

The path forward for sustainability of the pension system in a historical context

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Abstract

The long-term sustainability and stability of the pension insurance system can be provided on the basis of a pay-as-you-go system, specifically the NDC variant, which can combine the main type of solidarity (between those who can and want to be gainfully active and those for whom the insured event has occurred) with income solidarity. When reforming the pension system in this manner the opportunity arises to begin gradual changes through fully merit system reform and therefore significantly motivating of extending the period of productivity (putting off retirement) through the upgrade of this system for persons who have reached the retirement age as specified by law.

This paper aims to substantiate and explore possible changes in this direction that will not endanger anyone's entitlements when the reforms are implemented (they have got the form of Pareto improvement), as they derive their funds by extending the time of individual productivity. To this end, the possibility of introducing an extension on top of current system of pay-as-you-go insurance, which could be entered voluntarily by persons who have already reached or are near statutory retirement age, is proposed, and modeled. The extension would operate on the principle that the paid premiums will be transformed into a lifetime annuity. The system would be significantly motivating which for most people means extending life at the fullest, associated with the option to retain beneficial social contacts and gradually relax their gainful activity without experiencing an untoward decrease in income.

Keywords: human capital, pension system, pay-as-you-go system, productive services, mathematical model, health insurance, reform alternatives, educational services, social investment, social security

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Путь к устойчивости пенсионной системы в историческом контексте

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Аннотация

Долгосрочная устойчивость и стабильность системы пенсионного страхования может быть обеспечена на основе системы оплаты труда, в частности в виде условно-определенных взносов (Notional Defined Contributions – NDC), который может сочетать основной вид солидарности (между теми, кто может и хочет быть прибыльно активным, и теми, для кого наступил страховой случай) с солидарностью доходов. Таким образом, при реформировании пенсионной системы появляется возможность начать постепенные изменения посредством полной реформы пенсионной системы и, следовательно, значительного мотивирования продления периода продуктивности (отсрочки выхода на пенсию) через модернизацию этой системы для лиц, достигших установленного законом пенсионного возраста.

Целью работы является обоснование и исследование возможных изменений в указанном направлении, которые не будут угрожать ничьим правам при реализации реформ (они принимают форму согласно принципу улучшения Парето), поскольку они получают свои средства вследствие увеличения времени индивидуальной производительности труда. С этой целью предлагается и моделируется возможность введения расширения сверх существующей системы платного страхования, в которое могли бы добровольно вступать лица, уже достигшие или близкие к установленному законом пенсионному возрасту. Расширение действовало бы по принципу, согласно которому уплаченные премии будут преобразованы в пожизненную ренту. Данная система была бы значительно мотивирующей, что для большинства людей означает продление полноценной жизни, связанное с возможностью сохранить полезные социальные контакты и постепенно ослабить свою доходную деятельность, не испытывая при этом нежелательного снижения дохода.

Ключевые слова: человеческий капитал, пенсионная система, система оплаты труда, услуги производственного характера, математическая модель, медицинское страхование, альтернативы реформам, образовательные услуги, социальные инвестиции, социальная защита

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Introduction [Введение]

The issues surrounding pension system reform rank amongst the most controversial and of late the most hotly debated social problems in several countries [Bayar, 2013]. And yet we are not always sufficiently mindful that this question proceeds from two contexts.

1. The current context, associated with the question of the sustainability of the system. This is how it is perceived in many countries by economists, political representation, and the population. Of course, trying to solve the problem without adequately addressing it at a general level will lead to constant obstacles along the way and an ultimate loss of direction. One of the consequences is substantial pressure from the public against any attempt to change the pension system.

2. The historical context, associated with the question of an entire complex of changes comparable in significance and depth with the societal advancement and upheaval brought about by the industrial revolution. There is far less awareness of this context, not only among the public in the various countries, nor only by their political representation, but even by economists, and they often attempt to provide partial solutions instead of a general one, which of course destined their efforts for failure [Valenčík et al, 2017].

The Czech Republic has a pension system based on a large pay-as-you-go system (called the “first pillar”), which is supplemented by voluntary pension savings supported by the state and by employers (the “third pillar”). The attempt to implement a second pillar (based on capitalization of deductions to the pension system) failed, fortunately at an early stage; it was essentially a brief episode that did not gravely destabilize public finances. It should be noted that the first pillar contains several redistribution elements, is opaque, and in terms of the participant is not sufficiently motivating to make contributions to it worthwhile. This has proven to be a grave shortcoming [Vostatek, 2016, 2017].

In the Czech Republic the following alternative reforms to the pension system are under discussion:

- the form of individual “parametric” changes with as much public acceptance as possible that could at least somewhat extend the sustainability of the pension system;
- supplemental financing of the pension system from the tax system;
- gradual mandatory and broad-based extension of the retirement age such as to maintain the ratio between those who contribute to the system and those who withdraw from it;
- transition to capitalization and the individualization (i.e. privatization) of the pension system to a fund system in which a participant in the system is directed to returns from a portfolio of assets managed by state-regulated pension funds;

- transition to a merit-based pension system (based on the principles of NDC or other social insurance schemes) that would increase its role as an incentive, therefore not only motivating willingness to divert funds into a pay-as-you-go pension system but also to extend the period of individual productivity, i.e. specifically the individual retirement age.

The approach we are proposing, which is based on the last of these alternatives, offers an original proposal for transitioning to a pay-as-you-go merit [Kindermann, 2015] pension system in a “Pareto-optimal” way (i.e. such that none of the participants in the change is harmed in their entitlements in order to create the necessary social consensus). It contains the original proposal of the “upgrade structure” of the existing system and a reform of the entire pension system through gradual expansion. It emphasizes the fundamental importance of motivating participants in a pension insurance system to extend their period of productivity (gainful activity), which the system should generate and support [Valenčík, Wawrosz, 2019]. It demonstrates the context between pension system reforms and the reforms of other systems of social investment and social security (in particular health care and education). It emphasizes the historical contexts between complex reforms and the need to understand the breakthrough character of the modern era.

Current state and orientation of pension system reforms [Современное состояние и направленность реформ пенсионной системы]

The analysis of numerous expert economic subjects point to the need for more pronounced reforms of the current pension system because – as is shown – individual or parametric modifications do not suffice and can lead over the course of 25 to 30 years to loss of the sustainability of the entire system. While the time for the necessary changes may seem distant, experience of course indicates that the pension system is marked by a pronounced inertia while the willingness of the public to change anything is weak. Therefore, it is necessary to make changes soon in order to achieve sufficient consensus on a comprehensive concept and that reform can be achieved with the least possible expense and risk. This has been seen in Czech research papers [Mertl et al, 2019; Vavrejnová et al, 2004; Vostatek, 2020] but also in other countries [Barr, 2002; Carone et al, 2016; Montizaan et al, 2013; Seeleib-Kaiser, 2008; Rutecka-Góra et al, 2018; Zhang, 2007].

The most notable expert subject whose analyses points to the need for fundamental pension system reforms is the National Budget Council, an advisory body of the Government of the Czech Republic, whose annually

published analysis of the state of public finance is universally recognized^{1,2,3}. Based on this it issues recommendations for promoting the stability of public finances. In these the National Budget Council has inclined toward resolving the issue of pension system sustainability in the form of gradual mandatory and broad-based extension of the retirement age such as to maintain the ratio between those who contribute to the system and those who withdraw from it. Specifically, this consists of extending the existing statutory retirement age, which is 65 years, to 67 or more years [Nakazava, 2019].

This has been faced with fundamental objections. A substantial portion of members of older generations older than 65 years of age is losing its ability to find work in professional markets, which reduces the effectiveness of the proposed solution and creates stress for part of the population. Broad-based, mandatory extension of retirement age tends to encounter strong social resistance. In this sense alone our solution seems far more socially acceptable and economically effective [Šatava, 2015, 2020; Cadena & Kays, 2015].

Other proposals have proven to be even more problematic:

- parametric changes do not suffice, their use on a larger scale would impose significant strain in society without providing a prospective solution to the problems;
- supplemental financing of the pension system from the tax system is costly in the present and future budget situation, and can be considered only for the worst years (approx. 2055–2065) as a supplemental solution of negative balances if caused by exogenic factors. This is further complicated by the present trends of public financing related to the COVID-19 pandemic;
- transition to the capitalization and individualization of the pension system to a fund system is presently running up against the growing instability of financial markets, the projected turbulence in financial markets anticipated

¹ National Budgetary Board [Národní rozpočtová rada] (2018), *Report on the long-term sustainability of public finances [Zpráva o dlouhodobé udržitelnosti veřejných financí 2018]*, Office of the National Budgetary Board [Úřad Národní rozpočtové rady], Prague, Czech Republic. Available at: <https://unrr.cz/vydavame/sdeleni/> (accessed 10.01.2021). (In Czech).

² National Budgetary Board [Národní rozpočtová rada] (2019), *Report on the Long-Term Sustainability of Public Finances 2019 [Zpráva o dlouhodobé udržitelnosti veřejných financí]*, Office of the National Budgetary Board [Úřad Národní rozpočtové rady], Prague, Czech Republic. Available at: <https://unrr.cz/vydavame/sdeleni/> (accessed 10.01.2021). (In Czech).

³ National Budgetary Board [Národní rozpočtová rada] (2020), *Report on the Long-Term Sustainability of Public Finances 2019 [Zpráva o dlouhodobé udržitelnosti veřejných financí]*, Office of the National Budgetary Board [Úřad Národní rozpočtové rady], Prague, Czech Republic. Available at: <https://unrr.cz/vydavame/sdeleni/> (accessed 10.01.2021). (In Czech).

at least in the medium-term, and to complications in the disbursement of annuities from this system, in which pension funds do not have any commercial interest. In addition, experience has shown that smaller countries are exposed to pressure from strong players in global financial markets to include “toxic” financial assets in the portfolio of their pension funds.

In terms of the role of pillars based on capital (fully financed) funds in retirement systems, it is not possible to reject them in whole or in principle; rather we must define their proper position within the social security framework. They are primarily suitable for use in the optional parts of the system, and should not be imposed upon the mandatory parts, in particular as a tool for increasing available funds or replacing insufficient contributions to social insurance. This can also help them function better, because when pension funds must actually convince future clients of the quality and return of their products in order to drive purchasing decisions, instead of merely relying on state subsidies or other incentives, or even mandatory participation, the product will most likely offer better quality and returns than they currently do. Here it is worth noting that none of the transformed Czech pension funds matched inflation in 2018, as inflation was 1.2% while the average return was 0.7 %⁴. In 2019 the situation was not much improved; while absolute returns increased overall, and new participating funds showed a positive return, these are nonetheless more volatile. The transformed funds have yet to exceed inflation⁵.

Given the volatility of capital markets, the average rate of return of capital investments, and other important characteristics of capital pension financing [Feldstein, 1981], as seen in the behavior of Czech pension funds thus far, things could be better and more cost-effective especially in the mandatory parts of the social insurance system under present macroeconomic conditions, guaranteeing replacement rate depending on insurance paid under the right configuration. This is consistent with arguments about American social security [Aaron, 1997].

⁴ Urbánek V. (2019), “None of the pension funds in the Czech Republic exceeded inflation last year” [“Žádný z penzijních fondů v ČR vloni nepřekonal inflaci”], *Kurzy.cz*. Available at: <https://www.kurzy.cz/zpravy/494885-zadny-z-penzijnich-fondu-v-cr-vloni-neprekonan-inflaci-zhodnoceni-v-prumeru-0-7-pri-inflaci-1> (accessed 10.01.2021). (In Czech).

⁵ Svoboda J. (2020), “Pension funds did not beat inflation again” [“Penzijní fondy inflaci opět nepřekonal”], *Novinky.cz*. Available at: <https://www.novinky.cz/finance/clanek/penziji-fondy-inflaci-opet-neprekonaly-40323213> (accessed 10.01.2021). (In Czech).

Scope and methods of the analysis of pension system reforms and its social associations [Масштаб и методы анализа реформ пенсионной системы и ее социальных объединений]

Illustrating the scope of analysis immediately relates to the basic method of our approach, specifically the definition of terms. Without this, it would not be possible even to compile a functional mathematical model of the pension system with adjustable parameters that can test the various alternatives of proposed changes and subsequent pension system trends.

The Czech retirement system is defined as “insurance”, where reaching a certain age is defined as the insured event. This is where all the problems begin for finding a suitable theoretical approach for analyzing the pension system. It is completely illogical for reaching a certain age to be considered an insured event. It is as if an insured event were defined for car insurance as reaching a predetermined number of kilometres driven.

The insured event cannot be anything other than an age-induced reduction of the system participant’s ability to fully and eventually even partially secure sufficient funds for a dignified life based on their own gainful activity. This period arrives at quite different times for different people, in certain professions (roofers, miners) relatively soon and with little possibility of transitioning to a different profession. A representative example of the other “extreme” is the ballet dancer Maya Plisetskaya (everyone can find more than enough persons around them whose productivity at advanced age significantly exceeds the standard retirement age).

Drawing on the concept of precise definition of terms (and the “correcting” of their current usage) we can briefly present the essence of our methodological approach as follows.

1. It is significantly interdisciplinary, which suits the character of this topic. The results of the analysis presented in this article are based on methods of microeconomics, macroeconomics, mathematical analysis capable of compiling a suitable model, public finance, the economics of health care and health care policy, as well as statistics [Mendenhall et al, 1982], law and sociology.

2. The specific methods on which basis this article has been prepared:

- specification of basic terms;
- compilation of a mathematical model and testing reform alternatives; interpretation of results;
- analysis of structure and trends of the public finance system (specifically the system of social investment and insurance) including the identification of how reforms to these systems relate to each other;

- use of data from field investigations in effective job opportunities for persons of advanced age;
- classifying the issues in the context of changes comparable to the industrial revolution, i.e. changes associated with the creation and subsequent growth of the role of a new economic sector which in this case is the sector of productive services, i.e. services focused on acquisition, retention, and application of human capital (cumulative human capabilities acquired through social investment in the form of upbringing, education, training, deriving value from life experience).

If we wish to present the main findings such that it would be clear why a pension system scheme that expands the role of the system as a motivator for extending the period of individual productivity is the most appropriate long-term prospective solution to the sustainability of the pension system, we have no other option but to show all material associations in a comprehensive albeit concise manner. This is the only way, for example, to address the objection such as: “How do you wish to achieve a state where people older than 70 years of age are employable in a way that is economically effective?”, i.e. the necessary context of presenting the results of our analysis gradually arose over frequent expert discussions in various fora where the results of our team working at the University of Finance and Administration (since 2003) were presented and gradually achieved.

A full merit pension system and the path to achieving it [Полноценная пенсионная система и путь к ее достижению]

Previous approaches to ensuring the long-term sustainability of the pension system propose either transitioning to a fund system or parametric modifications consisting in particular of broad-based, mandatory extension of the retirement age. In the area of health insurance, the development of an optional component of the system in synergy with universally available and solidarity financed health care is not currently established systemically. Previous proposals either retain the existing state of the unsatisfactory reality of an aging population or endeavor to transition to a system of insurance plans or required nominal insurance premiums following the model of the Netherlands. This has substantial fiscal and social risks. The methodological problem is that none of the previous or current retirement commissions formed in the Czech Republic for reform purposes has succeeded in creating a system that would embody the features of Pareto improvement, i.e. that would not harm any of the relevant subjects [Mertl, 2018]. The key subjects include the state (the state budget, the public finance securing the first pillar of the retirement system), employers, employees,

sole proprietors (i.e. payers to the system) and pensioners withdrawing from the system. Most proposals thus far for modifications to the pension system, primarily for creating the “second pillar”, have harmed the key first (pay-as-you-go) pillar and thus potentially the very stability of the state budget. And yet minor parametric modifications do not guarantee the long-term sustainability of the system due to expected demographic changes, and therefore essentially disadvantage a group of future pensioners. The requirement of employers for reductions in social insurance rates is side-lined. The model analysed and developed for several years by the VŠFS research team, in collaboration with experts from other organizations, achieves the required Pareto improvement because it is based on voluntary extension of the work activity of citizens and synergies with health care and the labor market [Pertold & Federičová, 2020]. It is in a stage where it must be completed in confrontation with practice, its acceptability tested with the relevant groups and by public selection.

The starting point of the model is a full NDC merit system that can be very briefly characterized such that each participant according to statistical expectations will obtain in the form of lifetime stock what he deposited in the system in the form of mandatory deductions from gainful activity after the deduction of the solidarity amount from which the basic tested pension benefit is financed. The system can be illustrated as follows (Fig. 1).

The system has two solidarity components:

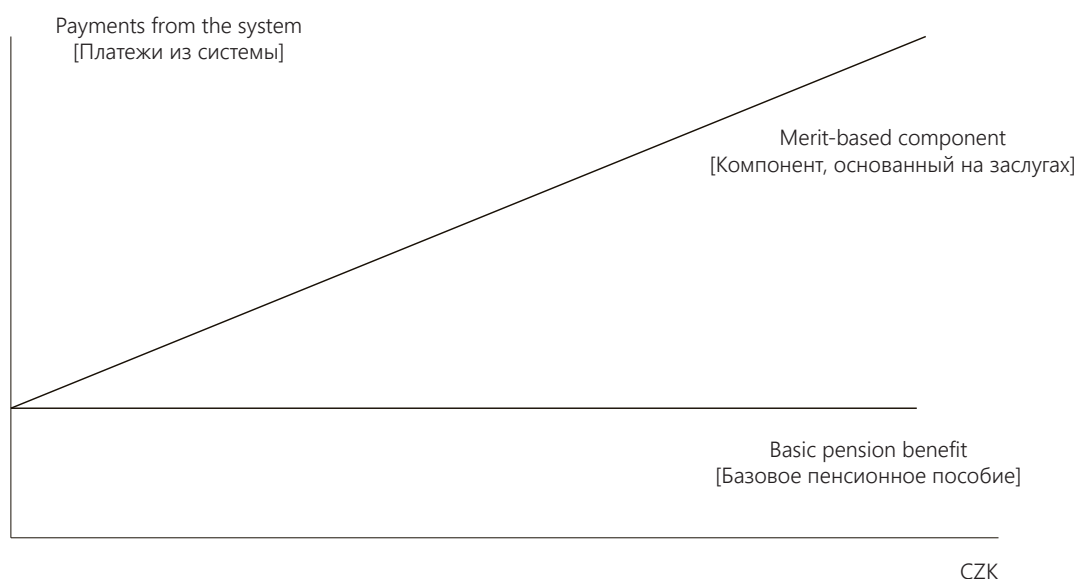
- the main component, insurance, based on solidarity between those who are able and desire to have gainful activity even at advanced age and those for whom the

demands of their professions, the process of aging linked to loss of physical and mental faculties, the loss of the validity of their qualifications resulting from changes in the job market, etc. has limited their options and prevented them from securing income sufficient for a dignified life in the form of gainful activity;

- the supplemental component, income (basic pension benefit), between those who during their professional career earned higher income and those who earned lower incomes.

This is matched by the method of financing the basic tested pension benefit. Determining it must follow the principle that the higher it is, the larger the main and supplemental solidarity components, yet the lower the motivational role of the pension system. If the deductions to the basic benefit were increased above a certain level, the amount of funds that could be disbursed would decrease. In other words, when setting the parameters of the system it is necessary to seek a certain social optimum. This must be determined in such a way that the system retains sufficient motivational power.

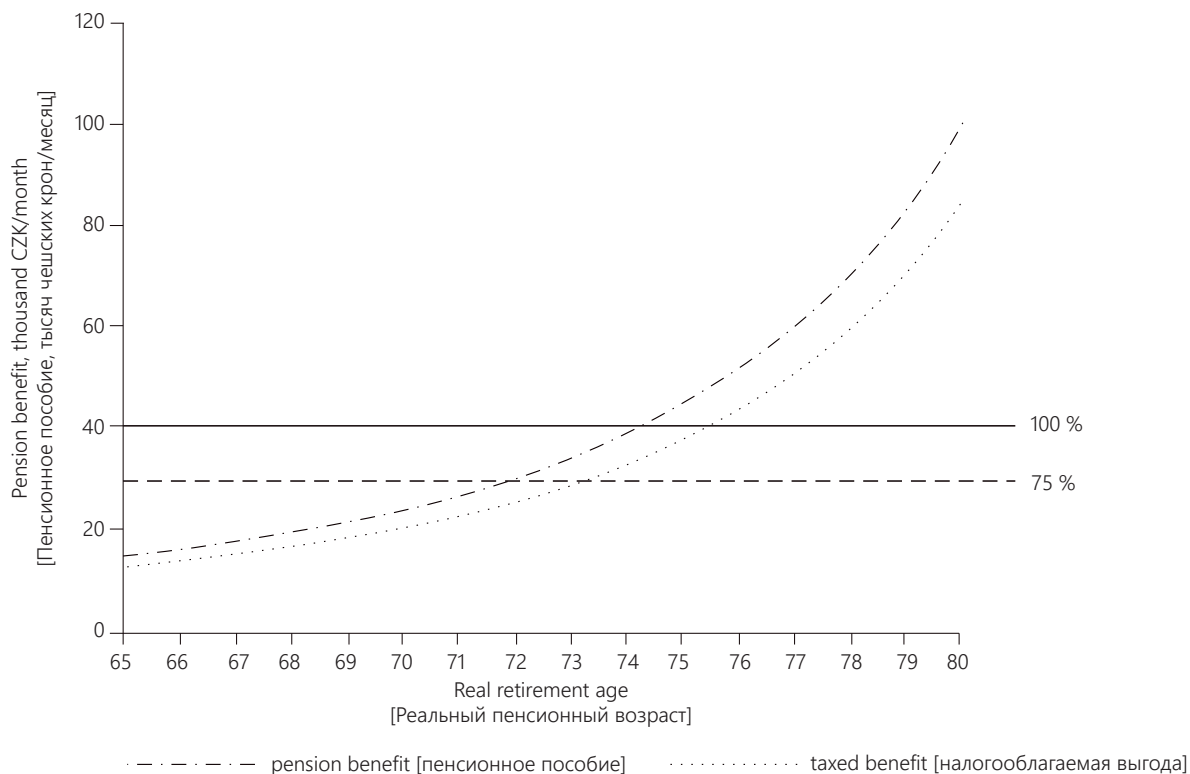
Expert and public discussions indicate that even a gradual transition from the existing pay-as-you-go system in the Czech Republic to a fully merit system is very risky and hardly fluid. For this reason, our team has proposed initiating a system of reforms by implementing a voluntary upgrade intended for persons of or approaching retirement age. For these people the principle of equivalence would apply. Here are the results of modelling income trends in this system (Fig. 2).



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Fig. 1. Merit-based pension system with basic pension benefit

Рис. 1. Пенсионная система, основанная на заслугах, с базовым пенсионным пособием



Compiled by the authors based on the materials of the study / Составлено авторами по материалам исследования

Fig. 2. Achieving 100 % and 75 % of the replacement ratio to net earnings
 Рис. 2. Достижение 100 % и 75 % коэффициента замещения к чистой прибыли

Note that the replacement rate of 75 % can be achieved already at 72 years of age and the replacement rate of 100 % as early as 75 years, which for the majority of participants is a fairly realistic pension system at least in terms of partial productivity remaining. Above all, however, this gives rise to the conclusion that as early as three years into participation in the upgrade of the pay-as-you-go pension system a person can gradually begin to relax their gainful activity without reducing their total income.

Summary and discussion [Резюме и обсуждение]

The long-term sustainability and stability of the pension insurance system can be provided on the basis of a pay-as-you-go system, specifically the NDC variant, which can combine the main type of solidarity (between those who can and want to be gainfully active and those for whom the insured event has occurred) with income solidarity. When reforming the pension system in this manner the opportunity arises to begin gradual changes through fully merit system reform and therefore significantly motivating of extending the period of productivity (putting off retirement) through the upgrade of this system for persons who have reached the retirement age as specified by law. Changes in this direction will not endanger anyone’s entitlements when the reforms are

implemented (they take the form of Pareto improvement), as they derive their funds by extending the time of individual productivity, which for most people means extending life at the fullest, associated with the option to retain beneficial social contacts and gradually relax their gainful activity without experiencing a decrease in income. The proposed changes have a number of contexts that we will address in the discussion of the above.

One of the fundamental questions is what options for gainful activity are available to persons of advanced age. An example of one of the most important possibilities, which is completely in line with the context of change comparable to the industrial revolution we are taking our approach, is the growth of the role of creative cross-generational teams in the manufacturing field and others. The cross-generational dimension, as indicated by our research in the field, has fundamental importance for stabilizing teams, it enables the inter-generational transfer of experience and other important effects. It is a means where persons of advanced age may also achieve higher incomes, retain important social contacts, and above all gradually relax their activities and focus on long-term benefit in the form of applying their abilities [Říhová, 2019]. Creative cross-generational teams are the basis of the innovation potential of a country.

Another question is the connection between gradual pension system reforms and the reforms of other systems of social investment and social security (in particular those that provide educational and medical services, such as the spa services highly important to older persons). Here there is the option to finance special educational services enabling an “upgrade” of competencies and their supplementation with other effects they bring (oriented toward “qualified” older people), or through health insurers if conditions are suitably set. In the Czech Republic the state pays into the system of public health insurance for retired citizens in amounts significantly smaller than the growing demand of older persons for health care is. In the environment of multiple health insurers, it is essential to redistribute premiums if they apply to the universal part of the system. Pension system reform following this direction offers the possibility of using the exemption of persons with gainful activity even in retirement age to give health insurers incentive to compete with optional products containing health care services (e.g. rehabilitation, geriatric, spa therapy, ophthalmologic, dental care, orthopaedic, psychological) intended to extend the period of full or partial gainful activity of persons of advanced age. This is associated with synergistic effects between the systems of pension and health insurance, where the de facto condition of extending productivity is satisfactory health and quality management of chronic ailments typical of advanced age with the goal of interfering with their incidence or any onset of complications [Prieto, Sacristán, 2003; Huang et al, 2018].

Last but not least, it is necessary in terms of the discussion on the feasibility of the described complex of reforms to specify the idea of the historical contexts, or the context of the changes within which they take place and to which they contribute. In EU countries at present the advent of Industry 4.0, the fourth industrial revolution, is the dominant change society is undergoing. This currently represents a far more distinct change associated with the rise of the productive services industry (services focused on acquiring, retaining, and applying human capital) as a dominant sector. This historic change, whose features we have been observing, unfortunately as the very consequences of an inertial trend, i.e. its non-execution, represents a real option for overcoming numerous problems encountered by all countries on our planet. It is a path to a type of economic growth that can be very dynamic and currently not only permanently sustainable but also unlimited.

Conclusions [Выводы]

It would be hard to find a country in the world that does not face the challenges of ensuring dignified old age. The approach we are proposing changes the problem

of aging into an opportunity to substantially increase the effectiveness of the economic system and concurrently take advantage of one of the possibilities of the substantial transformations of society linked to the transition to a new type of economic growth and method of production. When interpreting the specific issues of gradual pension system reforms in the context of other systems of social investment and social insurance we raised certain broad questions and showed their mutual coherence. This proved to be not only critical (in the sense known to experience, that anyone who seeks to solve piecemeal without solving the problem on a general level will never reach resolution), but also has another, very important effect: It allows knowledge and experience related to the given issues and their associations to be transferred even among different social conditions (given by the size of the country, its historical traditions, state of development, etc.). This creates a platform for effective research that allows the problem to be seen from distinct positions and thereby discover what is most important and remains hidden.

A need is arising in the current situation of the pension system to respect the basic principles of social security: long-term stability, fiscal sustainability, social solidarity, and synergy between the individual systems and policies. In the event of their absence, the system cannot set up even the best calculation or optimization well, leading to imbalances that must then be paid outside the system or generate a public debt. In this direction we can see even the anticipated trend partially as a the failure of family and social policy in the 1990s, when the birth rate in Czechia dropped sharply and money was withdrawn from the retirement system surpluses of the time into the general balance of the state budget. Yet another reason we should now set up a concept compliant with these principles, which the model we have created, and its individual variants make possible.

In terms of health care policy, it is essential to use the full potential of all the people, i.e. to allow them such economic activity as their biological dispositions allow. Here it can be presumed that in the Czech economy there are still certain opportunities, because even if no dramatic extension of the life expectancy as such can no longer be expected, in the extension of healthy length and quality of life (healthy life years) of persons of advanced age, we have significant gaps compared to other European countries, for example Sweden⁶. This gives rationality to contemplation of the synergistic effects between tools and products offered by health insurers and the extension of productivity in the pension system or its upgrade.

⁶ Eurostat. Healthy life years statistics. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthy_life_years_statistics, 2020 (accessed 10.01.2021).

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