

# Supporting Material to “The Outlines of a Possible Pension System Funded with Human Capital” – Two Introductory Studies

## I. The inherent faults of the state pension system and the main direction of its improvement<sup>1</sup>

**Summary:** In my study, I took into account the design faults of the state-funded, pay-as-you-go system and realised that its principle (created in arrears) is defective, and it is necessary to move to a new operating principle to correct it. We have to forget about the existing so-called ‘unfunded’ pension system, and the state pension system shall be explicitly placed on its real basis, human capital. This results in an automatic asset/liability matching that is currently totally missing, and we can forget about the usual debates about the sustainability of the pension system. The result of such a system would probably be an increase in the number of births compared to today, but this is not the purpose of the proposed reform, which I intend to elaborate in a separate study, i.e. how this can be put into practice.

Keywords: pay-as-you-go pension system, human capital, funded pension system, pension reform

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Over the past few decades, a rigorous protocol has been developed for studies and lectures on state-funded, pay-as-you-go (PAYG) pension systems around the world, including in Hungary<sup>2</sup>.

### *1.1. State pension systems and demographics – ‘surface treatments’*

The author/lecturer describes the demographic trends in the developed world and the country covered by the article, the low and typically declining total fertility rate (TFR) and ever increasing life expectancy. He mentions that these reduce the number of children and juveniles and increase the proportion of older people in the population, and the dependency ratio is steadily increasing, and concluded that measures have to be taken to stop this tendency. I also agree with the latter; however, I would disregard these ‘compulsory’ circles because related information can easily be obtained by the reader [e.g. Oksanen [2003]; Orbán, Palotai [2006]; Bajkó et. al. [2015]; Berki, Palotai, Reiff [2016]; Varga [2014]]. As a way out of the situation, experts tend to recommend a variety of solutions, which are usually divided into two groups: parametric and paradigmatic reforms.

Parametric reforms, which I will propose elsewhere, aim to improve the balance in a deteriorating situation. Their most important forms are, for example, raising the age limit and tightening the indexation of pensions, which was applied, for example, by the Bajnai government in 2009, or the abolition of unjustified benefits in 2011 applied by the Orbán government. These are important tools, but the improved balance between the revenue and expenditure side of the public pension fund is

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<sup>1</sup> It was originally published in: Public Finance Quarterly 2019/4. (p. 511-525.)

<sup>2</sup> The present study does not address a specific state-funded, PAYG pension system, but rather focuses on the common problems of all such systems. However, I took some concrete examples from the Hungarian system.

temporary. In addition, tightened indexation, for example, opens up a kind of ‘welfare inequality’ among old and new pensioners in the longer term (e.g. Simonovits [2018]).

Many people, therefore, expect the solution to be the result of ‘more serious’, paradigmatic reforms. Two important directions can be distinguished here, partial funding, which, for example, was introduced in Hungary in 1998 on the recommendation of the World Bank (World Bank [1994]) (with many errors that substantiated its almost complete termination in 2011); and the Swedish pension system with individual accounts, which is currently one of the main recommendations of the World Bank (Holzmann, Palmer, ed. [2006]; Holzmann, Palmer, Robalino ed. [2012-13]), although its expansion has recently come to a halt (Guardiancich et al., [2019]).

The essence of a partial (or even full, like in Chile) funding would be to reduce the portion of pension funded from current contributions, which would allow pension to be paid at the usual rate, even in a declining population. The downside is that in the meantime less contributions will be acquired by the public pension fund, so the state will have to make up for the deficit. In other words, it does not solve the underlying problem, it only dampens the exacerbation of financial difficulties by delaying it.

The introduction of individual accounts, or on its “official name” the Notional Defined Contribution (NDC) system, could be defined as a kind of ‘back to basics’ reform in which pensions are paid strictly based on individual contribution, as the official ideology behind the PAYG system explains. However, this only helps to rationalise the system and to make it (slightly more) sustainable over the long term by depriving it of the hard-to-justify eligibilities that have been introduced in the meantime.

However, these solutions, even though they are useful, because they can temporarily avoid exacerbating problems, can only be considered ‘surface treatments’, because they do not solve (or even seek to solve) the underlying problem: low TFR, since the possibilities of rationalisation become exhausted over time, while uncovered pension promises (measured by implicit public debt) remain.

In the case of capitalisation or funding, the picture is a bit more complicated. If, as it happened in Hungary, ‘capital’ simply became public debt, then we simply converted implicit public debt to explicit (Németh [2009]), meaning we converted a low-cost, long-term debt portion into a high-cost, short-term debt portion and therefore even worsened the situation (Banyár [2017b]). If we capitalise the pension system so that the capital we use is actually domestic public debt, we have not replaced the PAYG system, since we have only transformed implicit public debt into explicit public debt. (This was recognised by generational accounting, which attempts to take into account the whole, that is, implicit and explicit public debt and share it among generations — Kotlikoff [1993]; in Hungary, see: Gál, Simonovits, Tarcali [2001])

However, the requirement to capitalise the pension system so that capital used is not actually public debt (Kotlikoff [1993]; Feldstein [2005]) also does not result in improvement in the long run. While this seems to make the pension system independent of the birth rate, we know that an economy will only be viable in the long term if the population is changing in a suitable (even if declining) rate, otherwise even the funded system will not be able to eventually provide people with pension. In addition, announcing a funding would mean significantly reducing our current consumption in order to have an adequate pension. This even more questions whether it is worthwhile to ‘waste’ our limited income on economically unproductive things like raising children. In other words, funding is likely to further reduce TFR, thus exacerbating the pension problem in the long run, as this does not solve the underlying problem.

*I.2. The basic problem and the solution are different: investing in human capital is not worth it for the people concerned*

The underlying problem, that is low TFR, is probably because the cost of raising a child is increasing, while its economic benefit, at least to the individuals who finance most of it, is virtually zero, meaning it is not only bad business, but also a luxury consumption, which only few can afford.

TFR on different levels is declining worldwide. We do not know the reason for this, but by now all the factors justifying the so far high values have disappeared. High TFR used to be necessary, because:

- for the vast majority of the population, children had significant economic benefits. From a relatively young age, the child could be employed on the family farm or hired out to work. In addition, they also provided care for elderly parents who could not work any longer, which in retrospect is referred to as the 'traditional pension system';
- due to the high infant and child mortality rate it was advisable to have many children so that at least one or two survive to become adults, and can effectively help elderly parents when the time comes;
- contraception was very difficult and generally illegal, and marriage was common, so having a baby was a cheap, no-action required default;
- childcare costs were low, no money was spent on education, health care, parents did not care too much about their children, etc. — and was completed relatively quickly at a low age.<sup>3</sup>

All these have changed radically by now, having a child has become a 'project' that can be planned rationally, and according to the calculation it is not worth it, because a child 'only' has emotional value now. While the economic benefit of a child to society remains enormous, it is not society that wants to have a child, but individuals to whom society pays only a small part of the cost. The social benefits of children (they continue to operate the economy, pay taxes and social security contributions) are common; however, they are not realised by those who finance the majority of the ever increasing costs of raising children in modern societies.

So, if we want the pension system to be sustainable in the long term, parenting needs to become an economically 'good business', that is, we seem to have to deal with a factor outside the pension system. It is also clear that it is not having several children that is usually important. We should, however, raise more children who are given the impulses to make them fit into modern economy and division of labour. This is largely decided at a young age, so initial investment in human capital is key.

In principle, there are two ways to make child raising 'good business' (for those who are capable of proper parenting), which we can call 'input-' and 'output-financed'. According to the first, society provides resources for child raising; that is, it covers the costs, and according to the second, society reimburses the costs of child raising in arrears when it 'takes over' the 'finished' raised child. In practice, a combination of these shall be implemented, and the pension system is certainly worth incorporating (through 'output financing'). The reason beyond this concept is easier to understand if we take a look at where the developers of the principles of the modern pension system applied today made a mistake.

### *1.3. The genesis of the problem: problematic pension principles*

#### *1.3.1. Retirement solutions developed before the modern PAYG pension system*

Modern PAYG pension systems are considered general in the developed world, including Hungary, are nowhere near exclusive, but where they exist, they form a major part of the pension system, are recognised even by the World Bank for making it famous for its typology since then (World

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<sup>3</sup> Of course, it is also true that fertility is still high in the developing world and in those strata of the developed world where these circumstances are still common.

Bank [1994]) by referring to this as the first pillar of pension systems. However, this pillar was the last one, the earlier elements of the pension system are much older.

There are three former pension solutions that were originally specific to different social strata, but have now become different pillars of a mixed system.

For the upper classes, pension means living off the returns of accumulated (inherited) wealth. The 'minimum' form of this is insurance annuity. Technically, this is a (fully) funded defined contribution (DC) system. This was also tested as a state system: the Bismarck pension system was a funded system until its capital was used up by successive world wars and attempts to replace it were eventually given up.

Retirement itself was invented for employees. And retirement was funded by keeping employees on the 'payroll'. An early version of this was the civil list pension provided by the king or other aristocrats, which gradually evolved into a more financially sound and well-founded occupational pension. Its institutional form is the pension fund, which means a technically (often only partially) funded, defined benefit (DB) pension. In the West, this form has become more widespread, extended from employees to workers, and has become the main source of pension in many places and for many years. The level of the pension is guaranteed by the employer, and it is the 'sponsor' behind the pension fund, who holds its ground in the long run. This is why it is possible that such pension funds are not necessarily and always 100 percent funded (that is, the amount of capital in the fund is less than the expected value of promised pensions) — so it is possible to grant a delay to the sponsor to perform its funding obligation later, at a more suitable time.

For ordinary people, retirement (or its functionally equivalent 'something') was in fact a kind of intra-family transfer, facilitated by the transfer of the family business under the traditional division of labour from father to son, and generations were living together in one household. In the family farm, the economic performance and personal consumption of young children and the very old were not commensurate with each other, and they both received transfers from the active members of the family. However, young people received these transfers from those whom they later returned it as active ones, namely from/to their parents; therefore the system can be considered as a kind of intra-family transfer based pension system, where the cycle of transfers is always closed. In a more general sense, we can say that parents invested in raising their children, and they received the returns of this investment in their old age, more generally, this system can be called funded, where capital is human capital. Expanding the analogy, this could also be called a fully funded DB system. Today, this system has gone almost completely out of fashion in the developed world (but continues to exist in the developing world), due to changes in the division of labour, primarily as a result of the disintegration of traditional families living in one household. This change opened the way for a modern pension system, which was why there was a mass demand for it.

The overall conclusion is that until the modern pension system was established, there were only (at least partially) funded pension systems, but the capital behind the systems included human capital, and the 'owner' was who created it.

#### *1.4. The modern PAYG pension system as an unprincipled combination of previous solutions*

The source of the modern PAYG state pension system is twofold: It is linked to the New Deal of Roosevelt in the USA and the failure of Bismarck's pension systems in Europe.

The Roosevelt system of the late '30s and early '40s was admittedly an improvisation without any theoretical basis (Blackburn [2003]). If we want to find out what could have happened, we can say that the state actually copied the occupational pension funds and created a 'quasi-all-employer' pension fund. With this 'innovation' it considered itself such a strong 'sponsor' that it went beyond the extreme value of the partial funding of the pension fund, i.e. 0 percent, which made it necessary to distinguish it conceptually (see PAYG) from funded systems.

Previously established European systems imitating the Bismarck system (including the Hungarian pension system) were originally funded; however, capital was taken away virtually everywhere by the two world wars. Presumably, they saw the 'success' of the unfunded American system and decided to stop funding virtually everywhere after World War II, not to mention that this period coincided with a major expansion of pension systems (or the nationalisation of possible investment targets in the Soviet sphere of influence<sup>4</sup>), which would have made this requirement inherently illusory.

The theoretical foundations of the American system were provided by Samuelson [1958], but this was almost two decades after its introduction. The foundation laid down by Samuelson was a great success, and probably also contributed to the European acceptance of the American system. Beforehand the operators of the system had a bad feeling about operating 'Ponzi-scheme', but Samuelson dispelled these concerns (Blackburn [2003]). Emphasising this (and somewhat refuting it), the Economist put it this way in 2017 (in a dedicated part of a series of articles on top performances in economics): Samuelson showed us that good 'Ponzi schemes' do exist! (The Economist [2017])

According to Samuelson, pensioners were formerly dependent on their children ('traditional pension system'), but 'it went out of fashion' (he did not elaborate this). Therefore, successive generations have entered into a new 'Hobbes-Rousseau social contract, whereby the present active ones support the present elderly, and in return can expect to be supported by the active ones of the future. In addition, as the population grows (which is essentially expected), the elderly receive a kind of 'biological interest', meaning that they receive a higher pension in proportion to their contributions to the extent of growth in the population. Even though Samuelson never said so, he clearly provided a description of a DC pension system where contributions are made by the individuals concerned and indexation is essentially a contribution mass indexation. And this is where the problems begin.

The implemented PAYG systems were exclusively DB systems, and this feature, 'imported' from the occupational pension system, was taken for granted to the extent that at first there was great resistance to the conversion of PAYG systems to DC (NDC) systems, which was first implemented by Sweden at the turn of the millennium, but was followed by many since. Although this is actually 'the' Samuelson system, it is attributed to Buchanan, also a Nobel laureate (Buchanan [1968]). In occupational DB systems, the contributor is the employer and the employee 'deserves' his or her pension and may even lose it. In the DC system, the employee is the contributor by default (or, if the employer is the contributor, it transferred the contribution to the employee's ownership), and the resulting pension is, therefore, his or her own and cannot be taken away. However, in the majority of PAYG systems implemented, the contribution is paid partly by the employer and partly by the employee, so the eligibilities are unclear.

To make matters even more complicated, everyone seems to have readily accepted that pensioners would benefit from the population growth, but they did not really want to bear the burdens of population decline.

Another problem is that if we consider the PAYG system as a partially funded occupational DB system, we can calculate the missing capital of the system. This is the commitment or debt of the sponsor behind the system. Because in this case this is the state, it is public debt, and because it is not 'printed' public debt, it is called 'implicit public debt'. [Initially, it was not so obvious that the discovery of implicit public debt was also a huge act associated with Martin Feldstein [1974].] This, in turn, is a huge amount of multiannual GDP that has to be paid to the active generations, which creates tension when

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<sup>4</sup> However, paradoxically this is why the state pension systems of the socialist countries could even be regarded as funded, because they were backed by enormous state property. However, nobody really thought about that.

the number of the active ones decreases, thus increasing their burden. Since the EU requires the Member States to announce their implicit public debt behind pension systems in a mandatory manner starting 2017, it (also implicitly) recognises its nature. (See the Hungarian data on the MNB's website: <https://www.mnb.hu/statisztika/statisztikai-adatok-informaciok/adatok-idosorok/xii-a-nemzetgazdasag-penzugyi-szamlai-penzugyi-eszkozok-es-kotelezettsegek-allomanyai-es-tranzakcioi/a-penzugyi-szamlakhoz-kapcsolodo-egyeb-adatok/a-haztartasok-tarsadalombiztositasi-nyugdijjogosultsaga>.)

It actually turned out that the current systems—in a deteriorating demographic situation—are basically Ponzi-schemes and are making unfounded promises. This can also be put in such a way that the assets and liabilities sides of the modern pension system are independent of each other compared to other pension systems and contain no mechanism to reconcile or align them, and even the liability side (that is, pension promises) tends to inflate relative to the asset side (contribution capacity) (Banyár [2019]).

The sustainability of the PAYG pension system, just like the traditional pension system (and even Samuelson himself emphasised it), really depends on the right number of children. The system, however, does not recognise this, and even punishes child raising, since those who raise children take away money from their own consumption and do not get any reimbursement for it, since the result of 'investing' in the child becomes a public good through the payment of contributions.

Samuelson was wrong, the traditional pension system did not go out of fashion, but because of the new circumstances, it no longer worked without the intervention of the state; therefore, it is now up to the state to enforce and organise that children, in the form of a pension, continue to reimburse their parents the cost of raising them. In other words, he should have explicitly linked pension promises to their fundamentals, to raising children, as happened in the 'traditional pension system' that was replaced by the modern system. In the case of a growing population, the mistake was not noticed, since it was only a matter of distributing the surplus, but in the case of a declining population, the situation is quite different, and the theoretical mistake was transformed into a practical tension and requires an intervention.

#### *1.5. Solution: incentives and asset/liability matching instead of Ponzi schemes*

The first step to finding a solution is to recognise that there is no system that produces long-term returns without investment. Such systems only work temporarily and are called a Ponzi scheme (see, for example, Banyár [2019]), which always ends up with big losses and many losers (who could not get out in time), because previously paid returns turned out to be the result of capital depletion.

Current pay-as-you-go pension systems are gigantic Ponzi schemes, as it is acknowledged and even emphasised that they are not based on any kind of investment.<sup>5</sup> By the logic of the system, this can only be quit by death or the denial of contribution. One option is basically for actual pensioners (and older active contributors who already pay a lot of contributions), and the other is for the young active ones, so avoiding personal bankruptcy will offer different solutions to different age groups, resulting in a conflict among different generations, which becomes increasingly visible nowadays. (For an analysis on this, see Banyár [2017a])

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<sup>5</sup> The active defenders of the system consider this as an explicit advantage, saying it is cheaper, because they don't have to pay for expensive investment activities. Interestingly, and somewhat ironically, this 'wisdom' well-known to old pension bureaucrats is also quoted by the Botos couple with approval (Botos, Botos 2012), although they are also proponents of a system capitalised with human capital, but have not recognised the contradiction.

The Ponzi scheme nature of the system is also clear from the fact that the contributions are paid out immediately, without any investment period in between. And many people are misled by the fact that in many ways similar things happen in a funded pension fund. After all, the distinction between contribution and payment is made here, contribution is made into reserves, and payment is made from the reserves, in practice it is simplified: the contribution and the payment are 'netted', which means that payment is made from the current contributions and only the remainder is put into reserve, or only the missing part is taken out of the reserve. There may be a balanced position in which the reserve is not touched at all, and the payment is the same as the contribution, plus, technically, exactly the same amount of money is paid out that was recently received as contribution. But it is incorrect to think that it means that capital accumulation is completely unnecessary: this will be particularly clear when payments will be smaller than contributions and capital will be used up.<sup>6</sup>

What conceals the Ponzi scheme nature of a system is that, on the one hand, is very similar to a funded pension system (it 'only' lacks capital) and, on the other hand, it has actually been used to beat least in Hungary (and across Europe, but not in the United States!). However, by declaring that it is now operating as a pay-as-you-go system, another important thing has been declared, but this has gone unnoticed. From here, the system depends on how many and what kind of children we raise.<sup>7</sup> In other words, they actually switched to a system that was funded with human capital without drawing the resulting conclusions, and they continued to look at the system as if it were funded. By analogy, which is (would be) the exact opposite of this mistake: they pretended that the pensions of the participants of a funded pension system were not determined on the basis of the contribution to the capital, but distributed according to the number of children raised—of course, participants would be exempted from contribution for the duration of child raising. That too would be an unfair system and would slip towards unsustainability, but the problem would be exactly the opposite of what emerges now.

So the solution is: the promises of a system built on the return on human capital should be tailored to the actual investment in human capital, and that return should be given to the person who created it. As a result, asset/liability matching would take place in the system and would ultimately eliminate the issue of 'sustainability' of the pension system.

Therefore, the task is to lead the current pay-as-you-go system back to its economic basis, as Professor Werding put it (Werding [2014] — though he did not strictly adhere to this in his specific proposal). The economic basis is that the pay-as-you-go pension system should be a human capital-based system that has been transformed into a Ponzi scheme instead. The Ponzi scheme characteristic here is, with a slight twist to the 'classic' Ponzi schemes where investment is reclassified as a return, the difference here is that the return (which is practically the pension contribution) is classified as an investment, that is, it is considered as a contribution to the scheme (even the name suggests it).

Contrary to the bad logic behind conventional PAYG systems and unlike fully funded (FF) systems, the so called "pension contribution" should not be treated as a contribution to a reformed PAYG system, which should henceforth be referred to as a human capital based (HC) system, since here that is the return side. The investment side here is clearly and exclusively a child raising effort. That is, in an HC system, this needs to be accounted for as accurately as possible, and the income from child raising, or the pension funded from it, should be allocated as accurately as possible based on this effort.

Certainly the results of child raising can be very different, and what matters to us here is, first and foremost, how good a contributor the child is expected to be, i.e. how much contribution he/she

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<sup>6</sup> The line of thought comes from Lajos Bokros—see Bokros (2001).

<sup>7</sup> Interestingly, Samuelson, who created the official ideology of the PAYG system, noticed this too, but did not draw the right conclusions from it. This was substantiated by the concept behind his model that he considered the cost of child-raising as 0, so his system was logical, but he did not notice that this was a very special subcase of a general case.

will pay and for how long, and how intermittently he/she will receive earnings. As a result, there are some things that need to change in the HC system compared to the PAYG systems currently in operation, such as:

1. pension shall be increased by raising more and better educated children instead of by increasing contributions, meaning that the system does not incentivise increasing contributions;
2. however, child raising does not mean an exemption from the payment of pension contributions, since—as Hyzl et al. [2005] says—the contribution goes to the parents' pension and child raising contributes to our pension; therefore, everyone is obliged to pay a pension contribution;
3. if our pension does not depend on pension contribution, it is reasonable to expect people to contribute in the same way. It shall not be the same amount for everyone, the contribution may remain with their salaries, as this will provide a return on the parents' investment in their children as human capital. If it was not efficient, both the salary and the contribution would be low, and vice versa. But the problem is that we expect contributions to be made for different durations; for example, contributions are compulsory throughout one's active life, because they are different in duration. Therefore, the length of the contribution period in the HC system shall be standardised;
4. it is certain that the HC system cannot be operated by itself, there is a need for a traditionally funded subsystem for those who do not want or are unable to raise children.

Whether the implemented system will be more input- or rather output-financed is simply decided by the extent of increasing the direct reimbursement of the cost of raising children from taxes.<sup>8</sup> However, this does not change the fact that even with 100 percent output financing, the pension contribution will not constitute the basis of the pension; therefore, even in this case, this transformation of the standard PAYG pension system is defective. How to deal with the different rates of input and output financing in the pension system is going to be explained in another specific article.

#### *1.6. Birth rate promotion is not the goal but the result of the reform*

It is very important to see that, despite it is communicated by both the supporters of linking child raising and pension (above all Botos, Botos [2011], [2012]; Botos [2018] and Giday, Szegő [2012], [2018]) and its opponents (in Kovács (ed.) [2012], P. Mihályi, A. Simonovits, P. Holtzer), the purpose of introducing the HC pension system is not to encourage child raising. (Even neutral analyses—such as Simonovits [2014] and Regős [2015] — examine whether fertility is affected by the consideration of child raising in pension allocation. The pronatalist line was characteristic already at the first international time pensions and child raising were mentioned—see Demény [1987]).

The problem with this is that, if that were the purpose, objections would be justified, such as why the pension system was being 'touched' to solve such a problem, and that child raising could be more efficiently encouraged by other means. But the objections are not justified, because this is not the problem either: the HC system has to be implemented, because it is inherent in the internal logic of the PAYG system.

In other words, the purpose of introducing the HC system is not to encourage child raising, but to restore equity, so that the person who contributed to the pension base receives the pension.<sup>9</sup> Fortunately, this is economically consistent with promising pension only to those who have created the

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<sup>8</sup> Taxes are used to finance the major part of children's education and health care around the world. There are different types of childcare allowances (GYES, GYED, etc.) financed from taxes in Hungary. As of 1 July 2019, the Hungarian government announced further financial contributions related to raising children (extension of CSOK, soft loans, car purchase discount, etc.). These can be considered as tax-financed parts of child raising and would, therefore, provide pension for child raising based on a proportion of the tax paid.

<sup>9</sup> I only dealt with the financial/economic aspects of child raising here, but, of course, there are many other aspects that I do not discuss; however, many others have already done so.



contributory capacity to pay for it, meaning that this pension system will be sustainable in the long term, independent of the number of children born in the future. The HC system will automatically adjust to any number of children, so the biggest demographic public finance problem will be eliminated and the pension system will be independent of the number of children.

Of course, overall and logically we expect that the introduction of such a pension system will increase the willingness to have children<sup>10</sup>, not because the new system directly encourages childbirth, but because it eliminates the counter-incentive measures existing today in the poor PAYG system.

The fact that the HC system does not consider itself as an incentive to have children also means that it is not intended to force anyone to raise children, it is in the best interest of everyone (especially unborn children) if only dedicated parents decide to have children.

However, the goal is twofold

1. No matter how many children are born, the pension system must be sustainable, which means that the assets and liabilities of the system are automatically matched by making having or not having a child financially neutral.
2. In the future, people should not be fooled by the illusion that they will receive a pension without saving or making any economic sacrifices. As in the future paying contribution does not make anyone eligible to pension, who does not have children shall put money aside and shall complement his/her pension with the money saved.

It is fair to say that it is logical what people say that the Earth is overpopulated, so it is advisable not to have children or only few. However, on this basis, it is not logical to attack the HC pension system, because its aim not to encourage child raising, but, through the recognition of child raising, neutralises whether a person receives pension from investment in human or 'physical' capital. On the other hand, it would be inconsistent if one were to argue for a reduction in population while arguing for the current PAYG pension system, because the former obviously hinders the existence of the latter.

It is important to mention that almost all of the recommendations which want to take into account child raising are based on the mistake that the 'traditional' pay-as-you-go system of Samuelson is theoretically correct, meaning that the pension is based on contributions. Accordingly, almost all of the recommendations are based on the notion that not only pension contributions but also child raising should serve as an eligibility criteria; that is, child raising should also be considered as a form of eligibility. (Quoted papers by the Botos couple and authors Giday–Szegő, as well as Werding [2014] internationally)

To be honest, I also used to agree with them. I noticed early on that due to our upbringing, we owe a debt to society, which can usually be repaid through child raising or the pension system (Banyár [2001]; — later incorporated into Banyár, [2003/2017]). In our joint book with József Mészáros (Banyár, Mészáros [2008]), we raised the question of considering raising children as a contribution to the pension system, which we repeated in our proposal in 2010 (Banyár, Gál, Mészáros [2010]), and further elaborated in the early 2010s, but it was only published years later (Banyár, Gál, Mészáros [2016]).

In the references, I only found one exception to this approach, namely the study of 4 Czech insurance experts (Hyzl et al. [2005]), who had already examined the issue from the point of view of asset/liability matching, and produced a similar proposal (or a proposal similar to my planned more

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<sup>10</sup> Some people are sceptical about this, claiming that research proves that child raising is not influenced by financial incentives. I would like to make two comments: 1. Whether or not such a pension system encourages child raising is not an essential element of the line of thoughts above (my subjective belief is that it does). 2. Compared to what this system would provide in exchange for having children, the current financial incentives can only be considered 'pocket money', so it is no wonder that they have had little effect.

detailed other article). I gave up on this approach back in 2014 (Banyár), as I have found that the recognition of pension contributions as an acquisition of eligibility is wrong, and the current pay-as-you-go system itself is incorrect in terms of asset/liability management, even its justification by Samuelson [1958] is questionable. One consequence of this is that the question does not have to be examined from a pronatalist point of view, as Róbert Gál, for example, usually emphasises. In his words, the current system imposes a kind of ‘child raising tax’ on parenting (Máriás [2014]), thus holding back fertility (something that has long been observed with the PAYG system – see, for example, Gál [2003]).

## II. Some very general improvement possibility of the state pension system<sup>11</sup>

In this part of the paper I try to outline 5 important amendments that decision-makers should consider with or without moving to a new pension system, as they would significantly increase the efficiency also of the current system. (If they do, however, move to the HC system, I suggest incorporating them into that from the outset.) In fact, the individual proposals are largely independent of each other, meaning that they can even be “cherry-picked” – although their combined application would be the most effective.

### II.1. Transforming the state PAYG system to an individual account DC system

The pay-as-you-go (PAYG) state pension system, created by Roosevelt in the late ‘30s and early’ 40s, was admittedly an unfounded improvisation (Blackburn [2003]), the ideology of which – not fitting the original system in any way – was justified almost two decades later by Samuelson (Samuelson [1958]). Looking back, it seems that its elements have been “patchworked” from two existing pension solutions at that time: the employer-funded occupational pension scheme, which rewards employee loyalty, and the individual pension schemes operated by insurers (Banyár [2019]). From the first one came the “pension formula”, i.e. the defined benefit (DB) nature, which is widely used in state pension systems, and the use of length of service. From the second one came the more or less individual contribution, based on which the scheme should in fact have been of a defined contribution (DC) nature. After all, if we read Samuelson’s study with this in mind, then the picture of a DC pension system unfolds, and indeed: if pension entitlement can be acquired through contributions, as is – as a theoretical fallacy – the case in PAYG schemes, then the logical system is DC and not DB.

Because of this, PAYG systems should actually have been created as such from the beginning, but here it is very clear that the “official ideology” was born much later than the system itself. The system was not really in line with this ideology, it just breathed a sigh of relief that they have one already, so they don’t have to continue to think they are running a Ponzi scheme (though this is exactly the case (Banyár [2019]), but that’s another story).

Looking back, it also becomes clear why the system had to be formulated as DB in the beginning, and why the length of service had to be applied, which is in principle a redundant concept in a DC system.<sup>12</sup> The reason is that the system functioned as a transitional system for decades, but they were not aware of it (either!), and in fact the peculiarities of a transitional system were canonized. The essence of the transition was that although the pension was – in principle – provided in exchange for the payment of contributions (though this was only “revealed” later), already at the start of the system, after one or two years of contributions, those who reached the age limit, received a pension. If they also had received the pension after the actual payment of the contributions, its amount would have been only symbolic, it would not have been possible to make a living from it. The “pension formula” used in

<sup>11</sup> This paper originally was published in Hungarian in the (Hungarian) Economic Review in June 2020. DOI:10.18414/KSZ.2020.6.632

<sup>12</sup> Or, if we alleviate the theoretical rigor, we can say that it could and should have been given a completely different function than acquiring pension rights - e.g. it may play a useful role in differentiating retirement ages, but that’s another story.

occupational pension schemes, with its length of service as an integral part, seemed to be a good tool to address this.

For all these reasons, the transition to Samuelson's operational scheme (pension for the payment of contributions – or, more precisely: since with my contribution I supported the elderly at that time, I became entitled to be supported by today's active people, but later it will be interpreted in the former way) could, in principle, only take place after a transitional period of about 4 decades, when the system had been "mature" (Samuelson was declared to have dealt only with the peculiarities of the mature system), meaning that those who entered the labour market at the start of the system, i.e. those who actually received a pension based on their whole active career, started to retire. By then, however, it had long been forgotten that the system operated under temporary rules reflecting the peculiarities of the transition period, insomuch the possible operation of the PAYG system as a DC system seemed to be a new theoretical discovery when Buchanan raised it (Buchanan [1968]).

For all these reasons, although the transformation of the PAYG system to a DC system would have been justified and rational in the first place, even according to its own ideology, i.e. such a transformation could be best interpreted as a kind of "back to the basics" reform, it was celebrated as a major paradigm shift. (Holzmann - Palmer (ed.) [2006] and Holzmann, - Palmer - Robalino (ed.) [2012-13]). In fact, it was generally believed that the state PAYG system was inherently of DB type, and that the DC system can only be market-based ("funded"). This is also the reason why DC-operated PAYG systems are marked as "notional" and are referred to as NDC systems. And it was also the reason for many proponents of the PAYG system resisting the NDC system for a long time, looking for all sorts of theoretical problems in it. (e.g. Simonovits [2001] and [2007])

The transition of PAYG pension systems to DC-type operation has become a global trend in the last two decades<sup>13</sup>, although the pace has slightly slowed down recently (Guardiancich et al. [2019]).

Two major types of DC-operated PAYG systems have evolved: the Swedish individual account pension system (the actual NDC system) and the German point system. Both are based on the recording and valorisation of individual contributions, and the pension annuity is calculated from this valorised contribution mass as if it were actually available. (Instead, it actually shows the per capita value of the implicit pension liability behind the PAYG pension scheme.) Under the NDC scheme, the pension is calculated in the same way as the annuities provided by insurers, i.e. the capital (the valorised contributions shown by the individual account) is divided by the retiree's life expectancy in months (possibly adjusted by a technical interest rate). Valorisation can take place with a wide range of interest rates, which is in principle the right of the system operator to determine. However, the logical valorisation rate is the wage index.

The points system<sup>14</sup> is very similar to this, the main difference being that here the valorisation takes place somewhat obliquely and with clearly the wage index. For this reason, the system is easy to understand for outsiders and also for ordinary contributors, and it has a major advantage over the NDC system: the pension of different cohorts with similar contribution histories, since they are defined by points, do not "slip apart". In the point system, a contributor who pays an average contribution in a given year, receives one point, and everyone receives as many points as their individual contribution payment compared to the average contribution payment in that year. The pension budget, i.e. the amount of contributions received, is allocated on the basis of the total number of points of the surviving pensioners. Therefore, for one point, both old and new retirees receive the same number of pensions,

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<sup>13</sup> According to OECD [2017], among the OECD countries the NDC system is implemented in Italy, Poland, Lithuania and Sweden.

<sup>14</sup> Based on the data of OECD [2017], the state pension system operates this way in France, Germany and Estonia.

but this pension may not follow the wage index, as the possibilities of the PAYG system depend not only on this, but also on the ratio of active to retired, which is tendentially rising these days.

The disadvantage of the initial form of the points system compared to the NDC system was that it did not follow the increase in life expectancy of more and more newly retired generations, nor did it take into account the actual ages of retirement. These are inherently taken account of in the NDC system, but the points system can also be adapted to this requirement with some sort of demographic multiplier.

Also in Hungary, the transition to the DC basis has already been raised, namely the introduction of the NDC (Banyár – Mészáros [2008] and Banyár-Gál – Mészáros [2010]) and the introduction of the points system (Holtzer (ed.) [2010]). As the latter volume shows, which basically summarizes all the ideas of the Hungarian pension reform of the late 2000s, there was a consensus among Hungarian pension economists on the need to switch to the DC system, the only source of disagreement being whether it should be a pure points system, a combination of a basic pension and a points system, or an NDC system.

In principle, the government also took a positive approach to the topic, but then the implementation was removed from the agenda, and not even from a theoretical perspective was it dealt with by many. Today, however, the welcome increase in wages posed a new problem in the pension system, where in 2009 the indexation of pensions to inflation was introduced instead of the previous Swiss index (the average of the wage index and the inflation index). Due to the increase in wages, starting pensions have increased significantly – as pension entitlements are essentially valorised by the wage index –, while for those who have already retired, benefits are increasingly lagging behind the new entitlements. Because of this, the pensions of those with fairly similar contributory careers can be very different, depending on what time they retired. An obvious solution to the problem, based on the above, would be to introduce a points system, as suggested by Simonovits (Simonovits [2018]).

The transition to a DC system, overall, does not mean more than a strict adherence to the long stressed and perfectly logical requirement of the PAYG system that the benefits received from the system be proportionate to the contribution to the system. At the same time, based on our previous analysis in part I, it is a serious misunderstanding that the contribution to the PAYG system is the levy payment itself, since, as the PAYG system is all about redistributing the return on human capital investment, it is exclusively the rearing of children. The payment of levy is the return side, i.e. the obligatory repayment of the investment (and its return) in childrearing by all those involved, and as such, this must also be recorded. That is, the introduction of individual accounts in both the traditional PAYG and the reformed HC system is useful and even fundamentally necessary, although their function is different. In the HC system, this is not the basis for eligibility, although - in case of improper repayment, it may be a factor reducing eligibility. Eligibility requires additional records of the children raised.

If, on the other hand, we are considering whether to introduce an individual account NDC system or a points system, we need to be a bit more nuanced. An NDC individual account can also be used in the HC system, but the application of points - where points measure the payment of contributions - is more complicated in this case. At the same time, the HC system itself can best be constructed as a point system, but points should not measure contribution payment but child-rearing effort. For all these reasons, if decision-makers decide to maintain the traditional PAYG system, it is recommended to introduce an individual account. If they also decide to switch to the HC system, then in addition to keeping individual accounts with altered functions, it is reasonable to introduce a point system with a different logic than today. A further argument against the points system in favour of the introduction of individual accounts (NDC system) is that its technical infrastructure at least in Hungary, has essentially been completed in the meantime, so it could now be implemented at a relatively modest

cost, while a significant new investment would be needed to create the technical background for the points system.

## *II.2. Transition from an individual to a family pension system – widow's pension revisited*

As far as we know, the PAYG state pension is based on individual pensions, i.e. individual entitlements, all over the world. The OECD regularly reviews pension systems in developed countries. In their most recent volume (OECD [2017]), the word “family” is mentioned only 6 times and only once directly in relation to pensions, while the word “individual” is mentioned 86 times, as a “natural” attribute of entitlements etc. The individual pension system, i.e. when both the establishment of pension entitlements and the pay-out of pension benefits take place on an individual basis, seems self-evident at first glance, but widow's pension, for example, suggests that this is not the case, as it does not fit into individual pensions, still we find it legitimate. It indeed does not fit, because if the acquisition of pension rights is individual, how come the widow did not take care of her pension individually? On the other hand, it is obvious that most of the time she was unable to do so because she raised a child at home (the vast majority of widows are women), so it is legitimate that the husband's acquisition of rights also extends to her.

At the same time, the source of the widow's pension, as implemented in pension schemes based on individual entitlements, is not the husband's acquisition of rights but the burden of widowhood distributed among the risk group. This is especially problematic in a strictly DC, i.e. contribution-based system, which is, according to its own philosophy, the PAYG system. The usual justification for such solutions is the (partial) redistributive nature of the PAYG system, which reduces the realization of “actuarial fairness”, as the strictly contribution-based service is termed by the profession. Actuarial fairness is a matter of course in private insurance, i.e. it lacks redistribution, that is, solidarity. The presence of solidarity is widely seen as essentially the difference between private insurance and social security, hence the need of using the adjective “social”. At the same time, many are - incorrectly - using the word solidarity in an extensive sense. It is self-evident that even in private insurance, the contribution to insurance and the services received from the insurer are not equal on a personal level – as turns out afterwards. Equality is preliminary, in terms of expected values. The fact that the injured / long-lived, etc. get more than the undamaged, etc. it is not in the scope of redistribution. Redistribution means that those who are worse-off financially will receive higher benefits relative to their contributions, compared to those with a better financial situation, for whom the reverse is the case, as the deficit here will be the source of the former surplus.

Widowhood, however, can be managed on a risk basis without any further ado, and in private insurance it is indeed the case, as implemented in joint life insurance (or annuities). That is, it is not reasonable to classify this element under the scope of general “solidarity,” it can neither be well justified by the PAYG system's own ideology, nor by that of the HC system. In the PAYG system, one might ask why single men and women should be in solidarity with a childless widow who has never participated in the labour market, which is what spreading widow's pension to an entire “risk group” practically means. According to the logic of the HC system, the problem with such a solution to the widow's pension is that it is right to impose the burden of raising children also on the childless, but not in an ad-hoc, partial and non-transparent way, but in a systematic way.

Going back in time, behind the widow's pension implemented in this way, we find a problem, that – in addition to the ones explained above – has also made the use of length of service as an indicator useful for a while: paper-based record keeping. In a paper-based system, it would simply have been difficult to record family relations, especially after marriages started to become unstable. However, with electronic record keeping, and in particular with the individual pension account, this problem is resolved, so we can no longer rely on practicality as an argument in favour of a non-principled solution.

Of course, the family pension system does not mean that all aspects of the individual pension system should be abandoned, and we should move to something radically different. Individual accounts are also very useful in a family pension scheme and may even be the basis for it - with some modifications and further considerations to the scheme. Moreover, it is exactly the world of an individual account pension system transformed into a DC system where the family pension scheme can easily be implemented in place of the individual one, and the widow's pension could finally be put in place by abolishing it in this form. Instead, it is worthwhile to introduce the equalization of pension accounts and a joint annuity for married couples (or for those at least living in a registered partnership). (We have already explained this in detail in Banyár-Mészáros [2008].) The principle of the family pension system: the acquisition of rights during marriage (in case of a HC system it will be the repayment of the liability, and the rights are collected on a different account) is common, for the pension benefits the couple worked together. Auxiliary principle: none of the members of the couple is entitled to pension benefits at the expense of outsiders. If a member of a couple – on their joint decision – pulls back from the labour market for any reason, it is unfair that they do not acquire pension rights, however, it is also problematic, if they do acquire rights, but at the expense of completely unknown third parties. The fair solution in such a case is to consider the entitlement of the person acquiring it as a joint acquisition, which is shared within the couple, as there was a division of family work behind it, and this is why seemingly only one of the parties accrued pension right.

There are only three points where the individual record keeping of entitlements conflicts with this principle: death of spouse, divorce or retirement, so in these cases corrections need to be introduced into the system. Namely:

1. In the event of the death of the spouse before retirement, the accrued pension rights shall be inherited by the spouse / registered partner. Death after retirement is settled by a joint annuity.
2. In the event of a divorce, the entitlements on the individual account (repayments in a human capital-based system) are divided by adding the part of both accounts that was acquired during marriage and distributing it equally between the two parties. The situation is a bit more complicated in a technical sense, but the same should apply in the case of ongoing pension benefits, as there is an individual reserve behind it (or at least it can be easily calculated) that can be shared.
3. In the event of retirement, the individual accounts are consolidated, and a joint annuity is set for the couple, which is reduced to 65-70% of the total amount after the death of one of the parties.

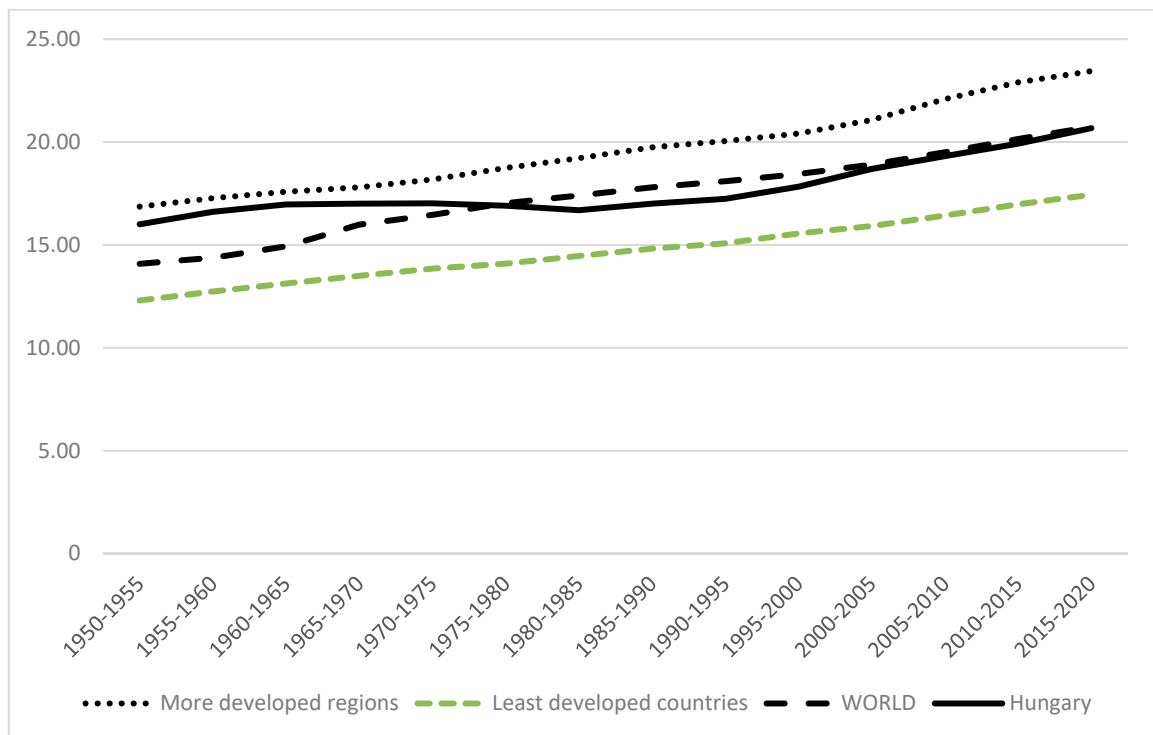
These are the main principles. Of course, there are several technical problems due to the fact that a couple does not retire at the same time, divorce can occur when one of them is already retired, but the other is not yet, and so on. However, based on the above principles, these problems can systematically be addressed, to which we plan to dedicate a separate, independent study later.

Contrary to the proposal, some critics have argued that because of the frequent end of marriages by divorce and patchwork families, the family pension system would be more complicated today than it would have been half a century ago. Fortunately, this is not the case, as we have given the “algorithm” for divorce above, so it can only cause some problems in that it needs to be applied a little more often. In a well-functioning administration system, where the appropriate public databases are well connected, this is not a particular problem. Also, the focus of patchwork families lies in child-rearing, so the spread of the phenomenon is neutral to the family pension system. Problems can actually be caused by “nonlegalized” cohabitation, but only if the state takes on the hopeless mission that the same pension rights arise in this case as in that of marriage. Instead, my suggestion is that the state should not do this, however, it should draw widespread attention to such consequences of avoiding marriage.

### *II.3. Automatic pension age indexation*

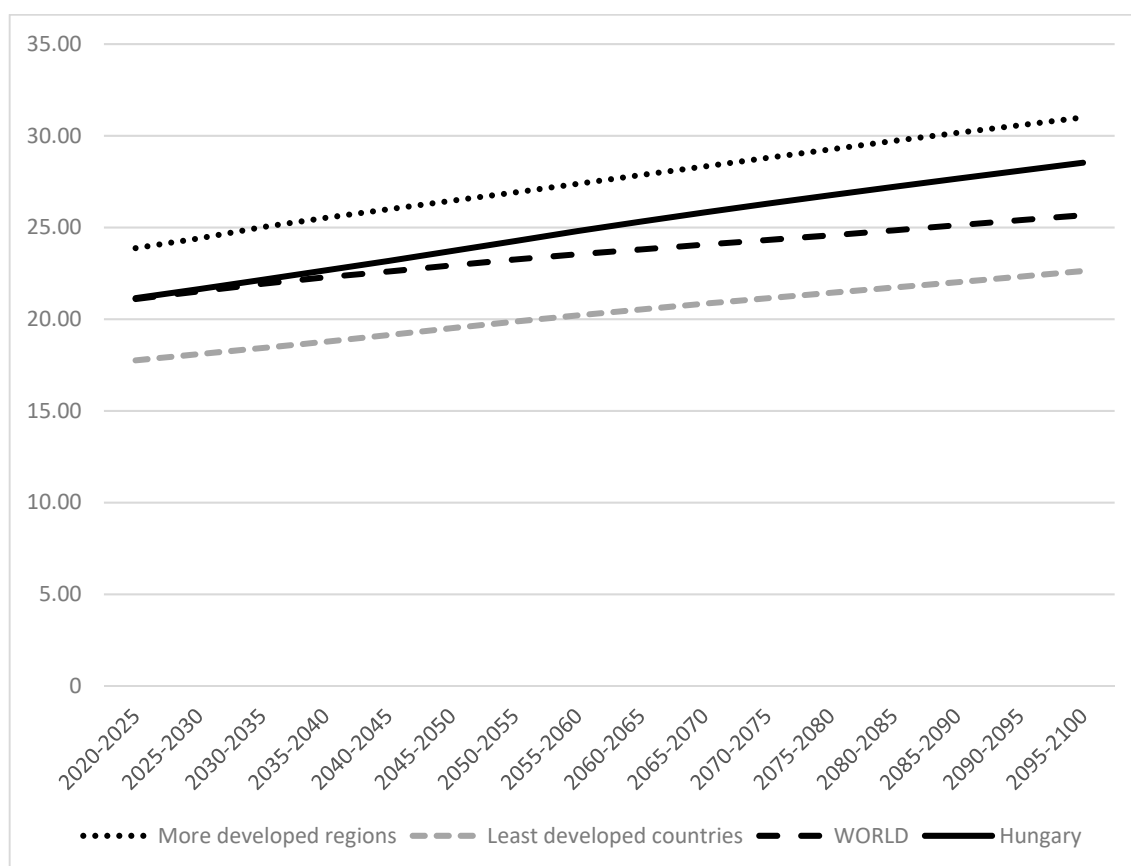
Life expectancy is increasing at all ages, including those prior to retirement, all around the world.

**Figure S1.** Change in life expectancy at age 60 – years 1950-2020



Source: UN Population Database

Growth is not expected to stop in the future, although it has seemed to come to a halt in the last year or two, but it is not yet known whether this is a temporary phenomenon or not (Horváth [2019]).

**Figure S2.** Projected change in life expectancy at age 60 – years 2020-2100

Source: UN Population Database

Growth in both developed and least developed countries has been relatively steady over the last seventy years, and this will be expected by UN experts in the future (in this century), so that the gap between the two groups of countries will be broadly constant (slightly increasing), and the world average will not be roughly halfway between the two as before, but (in line with their growing weight in the world's population) will tend to deviate towards the least developed countries.

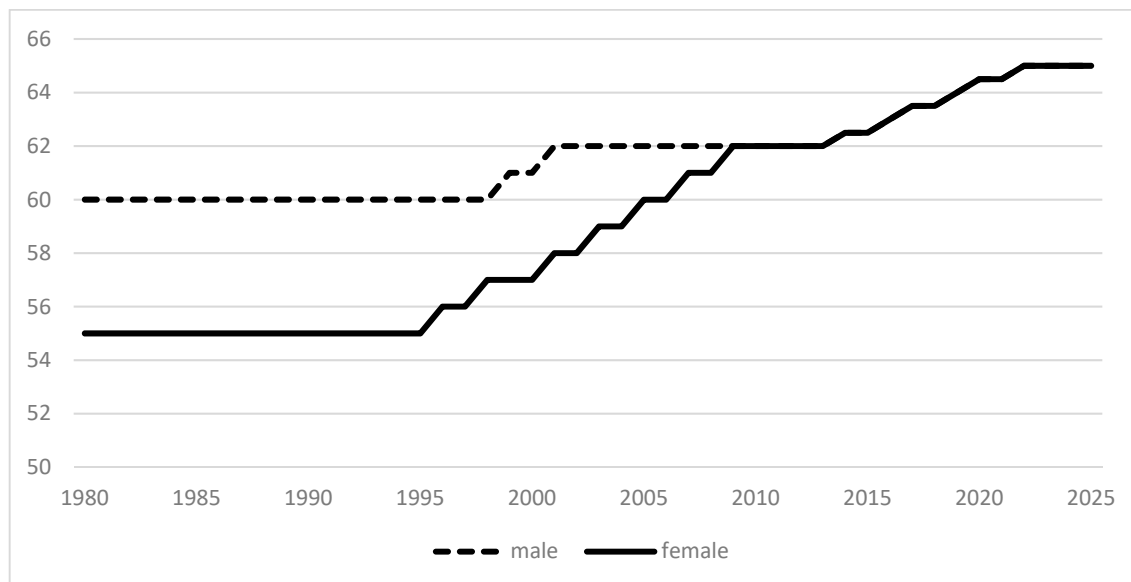
In the case of Hungary, what we see is that in the early 1950s our statistics were much better than the world average and strongly approached that of the most developed countries, but in the 1960s there was a three-decade long stagnation, and in the 1970s we fell below the world average. Then, the growth of life expectancy started again in Hungary, and this growth has been going on for two decades, and we have essentially caught up with the world average. The UN predicts that this will soon be phased out, and that growth will be faster than the world average, similar to that of developed countries, but the level gap to them will remain. What the bottom line is that the expected trend in life expectancy in old age is expected to continue, albeit at a declining pace.

In comparison, we like to think of retirement age as a fixed value, and not only in Hungary. See, for example, the French protests against the new pension system, where one of the main reasons for resistance is the slight increase in the long-standing state pension age, lower than in Hungary – coupled with a future life expectancy considerably higher than in Hungary –, which was then quickly withdrawn by the government. This is confirmed by the fact that the retirement age in Hungary was actually fixed for more than half a century. The retirement age of 60 for men and 55 for women (which was, by the way, reduced by 5 years from previous values), set by the Sztójay government in 1944, was in effect until 1995 for women, and until 1998 for men. The male state pension age gradually rose to 62 by 2001,



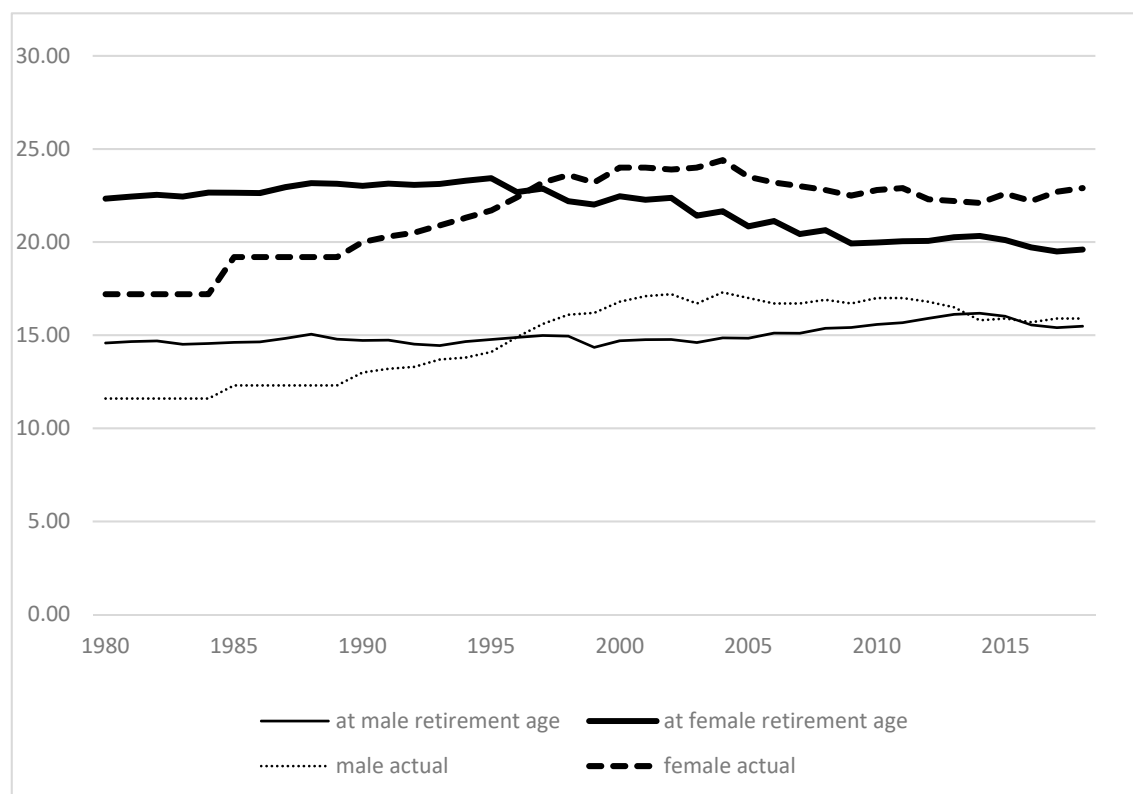
which women “caught up with” in 2009. However, this was thought to be a one-off adjustment, as was the change that began in 2014 and will run until 2022, owing to the retirement age gradually rising from 62 to 65 years, regardless of gender. This, although in the form of roughly half a year increase every year and a half, corresponds to an annual growth rate of 4 months.

**Figure S3.** Change in retirement age in Hungary.



Source: Hungarian State Treasury

The unchanged state pension age was actually justified by the stagnation of life expectancy for a few decades at that time, and similarly, the increase in life expectancy in the meantime was the basis for the one-off adjustment. Let's look at how life expectancy at retirement age, and actual years spent in retirement have changed:

**Figure S4.** Life expectancy at retirement age, and actual lifetime spent in retirement, 1980-2018

Source: Own calculation based on data from the Demographic Yearbook (Hungarian Central Statistical Office), and OECD

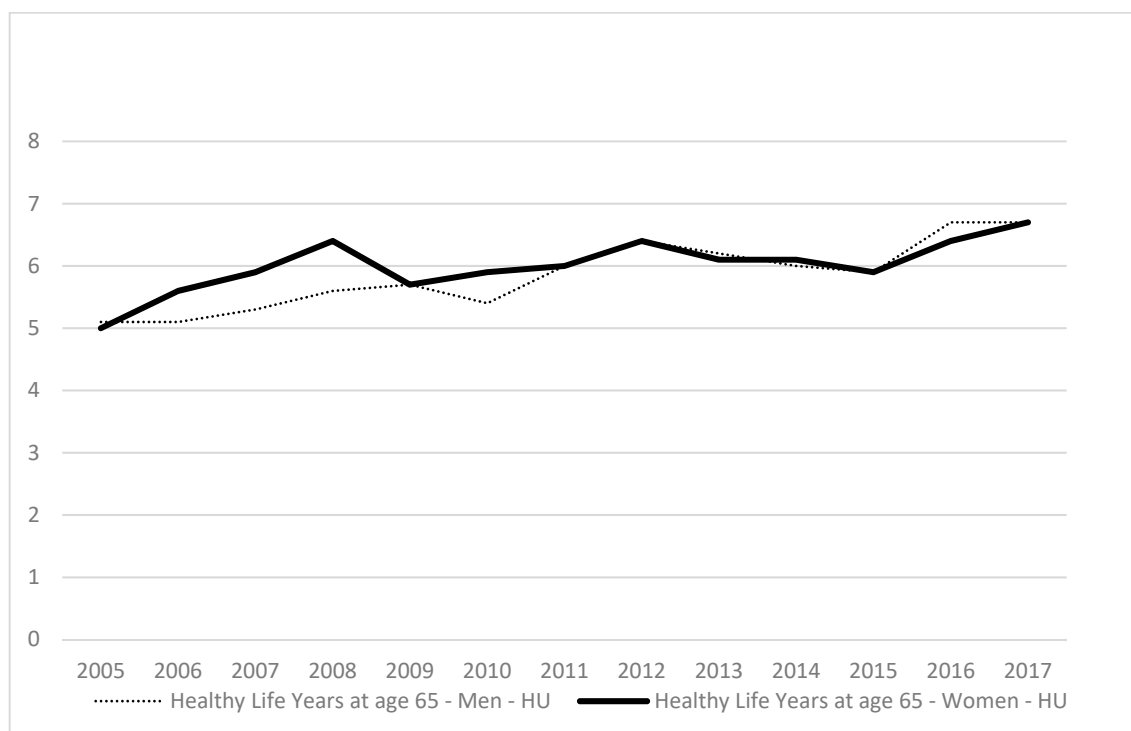
There are two types of values in the table above. On the one hand, it is the life expectancy of those who are just as old as the current retirement age in a given year. I calculated these gender-specific values from the mortality tables given in the Demographic Yearbooks of the Hungarian Central Statistical Office, separately by gender (where the retirement age was not an integer, I rounded it down). For men, this value is surprisingly stable at 15 years, even after the state pension age has begun to rise - roughly at this point, after decades of stagnation, began the increase in life expectancy. Due to the much larger relative increase in the retirement age for women, this value started to decrease thereafter, but it seems to have stabilized around the age of 20 for a decade.

The OECD measured something different: the actual time spent in retirement. This is different from the previous values for two reasons: a) because it does not apply to exactly the same population, as - although the penetration of the pension system is very high - not everyone will become a pensioner; and (b) because not everyone retires at the state pension age: this may happen earlier or later, although earlier is more common. This may explain the seemingly strange phenomenon for both sexes, that until the mid-90s, the time actually spent in retirement was significantly shorter than the life expectancy at retirement age. After all, those who could only expect a short life span typically retired earlier, and thus died as retirees before reaching the state pension age.

All in all, we might say that the stagnation of life expectancy can be considered a deviation from the rule, of which Hungary was an example for 3 decades, but have been not for more than two decades. The rule, which Hungary is now following, is a gradual, broadly steady increase in life expectancy. For this reason, the institution of a stable retirement age can also be questioned, which is sometimes modified for political reasons in an desultory way, usually in times of economic policy difficulties, but

with the need for it to be stable again after adjustment. What the combination of a stable retirement age and an increase in life expectancy means is that the increase in life expectancy is not realized in the elongation of the active life, but of the retirement period, i.e. the system loses potential contributions while payments increase. In addition, higher age is now typically paired with better health, meaning that people with increased life expectancy would be able to work longer than their former predecessors in poorer health. This is also shown by the European Commission's Healthy Life Years (HLY) indicator, which, albeit with fluctuations, shows a clear improving trend, essentially in parallel with the increase in life expectancy.

**Figure S5.** The change in healthy life expectancy at age 65, 2005-2017



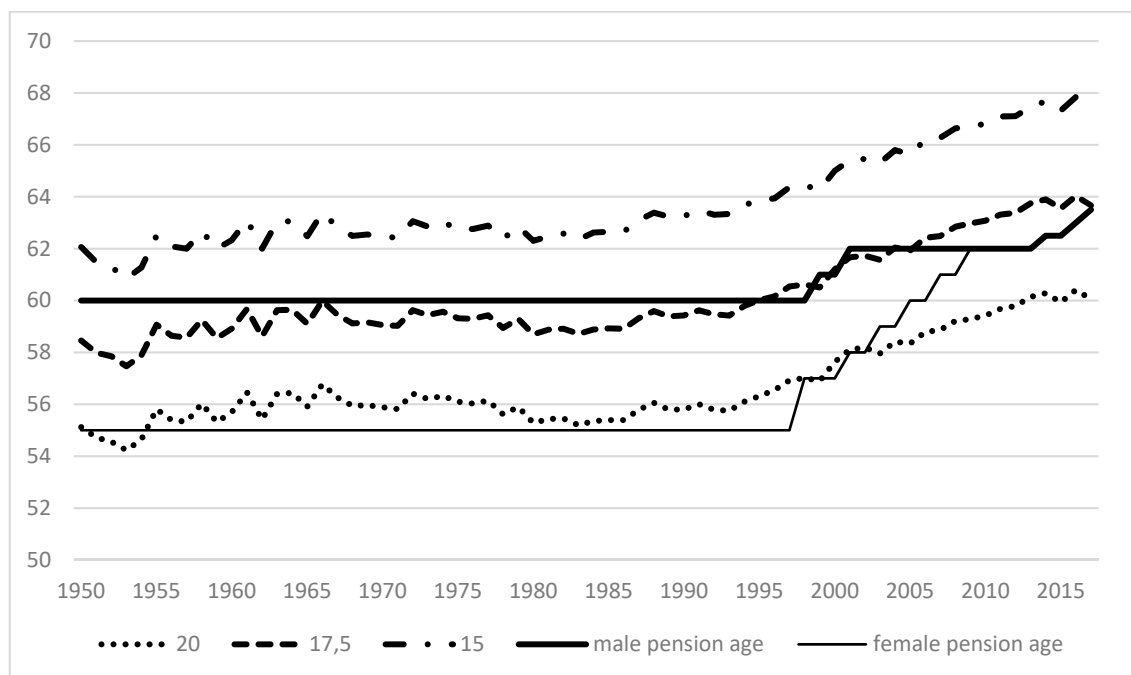
Source: EC - [https://ec.europa.eu/health/indicators\\_data/indicators\\_en](https://ec.europa.eu/health/indicators_data/indicators_en)

And with declining birth rates, these older workers are increasingly wanting in the labour market, not to mention that besides a diminishing active workforce, the length of benefit payments for old-age pensioners is getting longer.

Yet instead of the ever-increasing expected value of the time spent in retirement, it is logical to have this expected value fixed, i.e. a continuous indexation of the retirement age - instead of one-off, desultory adjustments. This has already been recognized and implemented by several countries, insomuch that it is included in the European Commission's 2012 White Paper on Pensions as a recommendation and as a presentation of best practice (EC [2012]).<sup>15</sup> Here is a figure of this:

<sup>15</sup> Based on the MISSOC (Mutual Information System on Social Protection) database (<https://www.missoc.org/missoc-database/>), the following countries have introduced the automatic indexation of retirement age in the EU so far: Bulgaria, Cyprus, Czechia, Denmark, Estonia, Finland, Italy, Slovakia and the Netherlands. However, in many more countries, there is currently a continuous increase in the retirement age until a targeted retirement age is reached. In most cases (e.g. in Hungary), there is no announced plan for what will happen next, but some of the aforementioned countries are also such that this announced age increase is currently in progress, and the time for regular retirement age indexation will come only after this, but it has already been declared.

**Figure S6.** Hungarian unisex ages with 15, 17.5 and 20 years of life expectancy, 1950-2017.



Source: own calculations based on data from mortality.org

In the figure above, I have shown the official retirement age from 1950 onwards, and also what the retirement age should have been in a given year on the basis of a unisex (i.e. a combined male-female) mortality table, if the expected time spent in retirement would have been fixed at 15, 17.5 and 20 years. Based on this, one might say that the male and, later, the uniform retirement age fit the 17.5 years relatively well. Although the matching state pension age would have been 1-2 years lower than 60 in the mid-1990s, it has been higher since then - although by 2022, when the current cycle of raising ends, the two curves may converge. Therefore, a policy could be announced to always raise the retirement age so that the life expectancy in retirement would be 17.5 years. The current 4-month increase per year, which ends in 2022, seems to be excessive in the long run, but based on the trend of the last two decades, it is approx. a 2-month increase per year that seems just right.

It is important to note that automatic indexation of the retirement age does not solve the problem of heterogeneity of life expectancy, and even aggravates it a bit, as only those with a longer life expectancy, such as high earners, will receive pension benefits for a significant period of time. This may further reinforce the “perverse” redistribution (i.e. the redistribution from lower-income to higher-income earners) caused by the abolition of pension depression and later the contribution ceiling (see, e.g., Simonovits [2017]), as the assumption that higher income earners live longer (József Banyár [2016b]), can now be considered as proven (Marosi-Molnár [2018]). For this reason, it is worth considering the management of heterogeneity (reintroduction of the contribution ceiling and/or degressive pension determination) and the differentiated (e.g. on the basis of education or indirectly differentiated by length of service) – and yet indexed – retirement age.

#### *II.4. Development of the state-organized, quasi-mandatory, funded dc pension leg<sup>16</sup>*

If the HC pension scheme is implemented, it follows that the childless will receive only a low level of pension from it, so they will need a pension supplement, for which it is expedient for them to

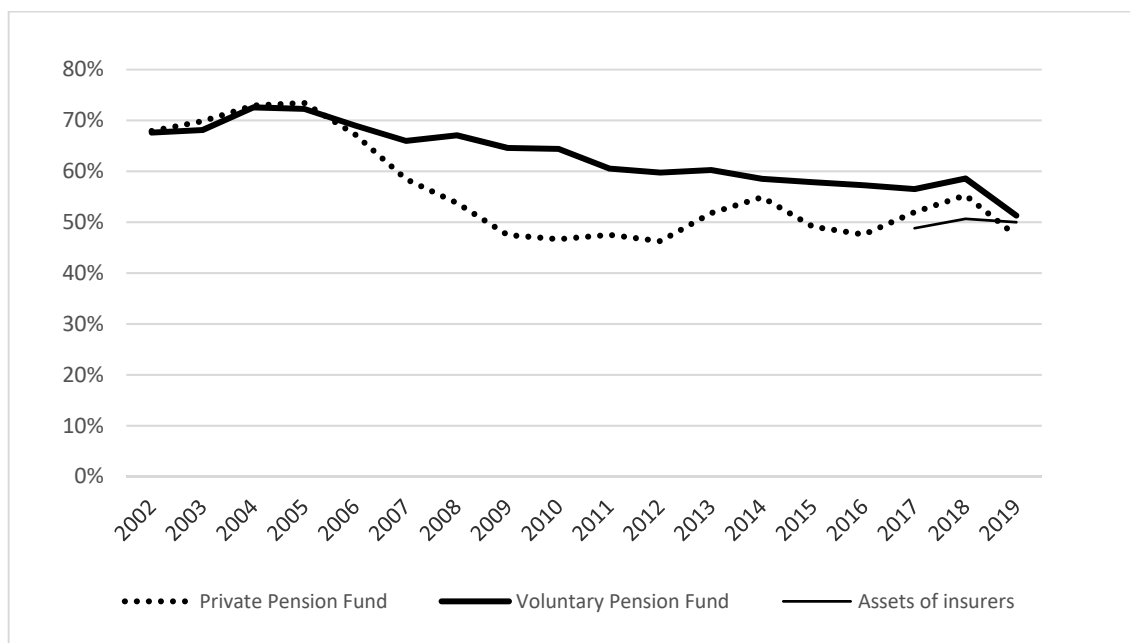
<sup>16</sup>I deliberately wanted to avoid using the term “pillar” because it’s already used in a different meaning. According to World Bank terminology, this would be a funded subsystem of Pillar I.

create a default, cheap, well-organized, funded pension subsystem, with an adequate government involvement in managing it.

However, such a state-organized funded subsystem should be implemented independently of the HC scheme, i.e. even if the current state pension scheme remains in place. In this case, the following main arguments are in favour of setting up the funded public subsystem:

1. in a deteriorating demographic situation, a PAYG system increasingly adds to the public deficit due to the constantly maturing implicit public debt. Although there is no one-size-fits-all defence method against this (it would be a transition to the HC system), the temporal spreading of this deficit (part of it) can be used for a relatively long time. The method of this is partial recapitalization (József Banyár [2017])
2. the partial capitalization of the pension system is already ongoing as a spontaneous process, mainly as a result of the promotional activities of the financial groups concerned: banks, life insurers and the pension funds they manage. However, this is very unequal and often results in inadequate coverage at a very high cost. A state-organized scheme would implement a cheaper, higher and more equal pension supplement than this.
3. as can be seen in Figure S7., private institutions have always kept a significant part of individuals' pension savings in Hungarian government securities. It is questionable whether it is effective to use them as intermediaries, or rather to deliver government bonds directly to those involved, building on existing public pension infrastructure. Even more since a few years ago, when the state institutions have been responsible for the sale of government bonds and pensions were merged, so that further synergies could be exploited in their activities.

**Figure S7.** Share of the Hungarian government securities among all investments - %



Source: Central Bank of Hungary/Supervision/Time series

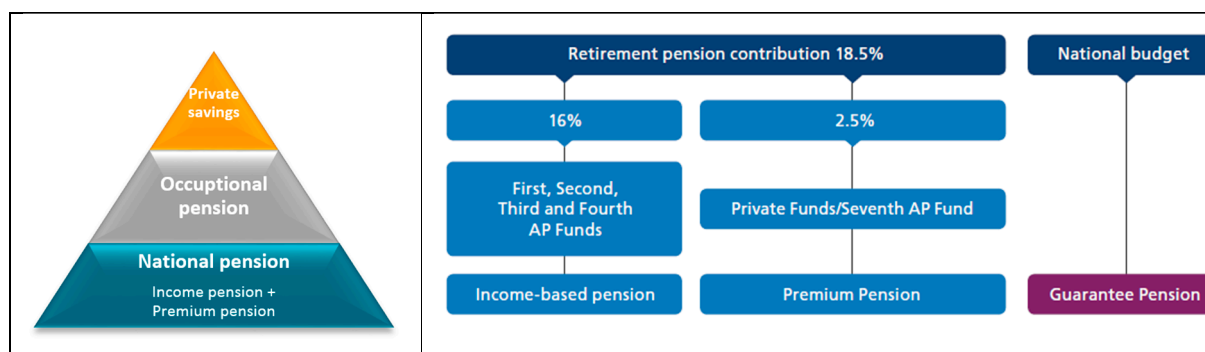
We should set up the quasi-mandatory capitalised pension pillar in Sweden<sup>17</sup> as a model, which is also an example of the fact that it was considered worthwhile to supplement a fundamentally PAYG state pension system with a capitalised pension leg.

<sup>17</sup> According to OECD [2017], there are 10 OECD countries where there is a mandatory or quasi-mandatory (= default but can be exited) capitalised DC pension subsystem. However, the same publication emphasizes that such a Swedish system is special because of the public administration that we have set as an example here.

A brief note on the Swedish pension system, in connection with which we have already noted that the individual account system was first introduced by them. But that's not what we're talking about here.

The Swedish pension system can be illustrated by the following two figures:

**Figure S8.** The structure of the Swedish pension system



Source: The website of the 2<sup>nd</sup> and the 4<sup>th</sup> AP Fund

The left side of Figure S8 shows that all three pension pillars proposed by the World Bank (World Bank [1994]) can be found - albeit here they are depicted as a pyramid. The base is a state scheme called the “National pension”. The structure of this is shown on the right side of Figure S8 and is described in the brochure on the government website (Government.se [2017]). The previously mentioned individual account system is a PAYG system called “Income-based pension” here, which, however, is not typical in that it is supplemented by a relatively large reserve<sup>18</sup> managed by four national pension funds (AP-fonden), as shown in the figure. The pension contribution is 18.5%, but only 16% of this goes to the PAYG scheme, and besides that, they also maintain a fully capitalised mandatory state scheme (“Premium Pension”), where a contribution corresponding to 2.5% of income is allocated. As can be seen, this is also organized by the Swedish Pension Agency, namely the “Seventh AP Fund” as a central administrator. It manages the pension account of each saver and, at the saver’s discretion, makes part of the capital held in the account available to the competing pension funds – possibly divided among several (up to 5) of them. Pension funds do not know whose money they are managing (a “blind account” system), so it is not worth employing agents for them. They can only influence clients with their investment performance, and for them, this is really the only important point, they can only compete with each other in this.

If we make a comparison to the Hungarian voluntary pension fund system (or the already non-existent private pension fund system, which is essentially the same structure as the voluntary funds, functionally in line with the Swedish Premium Pension), we can discover several shortcomings in it that cause losses to the client. Due to the lack of a central administrator, the administration is fragmented, and due to the excess capacity, economies of scale do not occur, i.e. the operation of the system is more expensive than it should be. Agents, ultimately on customers’ money, regularly contact them to convince them of switching to another fund. According to a 2012 survey of the Hungarian Financial Supervisory Authority, the changes do not show any correlation with the fund’s return performance, so the client clearly makes a loss.

<sup>18</sup> Despite this large reserve, the Swedish pension system cannot be called funded either, because the size of the reserve is orders of magnitude smaller than the implicit public debt behind the system. Its role is therefore more limited to smoothing out small fluctuations in revenue and expenditure.

So, competition is justified in terms of returns, but not in administration and agent remuneration, or in activity at all. However, the only administrator is a monopoly, the appropriate form of which is not a private company but a public institution. This could be the State Treasury, which is now also responsible for first pension pillar (that is, the Hungarian Pension Agency - so this would also be in line with the Swedish example), thus achieving large savings in administrative costs.

Moreover, government bonds can even be made default pension investments, in line with Thaler's wish, who criticized the Swedish system taken as a model here precisely for its lack of this (Thaler – Sunstein [2009]) - although they have since made up for the missing default. But it is not advisable to make government bonds the only optional pension investment (in fact, in the long run, the government must strive to reduce public debt, thus strongly reducing bond issuance), and thus - also on a Swedish model - it is worth organizing competing investors - even by transforming today's funds, which would then lose their administrative function.

#### *II.5. Parallel or sequential? The new relation of state system and funded system pension annuities*

Based on the above, it is definitely worth considering the division of the public pension pillar into two sub-pillars with different logics instead of today's single-logic system – while avoiding the mistakes (and the return of the system itself) made by implementing the private pension fund system. The ratio of the two sub-pillars would be different for an implemented HC system and for an ongoing PAYG system. In the first case, the persons concerned would receive different proportions of pensions from the state HC and the funded state DC system, as proposed to be introduced above. In the second case, the proportions of pensions received from the two subsystems would be similar on an individual level.

The private pension fund system, which is very problematic in many respects and has been essentially abolished, had something positive: it made it necessary to think about how to solve the annuitization of the accumulated pension assets, that is, how to make an annuity out of the capital. I did this work at the end of the '2000s (Banyár [2016b]), and one of my main conclusions was that in addition to the existing errors of the system, it also had an unrealized one: the way the annuity system was envisioned. It was taken as self-evident that the annuity paid out of the savings of the private pension fund starts and ends at the same time as the pension received from the public scheme, that is to say, the two partial pensions run in parallel. The problem with this idea is that the private annuity is very problematic, there is almost no evidence all over the world that it could be solved well, and there are serious technical reasons for this, which I analyse in detail in the aforementioned work. The lesson I drew in my monograph on annuities is that the free market annuity should not be forced, especially since there is really no need for it, the problem can be solved better with a fresh approach, with a method there referred to as the alternative social security model.

It is by no means self-evident, as almost everyone takes it, that the annuity received from the public (either HC or PAYG) scheme (“the” pension) and the annuities received from a funded DC scheme must be parallel. We receive the same (or, due to the absence of the above problems, higher) total pension if we change the relative timing of the annuities of the two pillars, and make them sequential by taking the pension from the funded scheme first, and place the pension from the state scheme thereafter.

If we transform the PAYG system into an individual account (DC) system - as we have suggested above, and which is already a trend nowadays - then the logic of the state PAYG system becomes completely similar to that of a funded DC supplementary pension system. In both cases, then, the “capital” available at retirement (in the case of the NDC system, of course, only “nominal” capital) must be divided by an “annuity divisor” (practically the expected remaining life in months at retirement) to calculate the annuity. (In the case of a private scheme, if it provides a life annuity, the

monthly benefit will actually be lower, because the service provider must also set up a safety margin - the smaller its insured portfolio, the relatively larger it is - but let's disregard that now!) The ratio of annuities from the two subsystems will be equal to the proportions of the initial capital. If the (nominal) capital of the PAYG scheme is  $f$  and the (actual) capital of the funded scheme is  $t$ , then the ratio of benefits (partial pensions) received from the two subsystems will be  $f/t$ . If we introduce the ratio  $p = t / (f + t)$ , we can say that for each HUF of a pensioner's pension,  $p$  is received from the funded system and  $(1-p)$  from the PAYG system.

At the same time, it does not matter to the person concerned whether he receives the HUF 1 from a single or multiple places at the same time, i.e. without further ado it is possible to imagine a "division of labour" between the two subsystems such that they do not provide pension in proportion  $p/(1-p)$  for the same amount of time, but instead the retirement period is divided in the same proportion. That being said, in the case of a retiree, the life expectancy after retirement can also be divided in the ratio  $p/(1-p)$ , and it is feasible that in the first part ( $p$ -th part of the whole life expectancy) the total benefit is paid from the funded system, as a return on the whole capital of amount  $f+t$ , and in the remaining time from the PAYG system. This would result in the pension annuity being divided over time into two stages: a) a first stage with a relatively well-predictable risk, and b) a riskier second stage.

What the split means is that we technically divide the single, immediate lifetime annuity into two annuities: an immediate term annuity and a deferred, whole life annuity. The two annuity components require different treatment in terms of risk. The insurance risk of an immediate term annuity is lower than that of the other one, as the mortality of the risk group is even lower here, and therefore we expect from the outset that the insured will be alive for most of the duration. From an insurer's point of view, the biggest risk is that everyone survives, but this is predictable and easy to calculate, especially if we make a small amendment to the design, as explained below. However, the risk of the deferred annuity portion is much higher, especially if the risk group is small. Risks can be significantly reduced by increasing the size of the risk group. If this annuity was provided by competing providers, their individual risk would be very significant, as the risk group would be cut into pieces. Therefore, a large risk loading would have to be included in the premium for them, or the product would have to be organized into a single pool. A simpler solution would be to leave this part to the state pension fund as a monopoly supplier, which already provides this kind of service.

The aforementioned small amendment to reduce the insurance risk of the temporary annuity component to zero is that instead of a term life annuity a term fixed annuity should be provided during this period. There is no longer any insurance risk in this, it is a simple scheduled fund withdrawal. This technically corresponds to an annuity with a guarantee period, where the length of this period is equal to the length of the term annuity (approximately a proportion  $p$  of the remaining life expectancy at retirement). This, of course, comes with a slightly higher premium than the pure life annuity, meaning that the monthly benefit is calculated with a few percent higher annuity divisor, and as a result, the length of the fixed annuity portion will be slightly shorter than  $p$  times the life expectancy. In return, however, the solution has two major advantages:

1. we completely remove the insurance risk from this part of the annuity, i.e. it does not have to be provided by a special financial institution (essentially a life insurer), almost any financial institution is suitable for such a service
2. from now on, this part of the annuity (capital not yet used due to the possible early death of the insured) will be inheritable, which, according to the experience of private pension funds, is very attractive to those concerned. In addition, it can easily encourage delayed retirement, as unused capital of proportion  $t$  (even in full) can be taken as a lump sum upon retirement.

If a HC system were introduced, this element would work so that those who do not raise a child (or only a few) do not receive much pension from the state system, at least if they retire at the same age as those with many children. However, if we sufficiently raise the retirement age for them, this state



pension can be the same as for those with children – and the resulting time gap will be easy to fill by withdrawing money from their individual pension accounts.

One may wonder why such a system has not yet been implemented anywhere in the world, even though it has come to mind for many. Although not particularly emphasized, this idea is already present in World Bank [1994], and the six-author Barabás et. al. [2006]. It has entered the minds of many, including me, independently of others. My explanation, based on two personal experiences, is that the idea has never been elaborated to an extent that it could reach decision makers. One of my personal experiences is that as a manuscript, Banyár [2016b] originally served as a preparatory reference material for the Private Pension Fund Annuity Act. The Annuity Act, which was passed by the parliament but not signed by the President of the Republic, was created based on this material<sup>19</sup>. Although I myself clearly proposed to legislate the essentially identical, alternative social security model described above, it did not take place because such a construction could not be developed based on the authorization of the Minister. The reason for this was simply that the Minister apparently tried to formulate the solution to be developed by the experts as broadly as possible in his authorization, but took the parallel payment of the state pension and the private pension so much for granted that he included it in the terms of reference. When I later asked an assignee (he was no longer an assignee at the time) why this was done, i.e. why they didn't ask for the better model, he answered honestly: it didn't cross their mind.

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<sup>19</sup> The act regulated two independent issues, annuities, and the privatization of private pension funds. The President of the Republic had, in essence, reservations only in relation to the latter. Besides, I did not recommend such a solution to the problems of private pension funds, which were obvious at that time, even then I suggested adopting the Swedish model described here.

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