

Examination of the adequacy of the voluntary pension fund contribution payments of men with high school diploma as their highest educational attainment

Abstract: With the help of two self-developed calculation models and a self-developed replacement rate, the author seeks an answer to whether the current average level of voluntary pension fund contribution payments can be sufficient so that there is no loss of net income upon retirement with the current pension determination rules for men sorted into three age groups with a high school diploma as their highest educational attainment. The calculations provide an estimate both with and without the full amount of the 13th monthly pension, of what percentage of the gross earnings would be needed to be regularly paid into the pension fund by joining at different ages, and what the actual contribution payment data shows in comparison. The article covers the proportion of those who do not pay any contribution, or pay only a small amount, as well as the average size of individual accounts' balance of those who pay contribution and those who do not, and also formulates proposals for the measures it deems necessary in order to increase the number of pension fund members and the willingness to pay contributions.

Keywords: Pension, voluntary pension fund, replacement rate, loss of income, payment of contribution.

Összefoglalás: A szerző két saját kidolgozású modellszámítás és egy szintén saját kidolgozású helyettesítési ráta segítségével az érettségivel, mint legmagasabb iskolai végzettséggel rendelkező férfiak három életkori csoportjára vonatkozóan keres választ arra, hogy a hatályos nyugdíj-megállapítási szabályok mellett az önkéntes nyugdíjpénztári tagdíjfizetések jelenlegi átlagos szintje elégséges lehet-e ahhoz, hogy a nyugdíjba vonuláskor ne keletkezzen kieső nettó jövedelem. A számítások során mind a 13. havi nyugdíj teljes összegével, mind annak mellőzésével becslést ad arra, hogy a különböző életkorokban történő pénztárba való belépés esetén a bruttó kereset hány százalékat lenne szükséges befizetni rendszeresen egy nyugdíjpénztárba, és ehhez

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képezt mit mutatnak a tényleges tagdíjfizetési adatok. A cikk kitér a tagdíjat nem, vagy csak kis összegben megfizetők arányára, valamint a tagdíjat fizetők és a nem fizetők átlagos egyéni számla egyenlegének nagyságára is, továbbá javaslatokat fogalmaz meg a nyugdíjpénztári taglétszám és a tagdíjfizetési hajlandóság növelése érdekében általa célszerűnek tartott intézkedésekre.

Kulcsszavak: Nyugdíj, önkéntes nyugdíjpénztár, helyettesítési ráta, kieső jövedelem, tagdíjfizetés.

Introduction

In connection with the increasing value of self-care for retirement purposes, in this article I sought an answer to the question of what is the amount of contribution payments that would be necessary for men with a high school diploma as their highest educational attainment sorted into three groups of specific ages (individuals aged 25, 35 and 45 as of 2021) in relation to their gross earnings to pay into a voluntary pension fund so that their net income does not decrease when they retire. To do this, we first need to define what we consider to be lost income at retirement: for this, I have developed a new type of replacement rate. Next, it is necessary to estimate the expected value of the starting amount of the state pension, as well as the expected starting value of the additional pension benefit that can be requested from the voluntary pension fund. The obtained expected contribution payment rates then have to be compared with the average payments that are actually made. In the article, I also present the methodological description of the two models I developed, which I used to estimate the expected starting amount of the state and pension fund pensions. I performed the calculations for six cases of age of entry into the fund, and in each of the examined cases, I also looked at what the result would be if the 13th monthly pension was part of the state benefit, and what would happen if it wasn't. When performing the calculations, I considered the year of 2021 as the reference period, so the used data is valid till that year, and the results are also valued at the 2021 price level.

Description of the models used for the calculations

METHODOLOGY OF THE MODEL USED TO ESTIMATE THE STATE PENSION

The basic characteristics of the model for estimating the loss of income at retirement are the same for all the scenarios examined, so they will be described first. In the case of a male person with a high school diploma as his highest educational attainment, the model determines the expected starting amount of his pension. In order to make the calculation as close as possible to reality, I started off from the wage tariff

survey [1] carried out by the National Employment Service for the year 2016, which shows the average real earnings of people with different educational attainments by age in a given year in comparison with the year 1998, measured at the price level of 2016. The differences between the values belonging to each age group can be interpreted as largely dependent on age and, in relation to this, work experience. In the survey, in the case of men with a high school diploma, data was provided for the period between 20 and 60 years old, on the basis of which the differences between the individual ages can be divided into 4 stages if we try to show the trend of the changes with the help of a linear function. The first stage extends to the age of 25, with an average annual salary increase of 6.44%. After that, the increasing trend continues, but with decreasing steepness: between the ages of 25 and 36 the average rate of wage increase is only 2.25% annually, while between the ages of 36 and 41 it is only 0.49%. From here until the age of 60, the change in wages is quite hectic for individual years, but the long-term trend is now decreasing, the rate is -0.42% per year. Given that the survey does not provide data for the period after the age of 60, I will assume that this downward trend continues. I considered the subject in the model to be 41 years old in 2016, at which time his HUF 277,810 monthly gross earnings can be obtained based on the 2016 data of the above-referenced wage rate survey as follows: based on the earnings of 20-year-olds, phased wage change explained above is added every year until the age of 41.

The model calculates with gross annual earnings taken at nominal value, from which the net income for the given year and the average earnings forming the basis of the pension calculation are calculated, taking into account the contributions and personal income tax specified by the legislation in force up to 2021. For the period after 2021, I consider the rate of personal income tax and contributions to be the same as for 2021. For the sake of simplification, I assume that the employee does not use the family tax relief or other tax reliefs, except for the periods before 2021 when everyone was entitled to it. I consider the period of service to be continuous and I assume full-time employment during its entire period, with the individual working from the age of 19 until the currently generally applicable retirement age of 65, which date is also the last day of the given year for the sake of simplification, and the pension is paid the following year on the first day.

When determining the amount of gross earnings for each year, the starting point is always the earnings of the year 2016 mentioned above. Earnings for the other years can be obtained from this by taking into account two factors: one of them

[1] Labour market yearbook (2018): *Age-income profiles by education level in 1998 and 2016, women and men*; http://www.bp.data.eu/mpt/2018hu06_04, downloaded: 10. 03. 2023.

[2] Hungarian Central Statistical Office (2022): *Changes in real earnings*. https://www.ksh.hu/stadat_files/mun/hu/mun0070.html, downloaded: 01. 06. 2023.

[3] 128/2022. (IV. 4.) *Government decree*. <https://magyarokozlony.hu/dokumentumok/c7d245e0af-08480f8108d9dcb-10ffe07460115c3/megtekintes>, downloaded: 21. 06. 2023.

is the rate of general wage alteration, which represents the change in gross average earnings at national economy level, while the other is the alteration resulting from the individual's movement in his typical life earnings trajectory, which is independent of the former factor. In other words, to put it somewhat simply, how much the earnings of someone who performs the same type of activity during his career increases or decreases in a given year depends partly on how much the wage level changes in general, and partly on how much more - or less - he himself earns because he is a year older. Given that the general wage change indicators are only available for the entire workforce, they are not broken down by gender or highest educational attainment, I use the alteration of the gross average earnings of the national economy in the case of the model employee as well. Up until and including the year 2021, this represents the actual values reported for each year, while for the period after 2021 I used an estimate, during which I calculated a geometric mean (9.44%) from the annual historical data between 1996 and 2021. [2] For the wage alteration at the individual level, based on the methodology explained in detail above, I used the values estimated from the wage tariff survey for each age group.

The gross earnings determined in this way until the date of retirement form the basis of the average earnings that can be taken into account for the amount of the pension, for the calculation of which, the amounts for each year must first be valued to the level of the average earnings of the last year spent at work. For this I also used the actual, officially published [3] valuation coefficients for the year 2020, while for the following period, the product of the average annual gross real wage change at the national economic level obtained by geometric averaging from the long-term data for the 25 years between 1996 and 2021 (5.42 %) [2] and the long-term average annual inflation rate (3.82 %) [2] calculated by using the same method. Although the valorisation multiplier in the official pension calculation is the same as the change in average net earnings at the national economic level, I used the assumption that the current taxation and contribution payment rules will be in force in the future, so the rate of change in gross and net earnings will not differ, i.e. the indicator measuring the change in gross average earnings can be used for estimation.

The denominator of the replacement rate is given by the net monthly average earnings of the last 5 years spent at work, with the average earnings of the first 4 years of this period having to be valued at the level of the year immediately before retirement. However, the valorisation multiplier here will be different from the one used to determine the state pension. The explanation for this is that the replacement rate

is actually intended to measure the degree of change in the individual's standard of living upon retirement. In my opinion, when comparing the earnings of individual years, the consumer inflation is the one that is most relevant from the point of view of the individual, since for him the amount of products and services that can be purchased from those earnings is what is of primary importance. The net monthly average earnings of the last period received after the valorization must be divided by the starting amount of the pension. Here the question arises whether the 13th monthly pension should be taken into account or not? According to the currently effective legislation, yes, since based on these, the 13th monthly pension has been gradually reintroduced from 2021, and the full amount will be paid from 2024.

At the same time, it should not be forgotten that this additional benefit was introduced once already, but after a few years the country's economic situation no longer made it possible to maintain it, so it was discontinued, and it was not until well over a decade later that it is being reintroduced, moreover, only a small portion of it was paid at first. In conclusion, the institution of the 13th monthly pension cannot be considered as a fixed benefit that can be financed in the long term as much as the „normal” pension. In the model calculation, therefore, the value of the replacement rate is determined both with and without taking it into account.

METHODOLOGY OF THE MODEL USED TO ESTIMATE THE VOLUNTARY PENSION FUND SUPPLEMENTARY PENSION

By estimating the starting amount of the pension and the average monthly net income of the last 5 years of work valued at consumer inflation in the model that estimates the state pension, we get the monthly net income lost at retirement. Since the purpose of my examination is to assess how much average monthly payment could be used to offset this loss of income, the basic assumption is that the starting amount of the supplementary pension from the voluntary pension fund must exactly match this lost income. In order for the supplementary pension to fulfil its function of income replacement not only at retirement, but throughout the rest of the individual's retired life, the fund pension must increase at the same rate as the state pension. Since the latter rate is the same as the rate of the average consumer price increase for the given year according to the current legislation, the model presumes that the pension fund will also increase by the same amount, assuming the annual average inflation rate to be constant. By itself it cannot be deduced from this how much individual account balance is needed at the time of retirement, to know this it is necessary to determine, on the one hand, how long the pension must be paid, and on the other hand, what returns and costs must be taken into account when calculating the amount of the annuity. The answer to the first question is the estimate of life expectancy at the age of 65, which, assuming retirement

[4] Eurostat (2021): *Projected life expectancy by age (in completed years), sex and type of projection*. https://ec.europa.eu/eurostat/databrowser/view/proj_19nalex/default/table?lang=en, downloaded: 02. 06. 2023.

[5] *Publications of voluntary pension funds*. <https://kozze-tetelek.mnb.hu/penztarak/kozzet-elek/nyugdijpenztar>, downloaded: 03. 06. 2023.

[6] Central Bank of Hungary (2022): *Adjusted fee burden index of voluntary pension funds 2002–2020*. <https://www.mnb.hu/le-toltes/osszefoglalo-a-nyugdijpenztari-tagok-dijterhelese.pdf>, downloaded: 03. 06. 2023.

at the end of 2041, is provided by Eurostat data [4], which calculates a remaining life expectancy of nearly 18 years for men in Hungary by 2040, so as a result in the models, the duration of the payment of both the state and the fund pension is 18 years. As for the other two parameters, in terms of returns, the actual average of the classical, i.e. relatively low-risk portfolios of the 7 larger pension funds operating a so-called optional portfolio system (AEGON, Aranykor, Generali, Honvéd, OTP, Pannónia, Prémium) for the period between 2007 and 2021 the annual net real rate of return (0.77%) [5] is taken into account by the model, from which the nominal net rate of return is obtained by multiplying it by long-term inflation, while I assume the rate of charged costs to be 0.5 % per year. In the annuity period, the fund member is no longer assumed to pay contribution according to the model, therefore the tax relief increases the amount payable only in the first year of this period, in connection with the contribution payment of the last year spent at work (the tax relief is always transferred by the National Tax and Customs Administration to the funds in the year following the year of the payments on which it is based).

The amount of the individual account balance required at retirement can be calculated from the length of the annuity payment period, the starting amount of the annuity, its annual growth rate, the rate of return that increases the amount of the annuity and the size of the cost level that reduces it. If we take this as a starting point, it is possible to calculate the amount of the contribution payments required in each year to achieve this. The size of the payments depends on three factors: from the length of time spent as a member in the fund before retirement, during the so-called accumulation period, from the level of the returns achieved and the costs deducted. I considered the last of these to be constant, since the operating cost deduction component of the so-called adjusted fee burden index of voluntary pension funds for the period between 2002 and 2020, which is calculated and published by the Central Bank of Hungary on its website [6], shows rather low volatility, therefore, I averaged the contribution sharing ratios for an annual contribution of HUF 120,000 specified in the effective statutes of the larger pension funds (94% for the individual account). Furthermore, in the year of joining, the member is charged an additional one-off fee of HUF 4,000, which corresponds to the maximum amount that can be deducted from the first two monthly contribution in connection with joining a fund membership, above the otherwise normally applicable deduction, which is enforced by most funds.

With regard to the rates of return, I have divided the accumulation period into several stages in view of the fact that the funds mostly operate an optional portfolio

system, where the member has the opportunity to choose from several portfolios with different risks depending on his willingness to take risks. Funds generally determine the recommended time frame for these portfolios in such a way that the classical portfolio is considered optimal for a 5-year period, the balanced portfolio for a 5–15-year period, and the growth portfolio for more than 15 years. Consequently, the individual in the model invests his savings in the classical portfolio for the 5 years before retirement, in the balanced portfolio in the 10 years before that, and in the growth portfolio for earlier, except for the period before 2008, where it will be the balanced portfolio, because no reliable rate of return data is available for the growth portfolio in this period, for reasons I will detail below.

I determined the real rates of return for each year as follows. For the period before 2022, I used the actual average rate of return of the larger funds operating the optional portfolio system in the given year (in addition to those listed above, Allianz and MBH-Gondoskodás /former MKB/). [5] Since in 2007 only 4 or less of these funds used an optional portfolio system, I did not consider them large enough compared to the total number of members to use their average rate of return as a quasi-sector average. Instead, I took into account the yield rates of the balanced portfolios, as well as the yield rate calculated on the coverage reserve of those members of the mentioned group of funds that have not yet introduced the optional portfolio system, and formed an average from these. The combination of the two types of rate of return is possible because when the funds introduced the optional portfolio system, the balanced portfolios practically continued the investment strategy that had been applied to the whole of the coverage reserve from the point of view that those members who do not want to choose a portfolio with a different risk, should have the opportunity to remain in a portfolio with the same risk as before, moreover, the funds almost without exception regard the balanced portfolio as the basic portfolio, i.e. the one where the members who do not choose a portfolio for themselves end up, which is why the majority of the members are found here to this day.

For the period after 2021, the model calculates with past average net real rates of return characteristic of the earlier, longer period. In the case of the classical and growth portfolios, these mean the arithmetic average of the 15-year average rate of returns of the 9 funds mentioned above, obtained by geometric averaging of the rates of return of the years between 2007 and 2021. This value for the classical portfolio is 0.79% [5], while for the growth portfolio it is 2.4% [5].

[5] *Publications of voluntary pension funds*. <https://kozze-tetelek.mnb.hu/penztarak/kozzetetek/nyugdijpenztar>, downloaded: 03. 06. 2023.

[5] *Publications of voluntary pension funds*. <https://kozze-tetelek.mnb.hu/penztarak/kozzetetelek/nyugdijpenztar>, downloaded: 03. 06. 2023.

For a balanced portfolio, a longer rate of return covering the period between 2002 and 2021 can be calculated by taking into account the rate of return calculated on the entire coverage reserve for the years before the introduction of the optional portfolio system at fund level; the 20-year average quasi-sector net real rate of return thus is 2.46 %. [5]

The future nominal net rate of return used in the pension fund model, i.e. for the period after 2021, can be calculated from the real rates of return detailed above as a product of the assumed annual inflation, the rate of inflation is the same as that used as a parameter in the state pension estimation model for the same period.

The third factor influencing the amount of monthly payments to be made in order to reach the required individual account balance at retirement is the length of the accumulation period. This is primarily examined by the model as the member joining the fund at the age of 25, i.e. accumulating his savings for 40 years, but other cases were also examined by increasing the entry age in 5-year increments. What is common in all versions is that the contribution payment is the same percentage of the individual's gross earnings throughout his working years, since in my opinion, this ratio is the easiest way to show how much payment would be necessary to replace the lost income at retirement. When presenting the results of the calculations, the future estimated amounts are discounted to the year 2021 based on the estimated future inflation rates.

Results of the model calculations

THE EXPECTED CONTRIBUTION PAYMENT LEVEL OF 45-YEAR-OLD MEN WITH A HIGH SCHOOL DIPLOMA AS THEIR HIGHEST EDUCATIONAL ATTAINMENT COMPARED TO THEIR GROSS EARNINGS

In the case of a 45-year-old man with a high school diploma, the starting amount of his state pension at the beginning of 2042, including the 13th month's pension, would be HUF 532,521. Regarding his last 5 years at work, his average monthly net income valorized with inflation is HUF 555,160, which represents a replacement rate of 95.9%, while the monthly net income lost at retirement is HUF 22,639. If he joins the fund at a young age, at the age of 25, the ratio of the required contribution

to gross earnings is 1.14%. If the individual joins the fund 5 years later, at the age of 30, he must pay 1.27% as contribution, and 1.48% if he joins another 5 years later.

Table 1. The expected contribution payment rates for 45-year-old men with a high school diploma as their highest educational attainment with a 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required contribution payment to gross earnings (%)	1,14	1,27	1,48	1,72	2,08	2,71

Source: own editing based on own calculations.

If the 13th monthly pension is not taken into account, the starting amount of the pension would be HUF 491,558, which, compared to the 95.9% replacement rate of the basic version, means a rate of only 88.5%, while the monthly net income lost due to retirement increases from HUF 22,639 to HUF 63,603. In order to offset the latter amount, 3.20% of the individual's current gross earnings should be paid for 40 years, assuming entry into the voluntary pension fund at the age of 25. If he joins the fund later, at the age of 30, 3.59% of his gross earnings should be used as inpayment, and if he joins at the age of 35, this ratio would be 4.19%.

Table 2. The expected contribution payment rates for 45-year-old men with a high school diploma as the highest educational attainment without the 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required contribution payment to gross earnings (%)	3,20	3,59	4,19	4,91	6,06	8,18

Source: own editing based on own calculations.

[4] Eurostat (2021): *Projected life expectancy by age (in completed years), sex and type of projection*. https://ec.europa.eu/eurostat/databrowser/view/proj_19nalexp/default/table?lang=en, downloaded: 02. 06. 2023.

Based on the above, it can be concluded that if the 13th monthly pension is not taken into account, the proportion of payments to be made will increase significantly, namely at a higher rate than represented by the annuity increased by the 13th monthly pension compared to the pension paid without it. The lack of one month's additional benefit amounts to 7.69% of the monthly amount of the „enhanced” pension, but the resulting additional amount needed to pay into the fund is much higher, even at the age of 25, at around 80%, and it continues to increase slightly as we look at later and later fund entry times.

THE EXPECTED CONTRIBUTION PAYMENT LEVEL OF 35-YEAR-OLD MEN WITH A HIGH SCHOOL DIPLOMA AS THEIR HIGHEST EDUCATIONAL ATTAINMENT COMPARED TO THEIR GROSS EARNINGS

In the previous section I assumed that the individual was 45 years old, and based on this, the necessary monthly contribution payments for entering the fund at different ages were calculated. It is also advisable to examine cases where the individual is of a different age, leaving all other parameters unchanged. Let us first consider the version when it comes to an individual who is 35 years old.

As a result, he will naturally retire 10 years later, i.e. at the end of 2051, the starting amount of his state benefits, including the 13th monthly benefit, would be HUF 737,283, and the average monthly net income of his last 5 years of work, valued with consumer inflation, is HUF 807,657. The monthly net income lost at retirement would thus be HUF 70,375, which corresponds to a replacement rate of 91.3%. In the basic version, the value of the replacement rate, taking into account the 13th monthly pension, was 95.9%, i.e. 4.6 percentage points higher.

In accordance with the increased remaining life expectancy at the age of 65 by 2051 [4], annuity should be paid for 19.5 years instead of 18 from the amount accumulated in the pension fund.

Table 3. The expected contribution payment rates for 35-year-old men with a high school diploma as their highest educational attainment with the 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required contribution payment to gross earnings (%)	2,83	3,10	3,51	4,17	5,26	7,09

Source: own editing based on own calculations

If we do not take into account the 13th monthly pension, the lost income is HUF 127,089, which corresponds to a replacement rate of 84.3%.

Table 4. The expected contribution payment rates for 35-year-old men with a high school diploma as their highest educational attainment without the 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required contribution payment to gross earnings (%)	5,25	5,77	6,57	7,87	9,88	13,10

Source: own editing based on own calculations

In the case of an individual 10 years younger than the one examined at first, it can be observed that, assuming the same individual wage change dynamics, the period spent in work and as a member of the fund, as well as the same future inflation rate after 2021, real wage growth rate at the national economic level, as well as fund yields and other parameters, with the 13th monthly pension also calculated, a 137–162% higher rate of contribution to the fund is required to offset the loss of net income upon retirement. Only a small part of this additional payment requirement can be explained by the fact that, as a result of retirement 10 years later, the fund annuity has to be paid one and a half years longer, as the length of the annuity period increased by only 8.3%, from 18 to 19.5 years. If we do not take into account the 13th monthly pension, compared to an individual 10 years older the ratio of the required additional payment is much lower than if we also count this benefit, as it is between 57% and 63%.

[4] Eurostat (2021): *Projected life expectancy by age (in completed years), sex and type of projection*. https://ec.europa.eu/eurostat/databrowser/view/proj_19nalexp/default/table?lang=en, downloaded: 02. 06. 2023.

THE EXPECTED CONTRIBUTION PAYMENT LEVEL OF 25-YEAR-OLD MEN WITH A HIGH SCHOOL DIPLOMA AS THEIR HIGHEST EDUCATIONAL ATTAINMENT COMPARED TO THEIR GROSS EARNINGS

If we make the assumption that the examined individual is only 25 years old, i.e. the date of retirement is at the end of 2061, due to the further increasing life expectancy at the age of 65, he will probably receive the additional annuity from the pension fund for 20.75 years [4]. The expected value of the starting amount of the state pension, including the 13th monthly pension, is HUF 1,053,200, while the average monthly net income of the last 5 years before retirement, valued with inflation, is HUF 1,186,085. This means that the replacement rate is 88.8%, while the monthly net income lost at retirement is HUF 132,885.

Table 5. The expected contribution payment rates for 25-year-old men with a high school diploma as their highest educational attainment with the 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required payment to gross earnings (%)	4,06	4,49	5,16	6,16	7,62	10,01

Source: own editing based on own calculations

If the 13th monthly pension is not taken into account, the replacement rate will be 82.0%, and the lost income will be HUF 213,900.

Table 6. The expected contribution payment rates for 25-year-old men with a high school diploma as their highest educational attainment without the 13th monthly pension

Age at entering the fund (years)	25	30	35	40	45	50
The ratio of required contribution payment to gross earnings (%)	6,69	7,42	8,50	10,06	12,39	16,21

Source: own editing based on own calculations

Compared to the group of people 10 years older, based on the model, with the same parameters, the examined individual has to pay 41–48% more in order to be able to offset the loss of income when he retires, calculated with the 13th monthly pension. If the 13th monthly pension is not taken into account, this additional payment requirement will be lower, around 24–29%, depending on the time of entry into the fund. If we make this kind of comparison with his fellow subject who is 20 years older than him, the differences will be even more striking: taking into account the 13th monthly pension, the individual would have to pay 249–269% more in order not to lose any income with the additional pension, while if we leave this out, it would still be about 98–108% more. Of these very significant differences, only a relatively small proportion can be traced back to the fact that the younger the individual examined, the longer the life expectancy at the age of 65, therefore the longer he has to finance the pension fund annuity: while those retiring at the end of 2041 will only have to prepare to pay for 18 years, those retiring from the end of 2061 have to pay for 20.75 years. However, if we were to extend the payment period to 20.75 years for those retiring at an earlier date, this alone would only require an additional contribution rate of approximately 13–14%.

Comparison of the required pension fund contribution payment rates based on the model calculations with the values extracted from the actual data

METHODOLOGY FOR ESTIMATING THE ACTUALLY PAID PENSION FUND CONTRIBUTION

Previously I showed, based on model calculations, that in the case of individuals of different ages and educational attainments, to compensate for the lost income obtained from the estimation of the expected amount of the state pension and the average monthly net income of the last 5 years spent at work, valorized

[7] *Annual reports of voluntary pension funds*. <https://kozzetetelek.mnb.hu/penztarak/beszamolok>, downloaded: 21. 06. 2023.

with inflation, taking the 13th monthly pension into account or excluding it, what is the amount of the payments to a voluntary pension fund in the case of joining the fund at certain selected ages. The expected contribution rates are therefore available, and in this subsection I will examine how the actually completed pension fund contributions compare to these, and how realistic it seems that pension fund members will be able to receive additional pension payments in the future in an amount that enables them as previously described, to compensate for the lost income upon retirement. Since contribution payment data for fund members of the examined age and educational attainment are not directly available, I used an approximate estimate to determine them.

As I laid out previously, in the framework of the article, I examined those with a high school diploma as their highest educational attainment. However, the pension funds do not have information about – and in fact it is not even relevant from the point of view of fund membership – what kind of educational attainments their members have; as a result, data is published exclusively for the membership as a whole, and within that, separately for women and separately for men. From this point of view, it is therefore not possible to clearly assess the average amount of the actual annual contribution for individuals of a given age and educational attainment, but the actual data can be used as an approximate estimate. A similar methodological problem is that the pension funds provide data on how many people belonged to a particular age group by gender at the beginning and at the end of the relevant year, but there is no data on members within a group of members belonging to a given age group as of when did they entered the fund. This problem can be overcome by assuming that the individuals in the model we are examining entered the fund at the age of 25, 30, or 35, and in relation to all three dates, we look at the relation of the expected contribution rate assigned to with the actual performance. Due to the scope limitations of the article, I am primarily examining entry at the 3 mentioned dates for individuals of 3 different ages, i.e. 45, 35, and 25 year olds in 2021, and also separately examining within each version the scenario with the 13th monthly pension and also excluding it.

The source of the actual contribution payment data is the supplementary appendix to the 2021 annual report of the voluntary pension funds, of which I used the data of the 7 largest funds [7] that published relevant data with an appropriate breakdown; their combined membership covers 61.1% of the membership of the entire voluntary pension fund sector, so in my opinion, the averages calculated from

the data of these funds closely approximate the averages valid for the entire sector. Within contribution, I do not differentiate between the payments made by the individual and his employer, I examine them together, and the average monthly payment is obtained by dividing the annual payment by 12. When determining the actual contribution rates, I consider gross earnings to be the amount, which in the model calculation is the estimated gross monthly earnings of the examined individual for the year 2021.

As I have indicated above, the pension funds do not have information about the highest educational attainment of their members, therefore the payments made by members with different educational attainments are combined in the contribution payment data, and data is not broken down by gender. As an approximate estimate, I used the method of first multiplying the average monthly contribution at the sector level by the ratio of the average gross earnings of men employed full-time in the national economy in 2021 to the average gross earnings of all full-time employees in the same year [8], then I multiplied the value obtained in this way by the ratio of the national average wage for those with a high school diploma as their highest educational attainment to the average wage for the entire workforce, also based on 2021 data. [9] This assumes that the average values of the contributions according to gender and highest educational attainment form the same ratio to the average contribution calculated for the entire membership, as the ratios that exist between the average gross earnings valid for the groups of full-time employees treated according to the same criteria and the gross average earnings at the level of the national economy.

AVERAGE AMOUNTS OF REALISED CONTRIBUTION PAYMENTS AND THEIR COMPARISON TO EXPECTATIONS

Based on this method, the average monthly amount of actual contribution payments for 45-year-old members in 2021 was HUF 7,336, without breakdown by gender and educational attainment. [7] Based on the reports of the Hungarian Central Statistical Office, men's earnings were on average 9.19% higher than the average earnings for all full-time employees [8], while high school graduates earned on average 9.41% less than the average value for all employees. [9] As a result of the combined

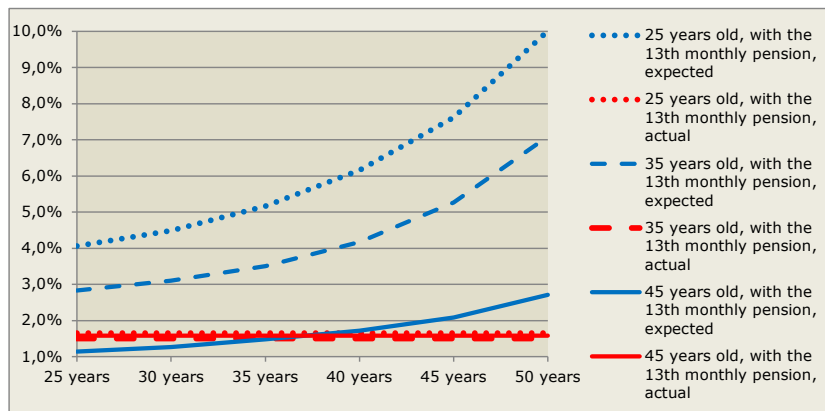
[7] *Annual reports of voluntary pension funds*. <https://kozvettelek.mnb.hu/penztarak/beszamolo>, downloaded: 21. 06. 2023.

[8] Hungarian Central Statistical Office (2022): *Average gross earnings of full time employees by major demographic characteristics*. https://www.ksh.hu/stadat_files/mun/hu/mun0184.html, downloaded: 21. 06. 2023.

[9] Hungarian Central Statistical Office (2022): *Gross average earnings of full time employees by highest educational attainment*. https://www.ksh.hu/stadat_files/mun/hu/mun0057.html, downloaded: 21. 06. 2023.

effect of the two effects, the average earnings of men with a high school diploma were 1.08% lower than the average earnings of all employees under the same conditions. By projecting this ratio onto the 7,336 HUF of the average 45-year-old members' contribution payments to the fund in 2021, we get that men of this age probably paid an average of 7,257 HUF per month into the funds, which, based on the model calculation used in the article, is an amount applicable to them for 1.58% of gross monthly earnings, so this can be considered the actual payment rate. If the 13th monthly pension is also taken into account, the expected contribution rate for fund membership established at the age of 25 is 1.14%, for those established at the age of 30, 1.27%, while for joining at the age of 35, it is 1.48%, i.e. in the typical cases, the amount of the actual payment exceeds the required level. If we do not count on the 13th monthly pension, the situation is not so favourable: even when joining the fund at the age of 25, the expected contribution rate is already 3.20%, i.e. twice the actual one, while when joining the fund at the age of 30 and 35, it is 3.59% and 4.19%, respectively, and the actual payment rates are only 44–38% of these rates, so we can deem this as a significant leeway.

Figure 1. The ratio of contribution payments required to compensate for the loss of income and those actually made to the gross earnings of 25, 35 and 45-year-olds with a high school diploma as their highest educational attainment, depending on the age of entry into the fund, with the 13th monthly pension

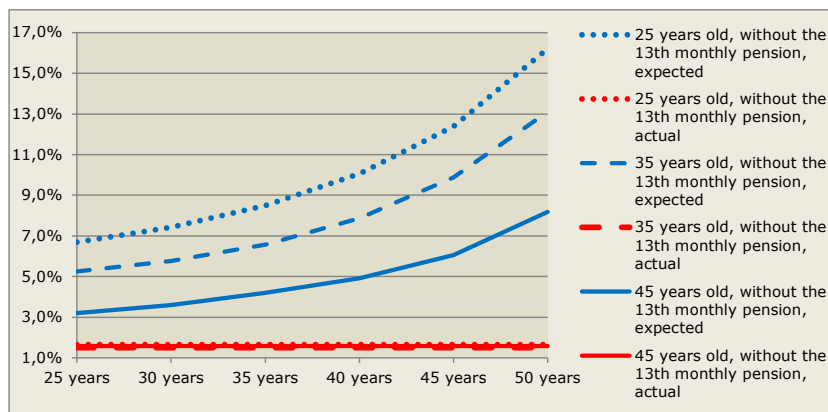


Source: own editing based on own calculations

Regarding the group of 35-year-old men with a high school diploma, the average monthly contribution for the entire fund membership is HUF 6,747 [7], which, corrected by gender and educational attainment, results in HUF 6,674; based on the model calculation, this means an actual payment rate of 1.50%. Calculated with the 13th monthly pension, the required contribution rates, joining the fund at the age of 25, 30 and 35, are respectively 2.83%, 3.10% and 3.51%, from which we can see, that even with those who join the fund at a young age, only about half (53–43%) of the expected rates are paid as contributions.

By omitting the 13th monthly pension, the leeway is obviously even greater, for the examined entry ages only approximately a quarter (29–23%) of the required sums arrive into the funds as contributions.

Figure 2. The ratio of contribution payments required to compensate for the loss of income and those actually made to the gross earnings of 25, 35 and 45-year-olds with a high school diploma as their highest educational attainment, depending on the age of entering the fund, without the 13th monthly pension



Source: own editing based on own calculations

In the case of 25-year-old men with a high school diploma, the actual average monthly payment before corrections is HUF 6,000 [7], while the corrected value is

[7] *Annual reports of voluntary pension funds.* <https://kozmetetelek.mnb.hu/penztarak/beszamolo>, downloaded: 21. 06. 2023.

HUF 5,935, which results in an inpayment rate of 1.65%. In the case of the 13th monthly pension, when joining the fund at the age of 25, it is 4.06% of the gross earnings, when joining at the age of 30, it is 4.49%, while when joining at the age of 35 5.16 % should be paid: the degree of falling short of the required ratio is also significant here, the actual values amount to 41–29% of the expected.

Without the 13th monthly pension, the difference between the required and actual contribution payments is the largest in the cases examined so far, since the amount of the latter reaches only 25–19% of the former, depending on the time of entry into the fund.

Summarizing the results, it can be concluded that if the 13th monthly pension is also taken into account, in only one of the three examined cases – for the 45-year-olds – does the amount of paid contributions reach or exceed the required level, and in two cases it does not. Excluding the 13th monthly pension, in none of the three cases is the contribution payment rate considered adequate, at most half of the required amounts are paid.

Taking the actual data into account, as well as applying an optimistic approach, according to which it is sufficient for a given age group to meet the expected contribution rate for those entering the fund at the earliest of the examined dates, i.e. at the age of 25, it can be concluded that, with the exception of the 45-year-olds with the 13th monthly pension, there is no significant chance for the groups of people with a high school diploma as their highest educational attainment that the net income expected to be lost upon retirement can be compensated.

Based on all of this, it can be concluded that the 45-year-old age group is in a relatively favourable position among men with a high school diploma, since their contribution payments are adequate, taking into account the 13th monthly pension and assuming entry into the fund at the age of 25 and 30. Without the 13th monthly pension, however, within the framework of the model calculation, they will in any case have lost income that they will not be able to offset. On the other hand, their peers who are 10 or 20 years younger than them, with the same educational attainment, do not reach the required contribution rate even in the case of the earliest of the examined entry ages, even if we take into account the 13th monthly pension.

THE PROPORTION OF THOSE WHO DO NOT PAY THE CONTRIBUTION,
OR PAY ONLY A SMALL AMOUNT, AND THE SIZE OF THE
AVERAGE INDIVIDUAL ACCOUNT BALANCES

This not-so-bright overall picture is further shadowed by the fact that the actual average pension fund payment data used in the calculations so far also includes the payments of members who have not fully

paid the mandatory uniform contribution, and also those who did not pay anything at all in 2021 and their employer hasn't paid any contribution either. This means, on the one hand, that those who paid contributions paid more than the shown average, and therefore have a higher actual contribution payment rate than what I calculated in the model, that is, some of the members of the investigated groups may be in a more favourable situation than what can be inferred based on the average payments, but at the same time, for those who pay little or not at all, the chance to offset their lost income is even smaller. Based on the processing of the data [7] of the previously mentioned 7 funds, in 2021 22.8% of the 25-year-old members did not pay any contribution, while this ratio is 46.1% for the 35-year-olds and 47.2% for the 45-year-olds. At the end of 2021, the average individual account balance of 25-year-old members who paid any amount of contribution was HUF 253,462, while those who paid nothing were HUF 78,125, which is 30.8% of the previous amount. For 35-year-olds, the difference is even greater: HUF 1,108,785 and HUF 166,331, so the ratio here is barely 15.0%. The situation is similar for 45-year-olds, the average balance of payers is HUF 2,062,377, and that of non-payers is HUF 392,140, which is only 19.0% of the payers' balance. It seems obvious, that someone whose savings do not exceed HUF 150,000 at the age of 35, or HUF 400,000 at the age of 45, and neither he nor his employer pays any contribution, most likely won't be able to increase his balance in the future to such an extent to consider the additional pension service worthwhile. What is even more worrisome is that less than a quarter of the employed population has membership in the most common self-care plan for pension purposes in Hungary, in which the employer can also make contributions for the benefit of its employees [10] [11], moreover, the legislation allows for simultaneous contributions to several funds with existing memberships, so the proportion of those who have a pension fund membership is actually even lower than this, but no data is available. In order to eliminate this shortcoming, it would be advisable to create a database, updated at least annually, which would include – based on the data provided by voluntary pension funds, private pension funds, occupational pension providers, insurers with pension insurance contracts, and investment service providers managing pension savings accounts – the tax identification number of Hungarian citizens with pension self-care plans, and whether the person and his employer made any payments in the given year, and if so, whether they reached at least the amount of the annual minimum payment required for the given plan. With this, it would be possible to determine how much of the Hungarian population has

[7] *Annual reports of voluntary pension funds*. <https://kozvettelek.mnb.hu/penztarak/beszamolo>, downloaded: 21. 06. 2023.

[10] Central Bank of Hungary (2023): *Statistics/Time series of pension funds*. <https://statisztika.mnb.hu/idosor-2067>, downloaded: 01. 07. 2023.

[11] Hungarian Central Statistical Office (2023): *Employed persons by industries by regions – NACE Rev. 2*. https://www.ksh.hu/stadat_files/mun/hu/mun0079.html, downloaded: 21. 06. 2023.

at least one form of savings for retirement purposes, and what their willingness to pay is, by filtering out the overlaps that exist with regard to the individual plans, and within that, the accounts held at the individual institutions, since – even with regard to the individual plans – currently only estimates are available. The Central Bank of Hungary would be the most suitable for managing the database, since it supervises the relevant institutions.

Summary

For the model calculations, I defined and used a new type of replacement rate, which compares the starting amount of the individual's pension to the average of the net monthly earnings of the last 5 years spent at work, valorized with inflation. I calculated the necessary contribution payment rates for six versions of the date of entry into a voluntary pension fund, including and excluding the 13th monthly pension.

Based on the obtained results, only for one of the three examined groups, the 45-year-olds, would the current actual average contribution payment level be sufficient to compensate for the loss of income at retirement, and even then only if the fund membership is established at a young age, and if the 13th monthly pension is also taken into account. Without the latter, however, the level of contribution payments for each group falls significantly short of what is required.

In addition, it is likely that among the 25, 35 and 45-year-old voluntary pension fund members examined, based on the available data, which is not comprehensive, but which, in my opinion, represents the sector as a whole, there is a fairly high proportion of members who did not pay contributions at all in 2021 (nor their employer), moreover, the average amount of the individual account balance of such members is significantly lower than the average balance of members who pay contributions, and their accumulated savings in the fund are low not only in a relative but also in an absolute sense, and this will probably not be sufficient for meaningful supplementary pension services.

I also identified as a shortcoming that there is currently no data on the extent of the prevalence of self-care plans for pension purposes among the Hungarian population, and how many people have at least one such plan, so I proposed the creation of a comprehensive database for this purpose.

In my opinion, it would also be justified to strengthen the role of employers in self-care for pension purposes. In order to support this, it would be advisable to return to the previous regulations regarding voluntary pension fund contributions in the area of non-wage benefits, which made it possible to provide them with reduced public charges. In favour of the discounts, the items in question are paid for the realization of a goal of paramount importance at the level of society as a whole, and these amounts, by investing a significant part of them in government securities, ensure a stable and predictable demand for the financ-

ing of the public debt, and help in the fight against inflation also by the fact that they are not immediately available as disposable income.

In addition, it also appears that the current pension fund system, which is based on a completely voluntary entry, is not able to appeal to young people, but even a significant part of middle-aged people are missing out on it. The role of employers could also be strengthened if all their employees, but as a minimum goal those newly employed, were obliged to enroll in one of the voluntary pension funds chosen by the employee by paying a contribution equal to a specified proportion of their wages, and the employee would have to annually declare whether or not he requests this in the future, and he could also decide to leave the fund after the waiting period of at least 10 years (a so-called opt-out system). It would be an additional incentive if the members admitted in this way were entitled to an additional contribution from the employer, if they make an additional contribution of a certain amount individually. In my opinion, this system-level amendment can be the only way to substantially increase the number of members, including paying members. The option of voluntary withdrawal could also protect against the reputational risk associated with the private pension fund system, due to its mandatory nature for certain groups of employees.