ATRC-Conference 2019

Life products using a collective approach

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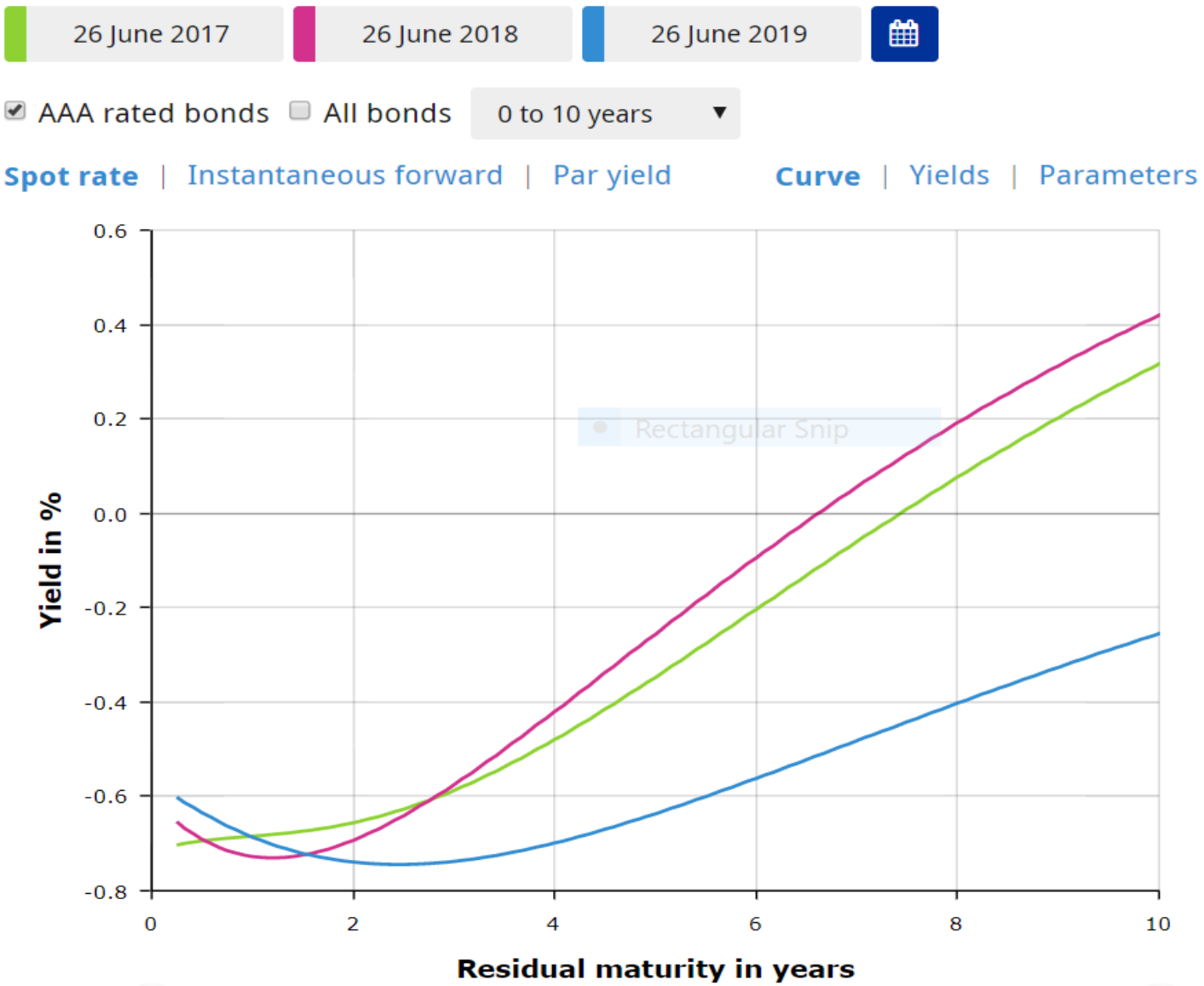
Agenda

1	**Introduction and challenges** The situation of life insurance companies and pension providers is challenging. Long-term saving and life-long pensions are difficult under low interest rates, with increasing requirements on solvency and other regulations and the developments in longevity. This is developing pressure in search of new solutions, not only for life insurance companies, the same is true for occupational pensions and state pensions. A special problem: There is a notion, that traditional long-term guarantees are an indispensable part of a life-long pension. But is a periodic interest rate guarantee, together with the related regulatory requirements for the asset management really the best solution for the problem? Is it possible to provide a high level of security combined with acceptable yields without traditional long term guarantees? Could we bring together the advantages of individual unit linked life insurance products with the traditional collective approach in a cost efficient automated environment?
2	**Current conditions and developments of recent years** The idea of designing pension products without traditional long term guarantees isn't new. In the private layer many products with reduced guarantees have appeared.
3	**Integrated Unit Linked Collective Assets (ICA)** The goal of the model we want to discuss here is an abstraction of the existing models.
4	**Resume and next Steps**

Euro area yield curves



2 Current conditions and developments of recent years

The idea of designing pension products without traditional long term guarantees isn't new.

- In the private layer many products with reduced guarantees have appeared.
- As an example: iCPPI, iOBPI, static hybrid, dynamic hybrid and index linked hybrid products.
- Looking at the occupational pension layer the change was even stronger.
- Examples are here
  - the **Pension Schemes Act** 2015 in UK (introducing shared risk schemes)
  - **CDC** (collective defined contribution) models in Denmark and The Netherlands

2 Current conditions and developments of recent years

- Defined Contribution plans with a high equity ratio had been badly hit by the dotcom crisis of 2000 and by the financial crises of 2008.
- Backtesting with real capital market data give strong evidence that the collective component can effectively protect against equity market crashes.
- A unit linked approach with a collective component **in the savings- and the pay out phase** does not only help against equity market crashes (in comparison to individual unit linked products).
- It is, in some sense, a good substitute to saving products and annuities with traditional guarantees. (intergenerational risk transfer improves the risk-return profile)
- The aim of that presentation is to motivate both perspectives
- And to give an overview of concrete current developments in that area in europe

2 Current conditions and developments of recent years

- The latest development in this area is the “**reine Beitragszusage**” (***pure defined contribution***) or “Zielrente” (target pension / defined ambition) as a part of the “Betriebsrentenstärkungsgesetz (BRSG)” in Germany (the law came into force January, 1st , 2018).
- The aspect of a collective approach in a unit linked environment in the private layer could be found in Unitised with Profits (UWP)
- A newer description for a collective approach is given in Annuity Pools. This model only applies in the pay out phase.

Product Innovations in recent years

1	**Traditional** and **capital efficient traditional products („New Klassik“)**
2	**Hybrid Products** (static, dynamic and index participation) **with reduced Guarantee**
3	**Unit Linked with or without investment guarantees (iOBPI, iCPPI)**
4	**Integrated unit linked collective models** with reduced or without conventional guarantee, Private or occupational pensions, Examples: „Sozialpartnermodell“, Collective DC, Annuity Pools
5	**Anglo-Saxon Products** (Unitised With Profits, Universal Life, …)
6	**Biometric Products**: new risks, new combinations, phase models, semi-markov / state-space-models, Individualization, Waiting periods
7	**Flexibility** and **Simplicity** (especially in a self service environment)

3 Integrated Unit Linked Collective Assets (ICA)

The goal of the model we want to discuss here is an abstraction of the existing models. It should unite the following main aspects in one model:

- A new understanding of security (instead of traditional guarantees)
- A rule based (optimized) mixture of an individual and a collective savings process
- The ability to derive new and the existing products for the private layer and for occupational pensions
- A unit linked framework (although additional cash accounts can be integrated)
- A cost efficient automated approach.

3 Integrated Unit Linked Collective Assets (ICA)

The main objective are lifelong old age provisions:

- We prefer an integrated approach, including the savings process and the pay out phase.
- Typically we have regular premiums during the savings process.
- Obviously such a model can be used to design separated products
  - As a pure savings vehicle
  - As an annuity only (in that case it's a single premium product)
  - As a combined solution with an option to take the money or transfer to the pay out phase
- For the purposes of this model it makes no difference if it is a binding or a non-binding premium agreement (pay as you like).
- Occupational pensions can have both, contributions from employers and employees.

3 Integrated Unit Linked Collective Assets (ICA)

Smoothing in a collective environment

As already mentioned it is aimed to support different investment profiles through a rule based system

How we want to adjust Security, Capital Gains and Liquidity (the magic triangle) ?

- In general there is no traditional long term guarantee. In particular there is no yearly interest rate guarantee
- Nevertheless old age provisions need security
- The level of security can be designed for each portfolio
- Different portfolios can have different smoothing algorithm

3 Integrated Unit Linked Collective Assets (ICA)

Smoothing in a collective environment

How we want to adjust Security, Capital Gains and Liquidity (the magic triangle) ?

- The idea is to replace traditional guarantees with low volatility
- Low volatility is achieved mainly by collective smoothing algorithms and an adequate asset management. That means that we emphasize collective smoothing over contract individual financial mathematics (like iCPPI or iOBPI). Although under certain conditions it can be combined.
- The long term perspective together with the collective approach and a good product design makes it possible to use so called illiquid assets (to achieve higher capital gains at portfolio level)
- The abandonment of traditional guarantees allows a more Return-oriented asset management and as a consequence higher expected returns for the policy holder and a better solvency position for the life insurance company or reduced liabilities for the employer

3 Integrated Unit Linked Collective Assets (ICA)

Smoothing in a collective environment

Security / Capital Gains / Liquidity:

- A portfolio can have a different collective model during the saving process and the pay out phase
- During the saving process we always have an individual contract (Each saver has an individual account)
- We support two general smoothing models:
  - Each contribution to an individual contract can be split
    - A part of the premium remains in the contract, the rest is transferred to a collective account
    - The part that remains in the contract can be accumulated first (interest-bearing) and used later for the purchase of shares
    - The part that is transferred to the collective account is used to purchase shares (at a collective level)

3 Integrated Unit Linked Collective Assets (ICA)

Smoothing in a collective environment

- The idea is to establish a corridor for the development of share prices hold by individual contracts
- If the development in the given period was better than the maximum of the corridor, x% of the exceeding proportion is transferred to the collective account
- If the development was worse than the minimum of the corridor, y% of the proportion below the minimum is refunded. That means the equivalent number of shares is transferred from the collective account to the individual contracts.
- The vehicle to enable the risk-sharing mechanism is a collective reserve. These are assets which are not allocated to individual accounts of the savers but belong to the savers collectively.
- If the assets perform better than expected then the collective reserve will build up. If assets perform worse than expected the assets attributed to the collective reserve are used to stabilize the performance of the individual accounts.

3 Integrated Unit Linked Collective Assets (ICA)

Biometric risks and riders

Although we focus on the savings process here, some remarks about biometric risks.

- A product model designed for old age provisions needs at least an option to integrate a coverage for invalidity and survivors pension
- We offer two different types of riders in the ICA-Model

a) Traditional riders with traditional guaranteed benefits.

b) Pension funds like riders

- The pension fund like riders are a perfect fit to the ICA-Model. The benefits are not guaranteed. They are financed by the same capital as the old age annuities.
- We just take the amount of money that is already accumulated and calculate an invalidity pension or a survivors pension using the defined present values
- In fact that way to finance the biometric risks we use a collective approach too.

3 Integrated Unit Linked Collective Assets (ICA)

- During the savings process at portfolio level there are three separated saving vehicles:
  - Contract individual accounts (level 1)
  - A collective customer fund (level 2) - accumulating the buffers
  - An optional additional collective fund – financed by the employer or by equity capital of the life insurance company (level 3)
- The Smoothing Algorithm establishes a relation between level 1 and level 2
- The Algorithm is always working on portfolio level (as a batch job)
- All individual accounts are smoothed or none (the same is true for the pensions in the pay out phase)

Product Model

Additional external contributions
Legal Subsidies
Employer Contribution

Private (or employee) contribution agreement
scheduled
binding non-binding
unscheduled

Additional internal contributions
Investment profits
risk profits
bonus

rules for investment and periodically (e.g. daily) portfolio rebalancing

Costs of Insurance
Charges & Fees
out of premium or assets
Risk premium
out of assets
Guarantee fees
out of premium or assets

Individual Assets / Liabilities
iCPPI / iOBPI
Reserve
Reserve-Account
Transfer-Accounts
automated rebalancing
Riskless Assets
Risky Assets
Hedge Assets

Integrated unit linked Collective Assets
Riskless Assets
Risky Assets

Traditional Collective Assets
RfB, ZZR, Schlussüb.

rules for pay out, transfers or disinvestment

Payment Agreement
scheduled
binding non-binding
unscheduled

A collective model in the pay out phase

- We have already mentioned that during the savings process at portfolio level there are three separated saving vehicles:
  - Contract individual accounts (level 1)
  - A collective customer fund (level 2) - accumulating the buffers
  - An optional additional collective fund – financed by the employer or by equity capital of the life insurance company (level 3)
- At the end of the savings process it is possible to pay the resulting amount to the policy holder or the employee. Obviously this feature depends on the product and the regulatory environment.
- Often a transition to the retirement phase is obligatory
- During this transition the amount of the first pension has to be calculated
- This again happens on portfolio level in a batch job. We want to treat all pensioners equally.
- Typically the contract individual accounts play an important role in this calculation and then they disappear afterwards.
- Thus, after the transition we have a pure collective model with level 2 and possibly level 3

A collective model in the pay out phase

How we can adjust the annuities during the pay out phase and what is the equivalent instrument to the corridor in the savings process?

Let **PV(K,t)** be the present value of the pensions of the collective K at time t and pv(V,t) the relative present value of the pensions of a policy V at time t. As already mentioned we use best estimates here and not the typical security surcharges. As a result we can expect a much higher amount for the first annuity and we have no guarantee.

A collective model in the pay out phase

The capital coverage degree of collective K at time t be **KDG(K,t)**.

For the calculation of KDG, we have to consider the time value of the collective customer fund (level 2) and the sum of the present value of the pensions. The relation between both is a good measure to adjust the annuities and gives us a definition for the KDG:

$$KDG(K,t) = \frac{Kap(K,t)}{PV(K,t)} (*)$$

The corridor we are looking for is an interval surrounding the capital coverage degree

An example is given by the German law (BRSG): 100% ≤ KDG(K, t) ≤ 125% (**)

This corridor is important, because an adjustment of the annuities can be restricted to situations when KDG is out of the corridor. That way we reduce volatility in the pay out phase.

A collective model in the pay out phase

Let V be a contract for which we want to do the transition to the retirement phase at the date t. With R we denote the pension which is to be calculated. The calculation bases for pv(V, t) are the same here, which are used for the determination of KDG(K, t).

The individual account value of V at t is G. The collective amount of the collective K to be credited (see (*)) is $\tilde{P}$(t). The collective buffer added from the pension transition of V is nP(V, t). The motivation for the following calculation rule is to determine the new pension of the individual contract in a way that the KDG of the collective remains unchanged.

The newly arrived pensioner brings the same buffer into the collective, which already exists in collective consideration.

$$\frac{Kap(K,t) + nP(V,t) + G}{PV(K,\ t) + pv(V,t) \cdot \boldsymbol{R}} = KDG(K,t)$$

A collective model in the pay out phase

This formula is easy to transform so that R can be determined directly.

$$R = \frac{1}{KDG(K,t)} \cdot \frac{nP(V,t) + G}{pv(V,t)}$$

The result is unsurprising: the right-hand factor would be the obvious approach, if one sets a KDG = 100% for the new pension. The left factor leads to the desired embedding in the collective.

Thank you for your attention.

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