Proposals for Additional Forms of Saving for Retirement in Poland

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Abstract: In order to secure the retirement some Poles decided to save under the third pillar. This article presents proposals for additional forms of saving for retirement in the form of Employee or Personal Equity Plans proposed in the Strategy for Responsible Development - Capital Construction Programme published by the Ministry of Development in July 2016. The study presents the form of voluntary savings under the third pillar and presents an analysis based on modelling of the replacement rate for a proposed rate of return on investment and the annual rate of wage growth.

Keywords: retirement provision, sample forms of additional savings, Employee Capital Plans, Individual Plans Capital, the replacement rate.

JEL codes: J32, J14.

1. Introduction

In order to secure the retirement some Poles decide to save under the third pillar which is a complement to obligatory second pillar and is managed by private institutions. Participation in the third pillar is voluntary. On 07th May 2016 Development and Finance Minister Mateusz Morawiecki presented a "Strategy for Responsible Development - Capital Accumulation Program" (polish: *Strategię Odpowiedzialnego Rozwoju – Program Budowy Kapitału*) whose task is to create good conditions for saving, the strengthening of the Polish pension system by building an effective and voluntary funded pension system and enter in policy strategy of economic

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development. The program presented proposals for additional saving for retirement under the III pillar in the form of Employee or Personal Capital Plans.

The aim of the study is to analyze the proposals contained in the Strategy for Responsible Development - Capital Accumulation Construction Program in the field of Employee and Personal Capital Plans and the identification of possible problems when using the solutions proposed in the project. In addition, current possibilities of voluntary savings under the third pillar and proposals for savings in Employee and Personal Capital Plans will be presented. In particular, the work will present modeling of replacement rates for a proposed rate of return on investment, the annual rate of wage growth and future life expectancy in Employee and Personal Capital Plans.

Assurance retirement security is an important issue for all citizens and the state. Poland is a country of aging, in which each year indicators demographic burden are increasing[1]. The rate of load (number of persons aged 65+ per 100 workers) in 2015 was lower than the average in the EU or OECD countries. This situation will change soon. In 10 years the rate of load in Poland will be lower than the average in OECD countries, and in 60 years will be lower than in the EU and OECD countries. The amount of pension is estimated on the basis of the replacement rate (pension amount to the last salary before retirement). In Poland, the replacement rate from pillar I and II are estimated together by Chądzyński M., Osiecki G. (2017) at a minimum of approximately 30 percent. If these forecasts will come true and the size of the last salary will be equal to 10 000 PLN the amount of pension will be at approx. 3 000 PLN. However, when the last salary will be equal to the national average monthly gross wages and salaries in the corporate sector, the amount of pension will be equal to only 30% of this amount (maybe it will be a level much lower than the national minimum monthly gross wage, minimum subsistence level or minimum existential level[2]). Hence the conclusion that in Poland it is necessary to think about pension insurance and in addition, voluntarily save under the third pension pillar.

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[1] Indicators demographic burden are the burden ratio for older people (the number of people of retirement age (65+) per 100 people of working age or the burden ratio for young people (the number of young people (0-14) per 100 people of working age).

[2] It is estimated that this may be about 80 percent of minimum social security.

2. The third pillar

Since 1999 in the third pillar money in Poland can be saved collectively in Occupational Pension Programmes (polish: *Pracownicze Programy Emerytalne*, PPEs) or save individually: since 2004 in the form of Individual Retirement Accounts (polish: *Indywidualne Konto Emerytalne*, IKE) and the Individual Pension Security Account (polish: *Indywidualne Konto Zabezpieczenia Emerytalnego*, IKZE). One person can save at the PPE, IKE and IKZE simultaneously.

Occupational Pension Programmes created in 1999 (Wykowska, 2014: 9-12)[3]. The PPEs saves in groups. Tax mechanism is used TEE (Tax, Exempt, Exempt). The annual payment limit is 1.2 times of the average monthly gross wages and salaries in the national economy for the year is not less than the amount of the limit from the previous year. Payment to the program brings the employer and employee. The employer premiums are exempt from social security contributions (The Polish Social Insurance Institution), but are subject burdened to income tax. Savings are exempt from capital gain tax. The paid out funds are exempt from income tax (in case of program member's death - inheritance tax and donations tax). The paid out funds can be made after the age of 60 (also after age of 55 if pension rights were obtained).

Individual Retirement Accounts created in 2004 (Wykowska, 2014: 13-15). The IKE saves individually. Tax mechanism used is TEE (Tax, Exempt, Etempt). The annual deposit limit is 3 times of the average monthly gross wages and salaries in the national economy for the year not less than the amount of the limit from the previous year. The contributions are subject to income tax that is paid from the salary. Savings are exempt from capital gains tax. The right to make the withdrawals is after 60 years of age (after 55 years if purchased prior permission retirement were given, and the funds were paid in any 5 years or majority of the funds collected five years before the applying for the payment). There is a possibility of early payment of accumulated funds and then the savings will be taxed with capital gains.

Individual Pension Security Account created in 2012 (Wykowska, 2014: 16-17). In IKZE saves individually. Used tax mechanism is EET (Exempt, Exempt, Tax). The annual payment limit is 1.2 times of the average monthly gross wages and salaries in the national economy for the year is not less than the amount of the limit from the previous year. The contributions are subjected to income tax. However, they are deducted from the tax base at the end of the year (tax exemption).

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[3] Dybał (2016: 273-276) presents a range of PPE in selected countries.

Due to the tax exemption the contributions are exempt from income tax. Savings are exempt from capital gains tax. The disbursements are subjected to 10% flat-rate income tax. The payment can be made after age of 65 if the funds were paid in any 5 years. There is no possibility of early payment of accumulated funds.

Table 1. Data on IKE, IKZE (as of 30.06.2016 r.) and PPE (as of 31.12.2015)

	IKZE	IKE	PPE	Total
Year of creation	2012	2004	1999	-
The number of accounts	613.9 thous.	867 thous.	392.6 thous.	1873.5 thous.
Participation of the working individuals LFS (Labour Force Survey)	3.80%	5.40%	2.40%	11.60%
Assets	764.1 mln PLN	6 mld PLN	10.6 mld PLN	17,36 mld PLN
The number of active accounts *	101.7 thous.	212.2 thous.	329.7 thous.	643.6 thous.
Indicator of active accounts in the first half of 2016..	16.60%	24.40%	84.00%	34.35%
Limit payments in 2016 **	4 866 PLN	12 165 PLN	4 866 PLN	-

* Active account is an account at which was reported at least 1 payment during the period.

** Deposit limit: for PPE that is 1.2 times, on IKE it 3 times, on IKZE is 1.2 times of the average monthly gross wages and salaries in the national economy for the year is not less than the amount of the limit from the preceding year.

Source: own, based on the Financial Supervision Commission (2016); Wykowska, (2014): 18-19.

Accordint to table 1 in Poland, at the end of June 2016 8865,7 thous. working people were recorded and the number of savers (number of accounts) in IKZE accounted for only 3.8 percent (613,9 thous.), in IKE 5.4 percent (867 thous.) and in the EPP 2.4 percent (392,6 thous.). The total number of saving accounts under the third pillar represented no more than 11.6 percent of working (1873,5 thous.)[4]. This means that statistically only once every 8 Pole working cares of his/her pension insurance[5]. It's very little. In addition, not every account is active (for which payments are made). The total number of active accounts in the first half of 2016 years accounted for only 643.6

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[4] One person may have three accounts, while at the same time saves at IKE, IKZE and PPE. In the future at the Department of Social Security, the Central Electronic Record of voluntary pension schemes will be built, to determine the number of savers in the third pension pillar (it will help with defying the number of people saving in third pillar).

[5] 1 divided by11,6% is 8.62.

thousand accounts, which is a maximum of only 4 percent people working saving for retirement[6]. This means that statistically only one in 25 working Poles thought about retirement insurance (given that some of those working make payments at the end of the year, in the second half of 2016 recorded will be more contributions). However, the number of employees who are thinking about additional saving for retirement is insufficient.

At the end of the first half of 2016 the number of members in the PPE amounted to 392.6 thousand and was more than 3.77 times less than in the IKE and IKZE total (1,480.9 thousand[7]), and the value of accumulated assets in PPE equal to 10.6 billion PLN was 1.56 times higher than in the IKE and IKZE total (PLN 6.764 billion, table 1). Such a situation results undoubtedly because of the length of the period of operation of saving form (PPE has run since 2004, the IKE since 2012, and IKZE since 2012). However, it can be concluded that the voluntary nature of the IKE and IKZE does not contribute to the universality of these products, and does not contribute to significant savings. At the end of June 2016. the total value of accumulated assets in PPE, IKE and IKZE (17.36 billion PLN) accounted for just over 1% of GDP, which is at a level much lower than in Western European countries. Hence it can be concluded that the voluntary nature of the IKE and IKZE does not contribute to the universality of these products, and does not contribute to significant savings. In order to secure retirement common products should be looked for (obligatory or quasi-obligatory), which, through regularity accumulate more savings for pension purposes.

Low interest in additional security retirement shows little interest in the products of the third pillar. It may be the effect of low pension consciousness (knowledge about the necessity of additional savings); ignorance or misunderstanding of the voluntary pension products; too little incentive for your long-term savings (benefits are too small or shifted in time for retirement); lack of financial resources resulting from the low wages (and the savings compared to other EU countries). In order to improve this situation, undoubtedly the pension awareness of citizens should be risen, the existing (and still look for new) possibilities of saving for retirement should be presented, the benefits in voluntary saving under the third pillar (i.e. financial benefits from tax exemptions, increase of the replacement rate) should be shown. But is it enough to cover the

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[6] 643,6 thousand of accounts is 34.5% from 1873,5 thousand accounts; 4% equals 34,5% from 11,6 percent from working.

[7] 1480.9 thousands of accounts equals 867 thousands of IKE accounts adding 613.9 thousands of IKZE accounts.

pension gap[8]? The role of the Government is to create certain conditions, as well as attractive incentives for long-term savings and building security of retired citizens. Socio-economic development contributes to the household savings rate (% of disposable income) and increase of spendings for pension purposes.

3. Employee and Personal Capital Plans

The seven main pillars of the Strategy for Responsible Development - Capital Building Programs are:

I) Employee Capital Plans - the introduction of a general system of voluntary third pillar occupational pension programs in the enterprise sector.

II) Reform of the third pillar individual pension schemes - simplified IKE and IKZE and introduction of Personal Capital Plans for micro-enterprises.

III) The safety and effectiveness of pension schemes - Polish Development Fund will bean institution managing Employee Capital Plans on the stage of their development.

IV) Information on capital pension plans in one place.

V) Public Real Estate Funds – will provide an universal access to real estate investment at real estate market .

VI) Infrastructure bonds and bonus bonds – will be an attractive offer of treasury and infrastructure bonds for individual investors.

VII) Development of a secure long-term savings - lower taxes on income from long-term investments in excess of one year (that is, introduce incentives for long-term savings).

The Capital Building Program is expected to come into force from 2018. First, to be included in the program, are big and medium-sized enterprises forming Employee Capital Plans (since January 2018), and then micro ones (from January 2019) forming Personal Capital Plans.

Employee (Equity) Capital Plans (polish *Pracownicze Plany Kapitałowe*, short PPK) and Personal (Individual) Capital Plans (*Indywidualne Plany Kapitałowe*, short IPK) are to be common form of saving for the retirement and to work at a voluntary III pillar. Their goal is a significant increase in security and retirement income. The employer in the sector of large and medium-sized

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[8] Pension gap is the difference between the expected value of the pension at the level of the last salary before retirement, and the amount paid to a pensioner (Feldman et al. 2014: 38-39).

company (employing more than 19 employees) will be created automatically PPK for all employees. Employees will be able to declare withdrawal from participation within 3 months from the record. In small companies (employing up to 19 employees) the employer will propose the establishment of IPK employees.

The contribution should consist of welcome contributions and the contributions paid by the employer (an employer contribution) and the employee (an employee contribution). Welcome contribution (250 PLN) will be financed from the state budget (Labour Fund). The minimum (obligatory) employee contribution will equal to 2 percent of his/her salary (to be exempted from contributions for pension insurance). The minimum (obligatory) employer contribution equals to 2 percent of gross salary (of which 1.5 percent of salary will pay the employer and 0.5 per cent of salary will be paid from a Labor Fund). The employer can voluntarily increase the premium by an additional 1 percent. The employee may voluntarily increase the contribution of an additional 2 percent and if an employee has a dependent, who does not work, his contribution may rise by even 1 percent. The maximum contribution for the employer is 4%, and for the employee is 5%.

(Fiscal incentives). Welcome contribution 250 PLN is to be paid from public funds. The contribution of the employee is to be freed from contributions for pension insurance. The contribution of the employer is to be exempt from social security contributions and to be at the expense of passage to obtain (at the same time does not exceed 1.5 per cent of all employer's costs and should not affect the overall cost of the employer). 0.5 per cent of the employer contribution will be paid from a Labor Fund.

(Payment of benefits). The program envisages that up to 25 percent of the accumulated funds will be able to be paid out at once after reaching retirement age and will be exempt from capital gains tax. A minimum of 75 percent accumulated funds to be paid after retirement in the form of periodic benefits - term or perpetual annuities. Up to 15 per cent of accumulated funds can then be used in case of health problems based on decision on work incapacity work. Part of the contributed funds can be used to purchase first flat (eg. down payment). After 5 years of grace, participant of the program is expected to begin repayment of the money used for its own PPK account for the next 5 years.

In case of liquidation of the Capital Plan all funds (from the government) must be returned. The program does not specify whether the savings will be exempt from capital gains tax or from paid contributions the income tax will have to be paid. During the presentation of the program on

the Stock Exchange in Warsaw the proposes to reduce the capital gains tax from 19 percent to 10 percent were presented.

Employee Plans Capital will be operated by (up to 24 months) financial institution - Polish Development Fund (*Polski Fundusz Rozwoju*, short PFR) which offers investment funds adapted to the age of the savers, the funds of the defined date. The investment policy has to be adjusted to the risk profile -age savers. After 24 months, there is to appear a full competition in the capital market for micro-enterprises. Funds dispatched by PFR will be used to strengthen the financial market. Limit of the total cost of the product cannot exceed 0.6 percentage points. Under the Capital Construction Program simplified procedures for occupational retirement provision will be developed and Individual Plans are to be conducted by institutions operating in the market.

4. Results of the analysis

The Capital Construction Plan presents the results of analyzes of saving for retirement by a person working and saving in the Employee Capital Plans (PPK) or Personal Capital Plans (IPK). In the project the following assumptions were : the initial salary of an employee at the level of the average gross monthly salary of 4313 PLN, the real annual growth rate of wages is 2%, real annual rate of return on investment is 3%, the duration of payment of pension is 18 years. The simulation results are presented for the contribution of 4% and 7% of salary and the period of saving 25 and 40 years. If the premium is paid at 4% of salary during the whole period savings equal to:

- o For 40 years the final capital will accumulate to the sum of 233 thousand PLN, with the monthly pension benefits will be equal to 1400 PLN, which will increase the replacement rate by 15 percentage points.
- o For 25 years the final capital will accumulate to the sum of 102 thousand. PLN, for which the monthly pension benefits will be equal 612 PLN, which will increase the replacement rate by 6 percentage points.

In the case of contributions of 7% of the salary during the whole saving period equal to 40 years accumulation of the final capital to the sum of 408 thousand PLN and monthly pension benefits of 2446 PLN, an increase in the replacement rate of 26 percentage points. In the case of contributions of 7% of the salary during the whole saving period equal to 25 years accumulation of the final

capital to the sum of 178 thousand PLN, monthly pension benefits of 1068 PLN, an increase in the replacement rate of 11 percentage points.

The aim of saving with PPK and the IPK has to be an important improvement of pension benefits through the "clear" growth of the replacement rate. However, if presented replacement rates are not too optimistic and have a chance to become true? The replacement rate depends on the amount of the actuarial future value of accumulated funds in the period saving, the level of which undoubtedly depends on the real annual rate of return on investment. Level of the real annual rate of return on investment, accepted in the model of 3% seems to be very optimistic.

In addition, Capital Construction Plan does not specify whether and when the savers will have to pay tax. Will the income tax from the premiums have to be paid? Will the capital tax from the profits have to be paid and if so, at what amounts? Paying the taxes will reduce the expected replacement rate.

Consider the 3 models capital plans, in which the total pension contribution will amount to 4% of salary in a given year, for different real interest rates: 1, 2, and 3%. All models assume: initial salary at 4 333PLN, real wage growth of 2% per year, saving period is 40 years, the frequency of pay-outs is monthly, and duration of payment of pension for 18 years.

The final salary – the level of salaries in the n-year saving was calculated as:

$$W_n = W_1 (1+s)^{n-1} \tag{1}$$

where: W_1 is an initial salary equal 4 333 PLN, s is a real annual growth of salary, n is a saving period.

The accumulated value of annuities-immediate[9] where payments of R are paid at the end of each period for n periods was calculated by Kellison S. (1991): 58 as:

$$R\left(1+(1+i)+(1+i)^2+...+(1+i)^{n-1}\right)= R \cdot \frac{(1+i)^n -1}{i} = R \cdot s_{\overline{n|}} \tag{2}$$

where: R size of the payment, $s_{\overline{n|}}$ is the accumulated value of n-periodic annuity-immediate paid at the end of each period, n saving period.

The accumulated value of annuities-immediate payable with more frequency than capitalization, where payments of $\frac{1}{m}$ are paid at the end of each period for mn periods was calculated (Kellison S. 1991: 103) as:

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[9] An annuity is a series of payments paid at equal intervals of time.

$$s_{\overline{n}|}^{(m)} = \frac{(1+i)^n - 1}{i^{(m)}} \tag{3}$$

where: m is the number of payment periods in one period of capitalization ($m \in N$), i is an interest rate, mn is a number of annuity payments, $\frac{1}{m}$ is an amount of payment (sum payment in one period of capitalization is 1).

The final value of the accumulated funds during the saving was calculated as:

$$K_n = \sum_{j=1}^{n} k \cdot W_j \cdot 12 s_{\overline{12}|}^{(12)} (1+i)^{n-j} \tag{4}$$

where: k is the total contribution paid by the employee and the employer during the whole period of saving, W_i amount of the salary in i-year of saving, $s_{\overline{12}|}^{(12)}$ the accumulated value of annuity-immediate paid 12 times in 1 year in amount of payment equal 1/12, n is saving period.

The amount of pension was calculated as:

$$\widetilde{R} = \frac{K_n}{m \cdot \ddot{a}_{\overline{n}|}^{(m)}} \tag{5}$$

where: $\ddot{a}_{\overline{n}|}^{(m)}$ is the present value of annuity-due where payments of $\frac{1}{m}$ are paid at the beginning of each period for mn periods (n years), K_n is the final value of the accumulated funds during the saving.

The present value of time annuity-due (incompatible) payable with more frequency than the capitalization, where payments of $\frac{1}{m}$ are paid at the beginning of each period for mn periods is was calculated (Kellison S. 1991: 102) as:

$$\ddot{a}_{\overline{n}|}^{(m)} = \frac{1 - v^n}{d^{(m)}} = \frac{1 - v^n}{\frac{i^{(m)}}{1 + i^{(m)}}} \tag{6}$$

where: m is the number of payment periods in one period of capitalization ($m \in N$), i is an interest rate, mn is a number of annuity payments, $\frac{1}{m}$ is an amount of payment (sum payment in one period of capitalization is 1), $v = (1+i)^{-1}$ to discount factor.

The replacement rate was calculated as:

$$r = \frac{\widetilde{R}}{W_n} = \frac{K_n}{W_n 12 \cdot \ddot{a}_{12n|}^{(12)}} = \frac{\sum_{j=1}^{n} k \cdot W_j \cdot 12 s_{12|}^{(12)} (1+i)^{n-j}}{W_1 (1+s)^{n-1} 12 \ddot{a}_{12n|}^{(12)}} = \frac{\sum_{j=1}^{n} k \cdot W_1 (1+s)^{j-1} \cdot s_{12|}^{(12)} (1+i)^{n-j}}{W_1 (1+s)^{n-1} \ddot{a}_{12n|}^{(12)}}$$

$$r = \frac{s_{12|}^{(12)}}{\ddot{a}_{12n|}^{(12)}} \sum_{j=1}^{n} k \cdot \frac{(1+s)^{j-1}}{(1+s)^{n-1}} \cdot (1+i)^{n-j} = \frac{s_{12|}^{(12)}}{\ddot{a}_{12n|}^{(12)}} \sum_{j=1}^{n} k \cdot \frac{(1+s)^{j-1-n+1}}{1} (1+i)^{n-j} = \frac{s_{12|}^{(12)}}{\ddot{a}_{12n|}^{(12)}} \sum_{j=1}^{n} k \cdot \left(\frac{1+i}{1+s}\right)^{n-j} \quad (7)$$

where: K_n is the final value of the accumulated funds during the saving, W_n is the final salary – the level of salaries in the n-year saving, $\ddot{a}_{12n|}^{(12)}$ is the present value of annuity-due paid monthly of $\frac{1}{12}$ at the beginning of each month over n=18 years, $s_{12|}^{(12)}$ the accumulated value of annuity-immediate paid (at the end of each month) 12 times in 1 year, k is the total contribution paid by the employee and the employer during the whole period of saving, n is the period of savings.

At the beginning of the study the amount of the salary at the time of retirement - the value of final salary after 40 years of saving, taking into account the annual rate of salary increase of 2%, was calculated using the formula (1). Then for models 1-3 the final value of the accumulated funds in the saving period was calculated using the formula (4), assuming real interest rate equal to 3%, 2% and 1%. In further research it was assumed that the residual value of funds raised is the initial capital (present value) of pension benefits calculated using the formula (5-7). Retirement benefits can be paid in full (100%) in the form of an annuity payable at the end of each month for 18 years or alternatively 25% paid as lump sum and 75% in the form of pension paid at the end of each month for 18 years. Subsequently, the amount of pension benefits and replacement rates in two variants payments is shown.

At the end of study the replacement rates were calculated for the three variants of the taxation models 1-3: the first assumed a 10% tax on capital gains, in the second 19% capital gains tax, in the third established a 10% tax on benefits paid and 19% capital gains tax (ETT model). The analysis results are shown in Table 2.

Consider the model 1 - the real interest rate will be equal 3%, and the total pension contribution will amount to 4% of salary in a given year (Table 2). This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 222 212.4 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 14.1% (in Capital Construction Plan was 15%). If saver will pay out 25% of the funds collected at once (55 553 PLN), the replacement rate will fall to 13.5%. If the premiums paid will not be taxed, and taxed will be

savings of 10% (capital gains tax), the replacement rate will be equal to 13% (or 10.1% if the earlier payment occurs of 25% of the accumulated capital). If the premiums paid will not be taxed, and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 10.6% (or 9.7% if the earlier payment occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 9.5% (or 8.8% if accumulated capital will be paid out over 25% of its sum).

Table 2. Results of the simulation for replacement rates of model 1-model 3

the total contribution during the whole period of saving	4%					
the frequency of payment of contributions	Monthly					
initial salary	4333 PLN					
real annual rate of salaries	2%					
final salary	9 379,81 PLN					
the period of payment of funds	18 year					
real interest rate	3%		2%		1%	
the final value of accumulated funds	222 212.40 PLN		181 737.32 PLN		150 260.97 PLN	
payment of 25% of the funds as a single benefit	no	55 553 PLN	No	45 434 PLN	no	37 565 PLN
replacement rate / of tax — percent of the funds collected	100%	75%	100%	75%	100%	75%
replacement rate without tax	14.1%	13.5%	10.7%	8.0%	8.1%	6.1%
replacement rate of tax on capital gains 10%	13.0%	10.1%	10.3%	7.7%	8.0%	6.0%
replacement rate of tax on capital gains 19%	10.6%	9.7%	10.0%	7.5%	7.8%	5.9%
replacement rate of income tax of 10% (with payment) and the tax on capital gains 19%	9.5%	8.8%	7.2%	6.8%	5.5%	5.3%

Source: own calculation.

Consider the model 2 - the real interest rate will be equal 2%, and the total pension contribution will amount to 4% of salary in a given year (Table 2). This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 181 737.32 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 10.7%. If saver will pay out 25% of the funds collected at once (45 434 PLN), the replacement rate will fall to 8%. If the premiums paid will not be taxed, and taxed will be savings of 10% (capital gains tax), the replacement rate will be equal to 10.3% (or 7.7% if the earlier payment occurs of 25% of the

accumulated capital). If the premiums paid will not be taxed, and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 10% (or 7.5% if the earlier payment occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 7.2% (or 6.8% if accumulated capital will be paid out over 25% of its sum).

Consider the model 3 - the real interest rate will be equal 1%, and the total pension contribution will amount to 4% of salary in a given year. This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 150 260.97 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 8.1%. If saver will pay out 25% of the funds collected at once (37 565 PLN), the replacement rate will fall to 6.1%. If the premiums paid will not be taxed, and taxed will be savings of 10% (capital gains tax), the replacement rate will be equal to 8% (or 6% if the earlier payment occurs of 25% of the accumulated capital). If the premiums paid will not be taxed, and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 7.8% (or 5.9% if the earlier payment occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 5.5% (or 5.3% if accumulated capital will be paid out over 25% of its sum).

Consider models 4-6, in which the total pension contribution will amount to 7% of salary in a given year. In the model 4 the real interest rate will be equal to 3%, in the model 5 the real interest rate will be equal to 2% and in the model 6 the real interest rate will be equal to 1%. All models assume: initial salary at 4333PLN, real wage growth of 2% per year, saving period is 40 years, the frequency of pay-outs is monthly, and duration of payment of pension for 18 years. The results of the simulation of models 4-6 are shown in Table 3.

Consider the model 4 - the real interest rate will be equal 3%, and the total pension contribution will amount to 7% of salary in a given year (Table 3). This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 388 871,4 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 24.7% (in Capital Construction Plan was 26%). If saver will pay out 25% of the funds collected at once (97 217 PLN), the replacement rate will fall to 18.5%. If the premiums paid will not be taxed, and taxed will be savings of 10% (capital gains tax), the replacement rate will be equal to 23.7% (or 17.7% if the earlier payment occurs of 25% of the accumulated capital). If the premiums paid will not be taxed,

and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 22.7% (or 17% if the earlier payment occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 16.7% (or 15.3% if accumulated capital will be paid out over 25% of its sum).

Table 3. Results of the simulation for replacement rates of model 4-model 6

the total contribution during the whole period of saving		7%				
the frequency of payment of contributions		Monthly				
initial salary		4 333 PLN				
real annual rate of salaries		2%				
final salary		9 379.81 PLN				
the period of payment of funds		18 year				
real interest rate		3%		2%		1%	
the final value of accumulated funds		388 871.40 PLN		318 040.03 PLN		262 956.49 PLN	
payment of 25% of the funds as a single benefit		no	97 217 PLN	No	79 510 PLN	no	65 739 PLN
replacement rate		percent of the funds collected	100%	75%	100%	75%	100%	75%
		replacement rate without tax	24.7%	18.5%	18.7%	14.0%	14.2%	10.6%
	of tax	replacement rate of tax on capital gains 10%	23.7%	17.7%	18.1%	13.6%	13.9%	10.5%
		replacement rate of tax on capital gains 19%	22.7%	17.0%	17.6%	13.2%	13.7%	10.3%
		replacement rate of income tax of 10% (with payment) and the tax on capital gains 19%	16.7%	15.3%	12.6%	11.9%	9.6%	9.3%

Source: own calculation.

Consider the model 5 - the real interest rate will be equal 2%, and the total pension contribution will amount to 7% of salary in a given year (Table 3). This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 318 040.03 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 18.7%. If saver will pay out 25% of the funds collected at once (79 510 PLN), the replacement rate will fall to 14%. If the premiums paid will not be taxed, and taxed will be savings of 10% (capital gains tax), the replacement rate will be equal to 18.1% (or 13.6% if the earlier payment occurs of 25% of the accumulated capital). If the premiums paid will not be taxed, and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 17.6% (or 13.2% if the earlier payment

occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 12.6% (or 11.9% if accumulated capital will be paid out over 25% of its sum).

Consider the model 6 - the real interest rate will be equal 3%, and the total pension contribution will amount to 7% of salary in a given year (Table 3). This final salary will be equal to 9 379.81 PLN, and the final value of funds raised will be equal 262 956.5 PLN. If in the checked model, the contributions will not be taxed, the replacement rate will be equal to 14.2%. If saver will pay out 25% of the funds collected at once (65 739 PLN), the replacement rate will fall to 10.6%. If the premiums paid will not be taxed, and taxed will be savings of 10% (capital gains tax), the replacement rate will be equal to 13.9% (or 10.5% if the earlier payment occurs of 25% of the accumulated capital). If the premiums paid will not be taxed, and taxed will be savings of 19% (capital gains tax), the replacement rate will be equal to 13,7% (or 10.3% if the earlier payment occurs of 25% of the accumulated capital). If the premiums will be subjected to 10% tax on income and capital gains will pay 19% tax, the replacement rate will be equal to 9.6% (or 9.3% if accumulated capital will be paid out over 25% of its sum).

4. Conclusion

Models 1-6 describe the dependence of the replacement rate on real rate of return on investment (interest rate) and the amount of pension contributions. The study shows that the rate of pension contributions is positively correlated with the replacement rate (an increase in the pension contribution increases the amount of pension). The research also shows that the real interest rate is positively correlated with the replacement rate (the higher the interest rate the higher the replacement rate). The real interest rate in the test project for the construction of capital is equal to 3%, which seems to be somewhat unrealistic assumption that gives the replacement rate which is too optimistic. In the case of a reduction in the real interest rate the replacement rate decreased significantly.

The Capital Construction Programme does not include tax payments (on contributions and savings and the benefits paid out). It is not known which tax model will be in force for PPK and IPK. When tax is paid (income from contributions or retirement benefits or capital gains tax) pension benefits and replacement rates will decrease. As a result, in model 3 (for a premium of 4%

salary and real rate of return on investment equal to 1% with income tax of 10% of retirement benefits and 19% of capital gains) estimates a replacement rate equal to 5.5%, which is almost three times smaller than the expected exemplary replacement rate of 15% presented in the capital construction programme. As a result, in model 6 (for the contribution of 7% of salary and the real rate of return on investment equal to 1%, with income tax of 10% of the benefits paid out and 19% on capital gains) replacement rate is equal to 9.6%, almost three times less than the expected exemplary replacement rate 26% presented in the capital construction programme. The possibility of making the payment of 25% of final funds accumulated during the savings in the form of one payment only will reduce the amount of pension benefits and a drop in replacement rates (which is not shown in the project).

The models 1-6 assumed that the saving period is equal to 40 years, a person aged 20-25 years (high school graduate or university graduate) saves up to the age of 60-65 years. Such a long period of saving is possible for people aged twenty years, but for older people naturally saving period will be shortened, resulting in a decrease of replacement rates. Bielawska, (2011: 159) underlines that the alignment of the retirement age for men and women, and the increase of appropriate labor market policies will increase and elongation of the professional activity of Poles would have a positive impact on the increase in future pension benefits and improve the public finance sector.

The Plan Construction Capital and studied models assumed the period of payment of benefits equal to 18 years (further life expectancy for a Pole aged 65 in the total life tables of 2015). As a result, the amount of pension benefits does not depend on the average further life expectancy at the moment of transition for retirement. Given that the year-on-year increases in further life expectancy retirement benefits should not be paid periodically for 18 years, but should be paid at the end of life based on the average life expectancy of beneficiaries (for statistical women at retirement age equal 65 years this is 20.06 years, for statistical men at the age of retirement 65 this is 15.71 years, for statistical Pole at retirement age equal 65 years this is 18.01 years, by the total life tables of 2015). If the pension benefits will be paid until the end of life of women, the replacement rate decreases as well. If the benefits will be paid according to the total life tables, the replacement rate for women increase, and men decrease. Jackowska and Wycinka (2012: 5) points out that the Court of Justice of the European Union from the date of 21.12.2012 introduced

prohibition of premium differentials based on gender. As a result, it is suspected that the pension benefits of the PPK and the IPK will be paid according to the total life tables for women.

To summarise, it is worth considering whether proposals for voluntary saving for retirement in the form of PPK and the IPK should be realised. Simulation results for new forms of saving presented in the capital construction programme are very optimistic, however, taking into account the aging of the population (demographic factors such as lengthening the further life expectancy, declining birth rates), the government should introduce common or quasi-obligatory additional saving for retirement. Szumlicz (2015: 305) correctly emphasizes that on order for voluntary pension savings to be realized in practice, it is necessary to make a clear fiscal incentives (tax incentives) for employees and employers. Such a support for participants in the social security system during the period of savings for retirement is underlined by Łyskawa. (2014: 17) and Dybał (2016: 280). "If you are not able to provide an adequate level of social security, expenditure by households should not be taxed in order to increase this level" (Szumlicz, 2015: 306). As a result of exemption of voluntary pension schemes from paying taxes future spending for pension purposes can be freed.

Finally, it is optimistically noted that, if the final accumulated contributions and all retirement benefits estimated on the basis of formulas in mathematics life insurance (annuity certain will be replaced by life annuities that take into account the probability of survival) retirement benefits will increase, which will be the subject of further research.

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Propozycje dodatkowych form oszczędzania na emeryturę

Streszczenie

W celu zabezpieczenia emerytalnego część Polaków decyduje się oszczędzać w ramach III filaru. W artykule przeanalizowane zostały propozycje dodatkowego oszczędzania na emeryturę w formie Pracowniczych lub Indywidualnych Planów Kapitałowych proponowanych w Strategii Odpowiedzialnego Rozwoju – Programie Budowy Kapitału opublikowanej w Polsce przez Ministerstwo Rozwoju w lipcu 2016 roku. W pracy zaprezentowano formy dobrowolnego oszczędzania w ramach III filaru oraz przedstawiono analizę w oparciu o modelowanie stopy zastąpienia dla wybranych realnych stóp zwrotu z inwestycji, rocznego tempa wzrostu wynagrodzeń w Pracowniczych i Indywidualnych Planach Kapitałowych.

Słowa kluczowe: zabezpieczenie emerytalne, formy dodatkowego oszczędzania na emeryturę, Pracownicze Plany Kapitałowe, Indywidualne Plany Kapitałowe, stopa zastąpienia.