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Proposal for a comprehensive retirement insurance solution (CRIS) to mitigate retirement risk based on theory of change

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Abstract

The aim of the paper is to propose a new comprehensive retirement insurance solution (CRIS) that, by offering appropriate modules, can be flexibly adapted to customers' needs during the accumulation of funds and entitlements and during retirement. Technically, the product is life-insurance-based and includes insurance for sickness and incapacity, long-term care (LTC), work activation expenses, hospital stays, and tontine and Luxembourg policies. Due to consumers' changing expectations and needs, the technical dimension of this solution is based on a three-layer insurance product in which individual parts of the protection are supplemented by several additional benefits (types of assistance) that improve the quality of life of insurance participants and allow the ongoing use of the product. The basis for considering such a new insurance product is the theory of change (ToC), which makes it possible to build considerable flexibility into such a solution. A SWOT analysis was used to position the proposed solution in relation to other insurance products and social security offered by the state.

Keywords

- modular insurance
- life insurance
- tontine
- long-term care insurance
- public-private partnership

JEL codes: H55, G22, I13, D14, G28

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Introduction

Increased life expectancy and social and economic changes, along with associated public policies, mean that satisfactory solutions should be sought to meet people's retirement needs. The literature and financial market analyses have indicated (Greenwood & Vissing-Jorgensen, 2018) that insurance products should supplement financial resources in retirement. However, shortages are still evident today due to insufficient supply, as well as the demand for specific insurance products. In recent years, insurance products, especially those based on unit-linked life insurance, were criticised for their mis-selling or high costs (Gatzert et al., 2011; Gupta, 2012). Additionally, the risk of not achieving the appropriate rates of return necessary to supplement retirement benefits remains with the insured in unit-linked insurance, which often coincides with high costs deteriorating the value of capital (Bernard et al., 2017). Additionally, the lack of awareness of longevity risk means that people do not seek appropriate products that could mitigate this risk, such as annuities (Brown, Mitchell et al., 2001) or long-term care (LTC) insurance or tontines (Milevsky & Salisbury, 2015). Therefore, it became necessary to comprehensively consider the issue of securing access to benefits in cash and in kind to maintain satisfactory living standards in retirement. The threat is that the growing population of retirees will otherwise be exposed to retirement risk, defined herein as the inability to cover *individual needs* the old age (Łyskawa, 2004). The coverage of retirement risk can come either from income growth or access to services. Bielawska and Kozłowski (2024), based on the subjective approach to the retirement risk proposed by Łyskawa (2004), operationalized the retirement risk and measured it for Polish retirees. The results of their research indicate a significant share among retirees', households for whom the pension from the public system, taking into account access to the system of other benefits (including in-kind benefits), is not sufficient to mitigate the retirement risk. The share of such households with materialised retirement risk is especially high in one-person households (above 50%).

The limited possibilities for expanding cash benefits from the public pension system and the lack of adequate quantity and quality of benefits from social

welfare systems collide with the increase in life span. This makes it necessary to build flexible products that use the full palette of solutions from existing instruments. But combining them appropriately, introducing the variability of individual benefits within a single product makes it possible to manage the retirement risk, providing the adequate benefits in retirement with respect to the changing needs of the individual over time.

We aimed to develop a comprehensive retirement insurance solution (CRIS) based on a technical modular design, the goal of which is to provide services tailored to customers' needs at reduced cost and time (Dörbecker & Böhmann, 2013). The product design is based on a tiered solution, with basic coverage surrounded by layers of additional benefits. The first layer consists of several basic types of insurance coverage (e.g., life insurance, hospital stays, or professional adaptation). The second-layer benefits include those that affect the use of base insurance coverage or insured forms of assistance benefits (e.g., the ability to change the scope of benefits purchased during the insurance period, with guaranteed benefits). In the final layer, benefits are triggered that allow participants to use insurance products on an ongoing basis (including during the savings period) based on a retirement benefit calculator, financial education, etc. Treating multiple modules as a single financial product provides tax advantages by transferring accumulated funds and entitlements to other types of benefits—there is no benefit payment, which means that there is no consequent income tax accrual. A new solution to meet insurance participants' future pension needs must answer the following question: How should products in the financial market be shaped to meet the changing needs of people in retirement?

Theory of change (ToC) can be helpful in this regard because, in simple terms, it can be used to identify long-term goals and thereafter support 'backwards planning' (Brest, 2010), which means identifying the conditions that need to be met to achieve the goal and deciding what actions need to be taken to ensure that these conditions are met. In terms of insurance coverage for retirement risks, this means acting and making adjustments during and after working life that allow insurance products to be used to achieve an ultimate goal, which inevitably involves a need for more flexible financial products. Such measures are in line with the assumptions of modular products already in use in the insurance market.

The paper uses the method of analysis and logical construction with respect to the theory of change (ToC). The issue of the optimal combination of benefits during the period of retirement benefits was divided into smaller factors and the properties of each factor were examined individually. The effects of this activity were combined again as a result of logical construction. Consequently, this process makes it possible to find a new solution which would be flexible. The SWOT analysis has been carried out to deliver the qualitative analysis of this solution.

The paper is organised as follows. In Section 1, we briefly discuss the goals of retirement system in the context of retirement risk. Section 2 provides a brief overview the possibilities and deficiencies of life insurance products in the covering the retirement risk. In Section 3, we propose a comprehensive retirement insurance solution (CRIS) and describe the specific modules it can provide. The final section presents conclusions.

1. Pension system goals versus retirement risk

The most generally accepted purpose of a pension system is to prevent poverty in old age and to protect people's standards of living (at least partially) by providing income for all those covered by the system for the entire period after retirement (Myles, 2002; Turner, 2010). Social development has led to a situation in which pension benefits are expected to satisfactorily meet needs, come from a variety of sources, and have 'sustainable' payment characteristics (Amaglobeli et al., 2019). In most developed countries, the main source of retirement income is the state old-age pension; however, the value of such a pension is likely to decrease as pension reforms more often concentrate on sustainability rather than adequacy (Hagemejer, 2018; Szczepański et al., 2022). Within private pension plans, there has been a shift from defined-benefit (DB) to defined-contribution (DC) plans, which means transferring to participants the risk of ensuring the amount of pension assets (Mitchell & Utkus, 2012). The first wave of pension reforms in 1990s concentrated on the accumulation of funds for retirement purposes (James & Vittas, 2000), but interest in the decumulation phase is increasing, as the proliferation of defined contribution plans necessitates decisions regarding the decumulation of assets. Moreover, increasing life spans require the provision of LTC, which is not a common social security component. For example, in the United States (US), an estimated 70% of people aged 65+ will require long-term services and support at some point in their lives (Super et al., 2022). Additionally, senior citizens often regret not having adequately provided for their retirement needs. Hurwitz and Mitchell (2022) indicated that many retirees regret having too few savings and/or not obtaining appropriate insurance products to cover their retirement needs. They also found that making Americans aware of objective survival probabilities increased their levels of regret for not securing LTC insurance (i.e. it increased by more than 2.4 times their regret for not having purchased lifetime income support (Hurwitz & Michell, 2022). In Poland, a country where senior citizens' social security is almost entirely dependent on public spending, a study was conducted on the representative sample that asked retirees aged 65 and over what types of insurance from a lifetime perspective they find useful (Bielawska

& Łyskawa, 2019). The respondents' answers clearly indicated that expectations of recognised and available insurance changed with the age of retirees. Those aged 65–74 years indicated that the most relevant insurance products would cover health benefits, but 63% of the oldest senior citizens (85 years and older) indicated a need for LTC insurance. These responses point to the public system's failure to meet retirement needs in long-term care services, since the market in Poland, as in many other countries, does not provide adequate insurance products for retirees.

Needs in retirement change with age, but also with many other individual factors. Therefore, we considered retirement risk through the lens of seniors' subjective perceptions of their needs, which encompassed not only access to cash, but also in-kind benefits. We perceive the holistic approach to the assessment of the senior citizens' material security as an inevitable in the era of demographic and economic changes.

2. Life insurance for covering retirement needs

Voluntary saving for retirement requires reducing consumption by the periodic setting aside of money throughout one's working life up to retirement age. Market practices have developed many forms of saving and investment products, including life insurance, which can be categorised as relating to the accumulation (pre-retirement) or relating to the decumulation phase (used to provide an income stream in retirement). The first group includes traditional participating life insurance, unit-linked, universal life, and dynamic hybrid products. To provide a stream of income during retirement, the following types of annuities may be used: immediate or deferred, fixed-term or lifelong, traditional (with profit), unit-linked, variable, or equity-indexed. The decision to choose life insurance depends on the future retiree's awareness of the need to supplement the benefits and services provided by the social security system, his/her propensity to save and financial literacy, and many other factors. However, Crawford and O'Dea (2020) pointed out that the actual replenishment of pension benefits is influenced by the accumulation of assets for as long as possible, at the expense of other needs, from the end of working life or during the first years of retirement (e.g., to counteract digital exclusion or poorer health).

Despite calls for the transparency of benefits for pension system participants, frequent changes in the design of such systems make it difficult for individuals to assess what their financial situations might be on retirement. In many countries, employees have become accustomed to the assurance of having the means to continue living after retirement delivered by the state,

which makes it difficult to attract them to traditional life insurance products, since savings need to be set against needs that may arise in 20–30 years' time. Simply making people aware of their needs is not enough. It is necessary to build flexible mechanisms that can be adapted to the defined goals of the insurance participant.

Savings insurance programmes are based on customers' high-end capital and, when transformed into periodic annuity payment programmes, allow for an 'additional pension' and supplement the benefits of the basic pension system. There is a general rule in life insurance that the person starting the insurance contract should be free to choose its main function. A lack of awareness of the need to build adequate capital for an additional pension causes young people to prefer benefits in the event of an unfortunate accident over saving for retirement. The design of such products is clear: the greater the benefits for adverse events in an insured person's life, the smaller the available final capital for a retirement annuity (Carlson, 2016). When taking out insurance, it is important to be aware that insurance companies—at the contract stage—cannot determine the precise value of a future annuity. They present only conservative estimates, while making the insured individuals aware that no specific amount is guaranteed. Years later, the benefits may differ significantly from the estimates (Milevsky, 2006); hence, it is necessary to keep analysing the value of insurance policies and the benefits, if any, that will be paid. However, it is extremely difficult for individual participants to assess the valuations of these instruments, and such assessments depend on their levels of education and numerical skills (Brown, Kapteyn et al., 2017). Annuities are proposed to be the main tool for decumulation of retirement savings in private pension plans. Annuities are a necessity for retirees to maintain an adequate standard of living (Antolin & Stewart, 2009), but the low interest rates of recent years have undermined the profitability of annuities, especially for life insurers (Antolin et al., 2011).

Insurers are developing products with alternative return systems and moving away from fixed interest-rate guarantees (Beer & Gnan, 2015). However, there is a great need to develop rules for the funding and solvency of pension plans (especially defined benefits) so that they remain countercyclical. Thus, the effectiveness of annuities in covering longevity risk should be monitored on an ongoing basis (Wettstein et al., 2021). Limitations on interest in these forms of savings and accessibility for all participants in the pension system are also vital (Lambregts & Schut, 2020).

3. The concept of a CRIS

Fundamental Assumptions in New Insurance Product Development

The assumptions listed below form the basis for the creation of a new CRIS, which should do the following:

1. Assume the continuation of the social security system as it currently operates, which does not adequately cover retirement needs for all its participants (i.e. assuming no policy change).
2. Based on a modular design (that is, insurance products providing cash and in-kind benefits in retirement as both related and independent solutions), it should include separate demands and negotiations by participants, but simultaneously not be available for purchase outside CRIS.
3. Consider the dual nature of benefits and compensation: overall, the retirement product should allow the payment of certain benefits in cash, as well as covering the cost of certain services and even goods (in line with the retiree's basic requirements). In addition, the product should include extensively developed assistance packages triggered in certain situations (triggers). This is the basis for the idea of a three-tier product.
4. Be materializable: due to the long-term nature of fund accumulation and the lack of or limited nature of CRIS, it is necessary to introduce solutions that allow participants to record acquired entitlements or financial assets on an ongoing basis. This will make it possible to keep in contact with pension product holders and introduce educational or preventive elements, especially regarding health situations.

In terms of methodology, ToC was used to prepare the CRIS and implement the necessary changes (Dhillon & Vaca, 2018; Mayne, 2015). This theory requires the identification of long-term goals to level the effects of retirement risks. Thus, it is necessary to identify the conditions that must be met to achieve the assumed level of retirement risk levelling. In operational terms, it is also necessary to identify the actions that need to be taken to achieve the desired results. ToC requires constant adjustment of actions based on strong theoretical assumptions (Reinholz & Andrews, 2020), and experience in applying ToC, mainly in education, has shown that it is vital for those responsible for change, such as insurance underwriters or pension system researchers, to use a common language (Connolly & Seymour, 2015).

Modular product design

The modern market for financial products is characterised by mechanisms for interactive product selection, which is particularly evident in the insurance field. Usually, this means scaling individual insurance coverage and choosing among different providers. In many cases, the insurance products offered are package products, with a single basic product and a set of optional extras but no ability to modify the scope of coverage. The shortcomings of traditional bundled products are supposed to be offset by the 'brick' (modular) design of the insurance product (Schmidt-Jochmann & Gröbner, 2012).

Insurance products constructed in this form consist of separate components ('bricks') that can be either sold as part of a modular product or marketed independently. The individual 'bricks' thus function as separate insurance products, which are standardised based on the parameters of the product design. The advantage of modular construction from the consumer's point of view is that modules can be selected or configured based on a combination of customer requirements and risk characteristics. Consequently, a modular product allows for flexible combinations of individual components. Such a design meets two seemingly contradictory goals: 1) from the customer's point of view, individualisation of insurance, and 2) from the insurance company's point of view, standardisation of the most important benefit elements. Each

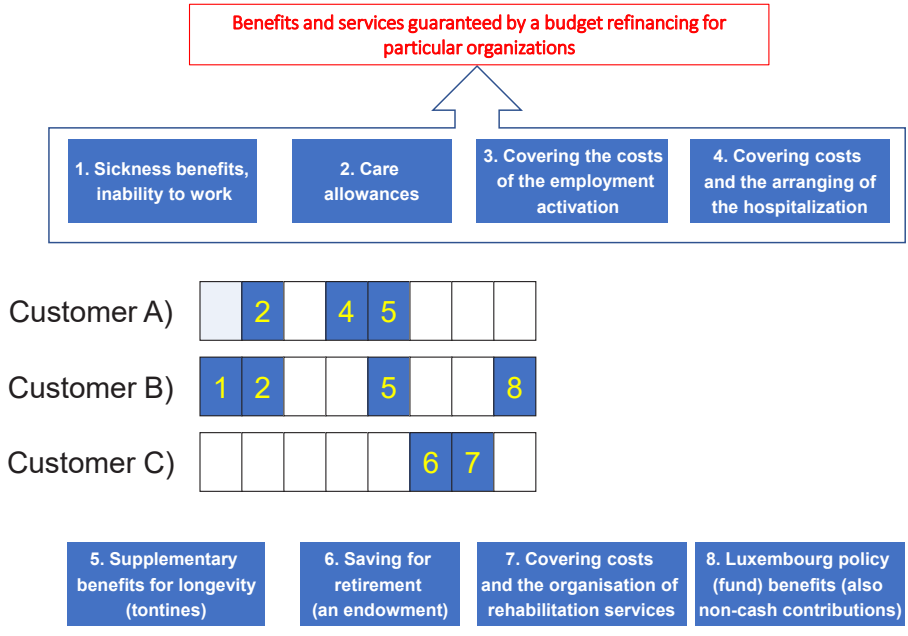

Figure 1. Proposed coverage for integrated modular pension insurance or CRIS

Source: own work.

of the proposed modules covers different consequences of approaching or actual retirement age (Figure 1). Therefore, the details of the selected product elements are discussed in the following sections.

At this point, it is necessary to determine the number of feasible options for an individual. In purely technical terms, the number of possible combinations is provided by the following formula: the number of possible module choices is $2\text{^}n$ minus the number of combinations after (min–1*) of n (*assuming that each module is only a 'take it or leave it' choice without any further variants). Bearing in mind that even a single module can be selected as the end result, this solution (8 modules) allows 255 different types of pension product combinations to be built.

In the case of personal insurance products relating to health status or future LTC expectations, pure product configuration mechanisms are unsatisfactory because for each selected configuration, products from multiple providers may perform similar functions (Stolze et al., 2000). In such a situation, it is necessary to build a product configuration mechanism (Felfernig et al., 2007) based on a defined and continuously calculated retirement risk. This means that before entering into an insurance contract or during its term of validity, each participant should have the ability to estimate the income and benefits already available. Each insurance company is obliged to offer an appropriate pension calculator and configurator to provide an optimal solution for a given participant.

The design of an insurance product for covering retirement risk should aim to reach a particular age cohort. The differences between age groups are large enough to determine the need for certain modules for each age cohort (e.g. those related to LTC at a sufficiently high level). Building appropriate distribution channels requires analysing the habits and possible technological exclusions of individual cohorts (Ayuso et al., 2021).

The product base for the proposed solution is traditional life and endowment insurance, the goal of which is to create financial security for insured individuals and enable them to maintain a certain standard of living at retirement age, while providing material support for the family in the event of their premature death (Nurittamont, 2021). Any contract of this kind, unless broken by the policyholder, ends with the payment of a benefit. Premiums for endowment insurance are paid throughout the insurance period and, most often, due to their considerable cost, in instalments. According to Skipper and Black (2000), the net premium (which creates a fund to cover the insurance company's future liabilities) for life and endowment insurance is based on the calculation of a term of life insurance (protection only in the event of death during the assumed period) and endowment insurance (premium calculated in such a way that after the assumed period of payment of premiums, a benefit of specified value is paid). Benefits are paid as a single payment or in the form of an annuity based on the current sum insured. In practice, its

value corresponds to the value of the premium paid for life insurance plus the interest rate on that premium. Within CRIS, the accumulated funds in life insurance are transferred to purchase the other modules, according to the need of the individual. Moreover, the addition of the tontine module makes it possible to obtain additional benefits for the members of a given cohort based on demographic changes (e.g., increased mortality). The period of participation in the programme is closely linked to the year of birth. It is necessary to construct uniform age cohorts, possibly differentiated further by place of residence. Endowment products include a minimum participation period (Huebner & Black, 1982); therefore, it is necessary to build a mechanism that will guarantee sufficiently long participation in the proposed solution. The possibility of changing the number of proposed modules can also be a response to negative regulatory changes for the insured regarding the basis of the pension or social benefit system. From the point of view of ToC, it is necessary to create a strategy for changing systems. In addition, it is necessary to keep an eye on the impact of the environment on participants' decisions to change individual modules. In the face of significant social change, it is also important to analyse the involvement of other family members in financing retirees' needs or selecting specific products. Institutionally, the proposed solution should be based on the operations of life insurance companies. Due to the benefit guarantees specified hereafter, these entities should have the ability to implement public–private partnerships, as is already done in the field of LTC (Cohen et al., 2018).

It should be emphasised that the modular solution described above and the large number of combinations are intended to show how many possibilities this type of insurance offers. However, it is essential to note that, from the point of view of the objective of retirement risk management, a separate study should be carried out with the question: Which of these proposed modules are most important for future retirees? On the one hand, political pressure means that more and more benefits that could be placed in such an insurance solution are being shifted to social assistance and provided by the state or local government. On the other hand, however, it is not possible to count on the needs in a given area being met in full, due to the shortages in the public funds. We are convinced that the use of a modular product, with different types of insurance that cover the retirement risk, would give impetus to the launch of a risk management mechanism by pension scheme participants.

Scope of protection of individual CRIS modules

Sickness benefits and inability to work

Insurance companies can, through their products and their skilful supply, contribute to the co-funding of the state healthcare system, which is in constant flux (Böheim & Leoni, 2017). Their role should be to supplement rather than replace the public system. According to Wang et al. (2012), a product offered to meet this objective should:

– cover risks relevant to people of retirement age (referring to actual and uncovered risks),
– be accessible to all interested parties,
– complement other general insurance programmes,
– be characterised by a high degree of flexibility in terms of individual types of disease events,
– provide protection for all or part of the actual cost of treatment (moving away from lump sum rules).

Care allowances

LTC policies provide security for the assets of an insured person who requires LTC. The market for this type of product is automatically limited by the following:

– health status,
– age (only people up to a certain age limit are accepted for insurance),
– the cost of the realised LTC.

Insurance products of this type are usually purchased by people of advanced age, but this trend is changing, especially in group insurance. Individual LTC products in the 1990s were purchased by customers whose average age was 72 years. For those who participated in group plans, this average age was 69 years, while for employee insurance, it was 43 years (Gelder & Johnson, 1997). LTC insurance policies offered today include coverage for nursing care (at various levels of intensity and expertise), care for the aged, and care for the disabled. Modern policies expand the scope of the benefits covered. As a result, the design of LTC insurance has changed, and it is now increasingly focused on solutions based on the number of payments (depending on the level of disability assessment or actual expenses incurred) and the provision of specific services (Denuit et al., 2019). From another perspective, Hieber and Lucas (2022) have indicated that the coverage presented is attractive to potential customers, and possible difficulties with the solvency of implemen-

ted insurance programmes can be overcome by using the tontine mechanism. When discussing LTC insurance, it is important to consider the conditions that determine the start of benefit payments. In earlier types of policies, insurance companies primarily required a hospital stay, a doctor's call (an extremely casual approach), or necessary actions in case of illness or disability (standard medical benefits). The most common system for issuing LTC insurance payouts is one based on disability ratings (Chen & Xu, 2020).

Covering the costs of employment activation

The decision to leave the labour force after the statutory retirement age is determined by a number of factors. Rapid social changes (related, e.g., to the development of information technology) and transformations in education systems (stronger specialisation and focused training, particularly for young workers) frequently worsen the position of the elderly in the labour market relative to other social groups. If these factors are further reinforced by unemployment or deteriorating health, there may be a strong desire to retire. However, it is also important to have the right competencies and opportunities to work before retirement age. The CRIS module presented here addresses both periods of employability: 1) until retirement age and 2) after retirement age. Age discrimination in the labour market is common in almost every country. Of course, performing a paid job at an older age allows for increased pension benefits from the basic pension system. Ribeiro et al. (2018) proved that working at an older age is associated with better physical health and social relations. The proposed features of the insurance module 'Retirement Insurance Product for Job Activation' are necessary for the preparation. The rule of this insurance is to reflect the current demand for training, services, or financial support related to vocational activation. Therefore, there is a need to constantly monitor the labour market and consider the various factors that influence the exclusion of older people.

Covering costs and arranging hospitalisation

There have been significant annual increases in the number of patients treated in hospitals because the increasing incidences of diseases and mental changes have forced people to make greater use of their insurance entitlements under the state health care system. In the case of the elderly, there are additional age-specific conditions, such as frailty (sarcopenia) (Zhang et al., 2018), the risk of malnutrition (Fávaro-Moreira et al., 2016), and even dementia, for which a stay in hospital is not the best form of care (Cowdell, 2010). Despite hospitals treating larger numbers of patients more promptly, there are still many unmet needs. A huge number of patients are waiting for

healthcare, which, in addition to their unnecessary suffering, creates a huge social burden, especially for the elderly.

The proposed design of this insurance module primarily involves the organisation of a hospital stay, the ability to choose the unit (ward), and even the attending physician and nursing care. The insurance company's coverage of the costs of medical procedures is based on a formula for listed surgical units (named 'perils') and disease units. The level of coverage for surgeries can be 100% or via specified lump sums. When several operations are carried out simultaneously, the insurer covers the full cost of the highest-classified operation, a maximum of 50% of each subsequent operation in a different operating group, and a maximum of 25% in the same operating group. This kind of deductible makes it possible, on the one hand, to reduce the cost of insurance coverage (premiums) and, on the other, allows the use of funds accumulated in other modules.

It is also important to bear in mind the phenomenon of supply-induced demand (SID), which has been observed in many countries (Yu et al., 2020). The keys to explaining this phenomenon are information asymmetry and the idea of moral hazard. Providers / professionals, based on their status as experts, sometimes generate strings of in-house or outsourced services. This occurs more frequently if tests and medical procedures are paid for by the patient individually or the contract with the payer provides reimbursement of all costs incurred. Patients (especially the elderly) with little knowledge of actual health needs or how to meet those needs tend to rely on the knowledge of the doctors who decide the actual course of treatment. Thus, the peculiarity of the market for medical services is that the demand curve for medical services reflects the preferences of doctors (the providers of services) rather than patients (the consumers) (Bickerdyke et al., 2002). Insurance companies may seek to establish their own hospitals (envisioning a steady stream of newly insured potential recipients of such services) and have additional quality and cost control (Burns & Pauly, 2018).

Supplementary benefits for longevity (tontines)

Tontines have a long history, yet modern tontines have little in common with loans to the Treasury in exchange for lifetime annuities. They have been handed over to private institutions—insurance companies. However, the essence of a tontine, distinguishing it from a life annuity or, today, from classic life insurance, is still valid: in the absence of payment of the contracted benefit to the insured person or another person designated by him/her, the accumulated funds pass to the other tontine participants in the same class.

CRIS assumes that each tontine has a certain size (e.g., a minimum of 2,000 members in a given age cohort based on 5-year stages), the profits of which are entirely reserved for members of that class who live to the designated

age. Considering the purpose of the modular insurance in question, this age should be set well above the retirement age limit for the country. This would facilitate improved investment returns for those who accumulate additional savings for retirement and are not concerned about the eventual financing of their needs. However, during the entire duration of this association, savings are unavailable.

There are two types of tontine associations:

1. Tontines with regular contributions (transferred monthly, quarterly, semi-annually, or annually while allowing the regular accumulation of savings), necessarily with a minimum contribution period determined on the basis of appropriate actuarial calculations.
2. Tontines with a one-time contribution (only one transfer during the contribution period, defined as a minimum, with the intention of multiplying the initial capital).

At this point, it should be noted that single-premium tontines can be financed through another module associated with the product presented: the Luxembourg insurance (funds) module. Tontines reflect the idea of community and solidarity, not only in terms of financing but also in terms of an ideology that unites a group of people (Kemayou et al., 2011). Tontines resemble ordinary investments, with the major difference that tontine investments are usually irrevocable (Chen & Rach, 2022). In the proposed solution, insurance companies take on the role of managing individual tontines.

Saving for retirement (endowment)

The wide variety of available retirement investment programmes requires basic systematisation. In modern pension systems, which attach much greater importance to the foresight of their participants than in the past, two basic types of additional retirement savings can be distinguished:

1. Systems organised by companies or socio-professional groups.
2. Individual savings, the purpose of which is to increase income after retirement age, which should be separated from short-term savings or those with a purpose that differs from increasing the level of pension benefits.

In the proposed solution (CRIS), we deal exclusively with individually initiated and paid-for products. Technically, it is difficult to identify optimal insurance products. The development of financial services is so dynamic that new products appear as often as several times a year, providing the possibility of using individual instruments or combining them with others. Therefore, the task of the operators of the proposed modular product is to ensure sufficient flexibility of the proposed solutions to expand, e.g., the package of proposed investment directions on an ongoing basis or to modify the rules of partici-

pation (Sohn, 2017). It is also necessary to respond dynamically to changing investment expectations (Mahayni & Muck, 2017). If there is no confidence in capital markets (e.g., due to low interest rates), insurers must consider other options that can satisfy the expectations of policyholders. At present, this means directing investments to companies actively involved in shaping the 'green revolution' and pursuing sustainable development (Nguyen et al., 2018). At all times, however, it is necessary to guarantee participants the protection of already acquired rights (Zelizer, 2017).

One of the most difficult tasks facing pension systems based on defined contribution principles is protecting system participants with low incomes (and, as a result, low pension contributions) (Rajasekhar et al., 2017). An example of such a measure is a mechanism that provides a guaranteed minimum pension paid from the system or certain social allowances (Butler, 2016). This brings the sum of the pension and social allowances received closer to the established level of the minimum pension. People with low incomes have little opportunity to voluntarily generate additional retirement savings (regardless of the quantity and quality of available solutions). From the state's point of view, in such a situation, it is necessary to consider what is more cost-effective in the long run in terms of overall social goals: creating special subsidised programmes, co-funding contributions during the accumulation period, or paying additional benefits during the pension realisation period. The proposed modular solution, especially in the context of solvency guarantees for insurance companies, aims to provide greater accessibility for people with low incomes by setting a better-than-standard cost structure at or a lower value (Benish et al., 2016).

Luxembourg policy (fund) benefits (with the option of non-cash contributions)

A Luxembourg policy (fund) is an arrangement that uses owned or accumulated assets to invest in a certain way, and the purpose of investments is to generate funds to cover expenses defined in other modules of the product under review (most often, a minimum value of assets under management). Investment funds can operate in two main legal forms:

1. undertakings for collective investment in transferable securities (UCITS),
2. alternative investment funds (AIFs) (Kofoworola et al., 2019; Rokas & Siafarika, 2019).

The proposed product is based on an investment in an insurance solution. The starting point is payment to the insurance company. Investments in this regard are not significantly different from those of the 'saving for retirement' module. However, notably, the 'deposit' can also have a property or business value converted into a monetary value. In such a situation, a valuation of the

asset is made at the time the contract is concluded, and the equivalent in a specific currency is transferred to the account of the managing institution.

Luxembourg funds benefit from several conditions, the imposition of which should safeguard the interests of insured people and be a *de facto* supplement to pension benefits in the country where such an instrument is launched. In conclusion, it should be stressed that a Luxembourg policy in its basic form is no different from common insurance with a savings element. But at CRIS, we would like to focus primarily on the additional option in this type of policy, where the insurance premium does not necessarily have to be paid in cash. The premium can also be an asset: housing, land, paintings, valuable movables.

Three-layer CRIS design

Modern three-layer financial products (including life insurance) are not only tools for covering specific contingencies (living to a certain age or the death of the insured person) but are often implemented as contracts for specific goods and services. Figure 2 shows the construction of the three layers of the proposed CRIS. The proposed solution assumes the use of additional insurance products in layer 2. In this regard, the modification of selected modular solutions is envisaged (changing the number of modules or the extent of coverage of individual products). This layer also provides the possibility of the payment of a premium of the policyholder's children (one-time or over a certain number of instalments). Consequently, the capital accumulated by parents can be transferred to the products they need in given situa-

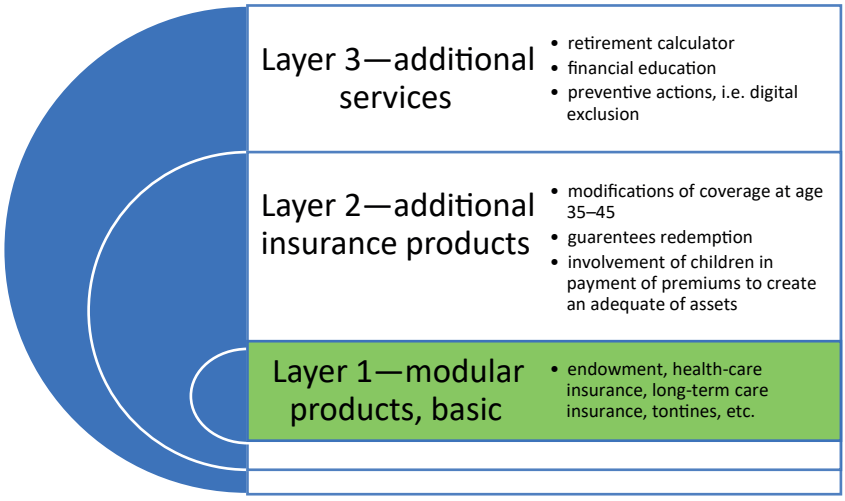

Figure 2. The three-layer design of CRIS

Source: own elaboration.

tions (e.g., the module 'Covering Costs and the Arranging for Hospitalisation' or 'Care Allowances').

Guaranteed realisation of selected benefits

The design of the multimodule pension product was assumed to cover the basic needs that arise during retirement. Despite changes in expenditures and the length of life in retirement, certain types of expenditures are crucial for preserving the health and lives of elderly people. Therefore, guided by social responsibility for this social group, it is necessary to create a state budget mechanism to guarantee the financing of certain types of benefits in a modular product, directed towards life insurance companies that sell and service modular insurance. The guarantee would cover modules related to: 1) sickness benefits and inability to work, 2) care allowances, 3) covering the costs of employment activation, and 4) covering the costs of arranged hospitalisation.

This means that quasi-reinsurance solutions currently operate in many countries (e.g. insurance for the agricultural sector). In addition, reinsurance mechanisms can be applied to social risks (Dror & Preker, 2002), but this requires that governments allocate part of their budgets in order to equalise the loss ratios of given insurance companies. Within CRIS, this means that a large risk materialisation in one year is financed from budget resources in the next year. Such a mechanism can be financed by reducing the necessary budgetary measures to provide these social welfare benefits. However, it is necessary to ensure the stability of such a solution. Life insurance companies and CRIS participants must be confident that the refinancing mechanism will function over a multi-year period and will not be subject to ad hoc decisions. Therefore, the premiums charged for each module should be verified by national actuaries. However, there is also a need for a public reinsurer entity, which must be guaranteed by the national treasury if its solvency is threatened. In the event of a need for disbursements in excess of the funds accumulated in the system, the security and liquidity of the proposed solution is ensured by the treasury guarantee. The reinsurer makes demands on the relevant state funds for recapitalisation (or infusion of funds depending on the legal form), and the entity responds with an appropriate issue of bonds or other risk securitisation instruments. The reinsurer's obligations to insurance companies to offer guaranteed benefits and services are unconditional, so the reinsurer must have state treasury guarantees.

The qualitative analysis of CRIS

Evaluating the effectiveness of the different parts of the new solution (CRIS) requires appropriate quantitative research both among people in working life

Table 1. SWOT analysis of CRIS

Strengths	Weaknesses
– hyper-personalisation: possibility to choose different risk coverage options at the time of contract conclusion and to change the choice during the contract period – the ongoing adaptation of benefit variants in individual products to a changing environment (e.g., additional in-kind public benefits, increased or decreased cash benefits) thanks to the application of the theory of change to the management of this product – competitiveness in comparison to traditional product solutions, as it incorporates the positive features of health insurance or unit-linked insurance, while allowing the use of tontine as a method of spreading risk in the population	– the need to build appropriate long-term investment solutions (e.g. change of legal regulations and introduction of tax incentives in other solutions) – portability between products can create a moral hazard for participants to use funds in the most expensive services – lack of an appropriate participant scale may destroy the insurance nature of CRIS (failure to spread the burden of benefits across a large group of participants) – an increase in the use of non-insurance benefits (layer 3) may disrupt the cost-effectiveness of the overall CRIS construction (particularly relevant for insurance and financial coverage in layers 1 and 2)
Opportunities	**Threats**
– an increase in competition between publicly funded objectives (e.g. energy transition or ESG) will reduce the interest of successive governments in increasing benefits for pensioners or building new types of benefits – technological developments are allowing more individualisation to be built into financial, investment product choices (CRIS meets these expectations) – the propensity of people, of all ages, to gamble may be the basis for engagement with the tontine mechanism	– a change in the level of benefits from the universal system or an increase in health and long-term care assistance will reduce interest in CRIS – the expansion of other financial products may blur the distinction between CRIS and other insurance and investment products – continued or worsening lack of interest in building capital on their own for use in retirement

Source: own work.

and among pensioners. At the conceptual stage, however, a qualitative assessment of the proposed solutions can be made. A SWOT analysis was used in this respect (Table 1), which is a technique for organising and analysing information related to the implementation of a new solution (Valentin, 2001).

The implementation of a new solution (CRIS) requires, above all, a willingness to change. This solution can take effect without a major revolution in the pension system or profound changes in legal regulations. In some countries, starting to offer tontines requires an adaptation of legal regulations to those enshrined in the directive for the operation of life insurance. However, unless there is a clear willingness to improve, and to do so in an iterative, i.e.

continuous improvement, there will be no chance of achieving sustainable results in improving the funding of retirees' needs.

As part of further work, appropriate tools and schedules would need to be prepared to manage this type of change. Including cost estimation and performance measurement in the analysis presented, which is the authors' intention as part of further work, would enable a holistic view of the economic elements, including the question of the value of this complex product to the customer. However, this requires further research in relation to the CRIS product as a whole, as well as to its individual components. The theory of change proposed in the paper allows resources to be used efficiently, effectively and to create sufficient value to justify the use of those resources (King, 2021).

Conclusions

The demographic shift that is driving a sustained increase in the proportion of elderly people in the population requires the adaptation of public policies and solutions offered by the private sector to mitigate retirement risk. The coverage of this risk can come from both income (cash benefits) and access to services. In a situation where ongoing pension reforms transfer the responsibility for pension benefits to participants, combined with increasing life expectancy, it is necessary to provide comprehensive solutions to reduce retirement risks.

For years, researchers have advocated the development of the annuity market and the development of LTC insurance. We are convinced that the focus on separate insurance products is inadequate. Therefore, we propose a new comprehensive view of retirement risk protection that can be flexibly adapted to the changing needs of insured people. CRIS is based on a three-layer modular product. The first layer combines insurance products that can accommodate policyholders' needs solely during retirement (as tontines or LTC insurance), solely during working life (to cover the cost of employment activation), or in both periods (pre-retirement and retirement). The second layer provides additional insurance products (i.e. guarantees), and the third layer offers different additional services to enhance policyholders' understanding of retirement risk and support their decisions regarding changes in modular products to better fulfil their needs. The modular insurance product should provide wealth creation and be part of the pension system. Its operation will reduce the social welfare system's obligations to individual retirees and should therefore not be taxed. The transfer of entitlements between modules allows individual resources and wealth to be built. However, the effects will be felt after the end of working life or will be transferred to the next generation (through inheritance).

The proposed solution, based on a ToC mechanism of insurance product creation and evolution, makes it possible to constantly review the solutions used, modify them internally, or add new modules. Only such an approach will provide an ongoing response to the changing mix of goods and services that future retirees will require. Simultaneously, the application of a three--tier solution will permit insurance participants to make changes in their selected products both during the period of accumulation of funds and vesting, as well as during retirement and the partial use of funds. The SWOT analysis carried out indicates that there are many opportunities in front of this new product solution due to the need to individualise product solutions and retirement risk management. But similar constraints as in existing pension products remain: the lack of propensity to build up additional savings for retirement and the state's commitment to raising benefits or providing additional care and health benefits for retirees.

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