on individual data are in table 13 and 13a.

Table 13
Average replacement rates based on individual data
(age groups 65-69/55-59) **in relation to level of education** (per cent)

Level of education	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005			
2	70.64	77.91	71.79	79.13
3	55.81	59.20	56.09	59.25
5	44.03	43.78	44.24	44.59
6	19.25	14.78	19.15	14.78
	2006			
2	68.29	83.51	59.30	84.64
3	56.66	62.75	56.07	62.80
5	36.81	48.92	36.99	48.92
6	19.45	28.31	19.45	28.31

Source: Own calculation based on data from EU SILC 2005, 2006.

Table 13a
Average replacement rates based on individual data (age groups 60-64/50-54)
in relation to level of education (per cent)

Level of education	Unweighted		Weighted	
	Mean	Median	Mean	Median
	2005			
2	62.96	71.78	63.20	72.16
3	52.06	57.56	52.26	57.98
5	40.76	44.40	40.76	44.41
6	46.79	41.46	47.79	44.11
	2006			
2	74.58	79.36	73.72	79.38
3	55.37	62.89	55.42	62.70
5	37.23	44.47	37.42	44.55
6	38.45	42.05	39.29	42.05

Source: Own calculation based on data from EU SILC 2005, 2006.

As we would expect the differences in replacement rates are even deeper once we cluster pensioners according to their levels of education. These differences are caused mainly by wage rate growth for the age group 55 – 59 and to a great extent influenced by the number of persons included in each level of education for both age groups (55 – 59 as well as 65 – 69).

For instance, there were only from 3 to 13 persons in respective age groups with the education level of 6, and the number of persons in the education level 2 was also very low (from 19 to 83 persons). Therefore, we ruled out to consider other more detailed classification of replacement rates such as type of employment according to ISCO 88 (COM).[11]

4.2.2. Replacement rates based on households data

Tables 14 and 14a presents replacement rates based on average per head income in a household based on age groups 65 – 69 and 55 – 59 (60 – 64 a 50 – 54), which is in line with OECD modified scale for the AIM project.

T a b l e 14
Replacement rates based on average income per head in a household for the age groups 65-69/55-59 (per cent)

Indicator	Unweighted		Weighted	
	Disposable income (1)	Disposable income before social transfers (2)	Disposable income (3)	Disposable income before social transfers (4)
	2005			
Mean	67.01	67.20	66.73	66.90
Median	69.10	71.70	68.82	71.24
	2006			
Mean	69.05	68.58	68.45	68.00
Median	71.73	72.24	71.12	71.83

Source: Own calculation based on data from EU SILC 2005, 2006.

T a b l e 14a
Replacement rates based on average income per head in a household for the age groups 60-64/50-54 (per cent)

Indicator	Unweighted		Weighted	
	Disposable income (1)	Disposable income before social transfers (2)	Disposable income (3)	Disposable income before social transfers (4)
	2005			
Mean	77.85	76.61	77.68	76.41
Median	79.95	79.31	78.88	79.03
	2006			
Mean	74.90	76.27	74.99	76.23
Median	79.63	81.46	79.72	81.46

Source: Own calculation based on data from EU SILC 2005, 2006.

[11] ISCO 88 (COM) – European variant of International Classification of Occupations.

When we compare the values of replacement rates based on individual data (table 12, table 12a the first and the fourth rows) with average household income (table 14, table 14a) based on both respective age groups (65-69/55-59 and 60-64/50-54), we find that replacement rates based on average household data are higher than the ones with individual data. This is true despite the fact that replacement rates in tables (12 and 12a) represent gross replacement rates and replacement rates in tables (14 and 14a) represent net replacement rates. This seems to suggest that a decline in income after retirement, on average, was substantially lower taking into account the average household.

The results in table 14 and 14a suggest that there is a substantial disparity in the computed values depending on the type of age groups.

CONCLUSION

The paper brings a number of important issues. First, the paper discusses the some of the arguments on the necessity of the pension reform. Second, the paper analyses the dynamics of replacement rates after the introduction of the second pillar both from the perspectives of gender differences as well as from the education levels of pensioners. Based on our results, it appears that the decline in income after retirement (after the introduction of the pension reform), on average, was substantially lower taking into account the average household. However, our results and similar other studies seem to indicate that the new pension system was reflected in the declining rate of solidarity, where after the new system has been put in force, those with higher pre-retirement income were better off than those with lower pre-retirement income. This is reflected in the growth of replacement rates for high-income pensioners and a decline in the replacement rates for low-income pensioners.

From a different perspective, the level of education plays a substantial role in terms of determining replacement rates after retirement where those with higher levels of education seem to have done better than those with the lowest level of education. On the other hand, gender does not seem play a critical difference in the replacement rates after retirement.

Nonetheless, given the short history of the pension system in Slovakia, we argue that the differences in the replacement rates are the result of differences in income level for different age groups rather than that of the pension income level itself. This assumption may hold since the computation of pension income (from the first pillar) depends not only on work-related income but also on the number of years of work after the ages of 50 or 55. The replacement rates might have been influenced also by the changes in the household structure. Therefore, it is critical to compute the replacement rates from income level, education level and gender perspectives using the most recent data in order to offer a more solid conclusion.

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Appendix 1

WORK PACKAGES OF AIM PROJECT:

WP1: General conceptual issues and scientific coordination
WP2: Classification of welfare state arrangements
WP3: Public choice, public perceptions and voter preferences
WP4: Modelling of pension systems and their adequacy
WP5: Simulation properties of models of pension systems
WP7: Ensuring sustainability and actuarial fairness through systemic reforms
WP8: Poverty and social inclusion of the elderly
WP9: Maintaining living standards after retirement
WP10: Solidarity between and within generations
WP11: Synthesis, policy issues and dissemination
WP12: General administrative coordination and management of the project