Variable Annuities & Alternative Guaranteed Products
How to Manage Risk by Product Design

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Agenda

Current challenges for insurers selling guarantee products

Short overview over different guarantee products

Risk Management by product design – a few examples

Outlook
Current challenges for insurers selling guarantee products

- The current capital market situation with low interest rates and high volatilities puts significant pressure on traditional products with long term guarantees
- Example 1: „Old“ guarantees “in the money” (example from Germany)
Current challenges for insurers selling guarantee products

- The current capital market situation with low interest rates and high volatilities puts significant pressure on traditional products with long term guarantees.

- Example 2: Guaranteed surrender values for guarantee products in many markets (e.g. Germany)
  - High volatility of interest rates might cause a significant increase in interest rates in a rather short time period
    - Market values of bonds drop
    - Surrender values are not subject to any „market value adjustment“ (guaranteed surrender values)
  - High surrender could cause significant problems
    - Especially if consumer protection organizations and media advise that under such circumstances policyholders should surrender their policy and invest their money somewhere else
Current challenges for insurers selling guarantee products

- Variety of additional challenges

**Solvency II**
- In many countries „year to year“ cliquet guarantees
- Long term guarantees
- Market consistent evaluation of insurance liabilities shows the significant value of long term guarantees provided in the past

**Decreasing technical rates**
- Decreasing attractiveness of guarantees for clients
- Especially for short terms to maturity, i.e. insured of higher age
- At the same time: guarantees are highly demanded in this segment

**Consumer protection**
- Several Examples of misunderstood consumer protection
  - e.g. Unisex
  - e.g. guaranteed surrender values
- Potential to threaten the whole system

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Risk Management by Product Design
Current challenges for insurers selling guarantee products

- New and upcoming transparency rules
  - Disclosure of charges
  - Calculation of Risk return Profiles making chances and risks from a client’s perspective transparent
  - Calculation of “risk indicators” or risk classes

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Agenda

- Current challenges for insurers selling guarantee products
- Short overview over different guarantee products
- Risk Management by product design – a few examples
- Outlook

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Risk Management by Product Design
General product overview – Traditional Products

Product design

• The guaranteed interest rate is usually fixed for the whole term of the contract (sometimes this means accumulation + annuity phase)
• Guarantees are often not adequately hedged
• Level of the guaranteed rates is high in comparison to market rates
• On top of this interest rate guarantee an annual bonus is provided

Recent developments

• Still, traditional (non linked) business constitutes a big portion of new business in many markets
• This holds in particular for recent years, where insurance companies provided higher interest rates than banks and attracted large volumes of single premium business

Challenges in the current environment

• Low nominal interest rates combined with rather high long-term interest rate guarantees granted to contracts that have been sold when interest rates were higher
• De-facto guarantee of surrender values
• Market-based valuation of insurance liabilities leads to high volatilities of the company’s P&L
• Solvency-II approach exposes some of the inherent risk of traditional products that has previously not been considered
General product overview – High watermark CPPI-funds

Product design

- Family of guaranteed funds (different maturities) with monthly ratchet
- Monthly ratchet makes sure that all premiums paid into the fund are guaranteed at maturity
- If maturity of the policy is after the maturity of the “longest” fund, client’s money is switched
  - either immediately when a new fund is offered (which requires the new fund to come with the previous fund’s guarantee) or when the old fund matures.

Recent developments

- Initially extremely successful in several countries due to very simple marketing
- 100% premium guarantee, 100% “highest value guarantee”, up to 100% equity exposure
- Not seen as „state-of-the-art“ any more
- Risk-return-profiles show the limit in upside-potential
- Less new business in this product category

Challenges in the current environment

- Cash lock risk has become an issue
- High volatilities and low interest rates lead to decreasing stock ratios
General product overview – Select Products

Product design

- Client can choose every year if he wants his accrued account value to participate in the general assets (surplus participation) of the insurer or in some formula-based participation in some equity index
- Client’s surplus is used to purchase option on this index participation
- The client’s account value cannot fall within a year

Recent developments

- Product has been developed by Allianz in the German market (Allianz IndexSelect)
- Awareness of other insurers about the success and capital efficiency
- Recently: Two insurers “copied” the product in Germany
- Product sold in Switzerland by AXA Winterthur (Protect Plan) is based on the same idea

Challenges in the current environment

- Very little exposure to market risk for the insurer
- Impact only on the conditions of the index participation
- Products proof to be rather “capital efficient”
General product overview – Static Hybrid Products

Product design

• Very simple design: “Zero plus underlying” where traditional life insurance with a guaranteed rate of interest is used as the safe asset
• Typically: Guarantee = premiums paid
• Each premium paid is split in three parts: charges; PV of the guarantee (calculated with the guaranteed rate) → invested in traditional life insurance; Rest → invested in funds
• Many different variants of the product exist

Recent developments

• Rather old concept
• Initially very successful, but product was not understood by many distributors and clients
  • Often marketed like normal unit-linked product without guarantee. If you tick a box, you get a guarantee, that you will get your premiums back. No explanation that ticking the box leads to a significant investment in traditional life insurance
• Product’s fund exposure has decreased due to low interest rates
• However still sold by many providers

Challenges in the current environment

• Problems due to low interest rates
  • For “short term” contracts (sometimes up to 18 years) the product might not be possible any more
• Product modifications arise
• Same challenges as traditional products → mainly traditional allocation
General product overview – Dynamic Hybrid Products

Product Design

• A dynamic hybrid product is an individual CPPI calculated for each client with the insurer’s general assets as riskless asset.
• However, most insurers can only perform the calculations (and hence trade) once a month. This significantly increases the gap-risk.
• Guarantee funds used to cover for gap risk (monthly 80% guarantee reset).

Recent developments

• Introduced in 2006 by HDI Gerling in the German market. Within a few months, several providers followed.
• Currently: More than 20 providers in Germany. About 1 in 3 unit-linked policies sold in Germany is a DHP (source: Towers Watson)
• First products are offered (or being developed) in several other countries.
• Rather skewed distributions become an issue → Product modifications that deal with that issue

Challenges in the current environment

• Low interest rates increase pressure on traditional part of the allocation
• General assets as “safe haven” → Especially in times of high volatilities may have undesired effects for traditional business. → Product designs that reduce trading intensity and/or frequency are an issue.
Dynamic Hybrid Products – Basic idea

- Example: The CPPI-algorithm uses a multiplier of 5, i.e. we assume a worst case drop in equity of 20% within one period. (Typically the fund would guarantee a worst-case drop of 20% per month)

- Then the client’s assets are allocated as follows:

  - Fund
  - 1.75% p.a.
  - today’s account value

  - Worst Case
  - -20%
  - end of period

  - Fund
  - traditional
  - Worst-case policy-NAV at the end of the period
  - >= PV of guarantee
  - (calculated with guaranteed rate)
General product overview – Dynamic Hybrid Products

- Dynamic Hybrid Products – illustrative backtest
General product overview – US-style Variable Annuities (VA)

Product design

- Unit-linked product: funds without guarantee + guarantee by insurer
- Guarantees and corresponding risks are managed by internal hedging (or outsourced).
- Transparent guarantee charges, typically a fix percentage of NAV p.a.
- Different types of guarantees: GMDB, GMAB, GMIB, GMWB (temporary), GLWB (lifelong)

Recent developments

- Products have been very successful in the USA and in Asia
- Different success stories in Europe
  - Not very successful e.g. in the German market
  - Not many new product launches in the last few years
- Re-pricing guarantees and fees (de-risking of products in general)
- Increasing interest rates might be a great chance for Variable Annuities

Challenges in the current environment

- Reduced attractiveness of products in new business
- Losses with existing products due to inefficient hedging programs
- Policyholder behavior has become an issue
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Short overview over different guarantee products

Risk Management by product design – a few examples

Outlook
Risk Management by product design – a few examples – traditional products

- Traditional products are to be re-designed

- Potential changes
  - Guarantees are provided for limited durations
  - Renewable guarantees
  - No more nominal guarantees
  - etc.

- In many markets: Changes in regulation might be necessary

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Risk Management by product design – a few examples – traditional products

- Traditional products are to be re-designed
- Example for reducing solvency capital requirements by product design
  - Traditional product construction like in Select Products
  - Significant lower SCR, essentially due to point-to-point guarantees instead of cliquet-guarantees
- Other possibilities
  - Inflation linked insurance products
    - Rather complex for ongoing premium payments
    - Products without nominal guarantee might be a problem in distribution
  - Innovative decumulation products
    - Enhanced annuities
    - Annuity pools
    - Unit-linked decumulation products

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Risk Management by product design – a few examples – Variable Annuities

- Risk Management of client options within Variable Annuities
  - fund choice
    - limiting the fund universe to funds that are highly correlated to standard indices
    - Use of funds with rather low volatilities
    - Insurer reserves the right to change the policyholder’s asset allocation, e.g. when volatilities rise
  - premium payment options for ongoing premium business
    - reduce premium payment options where possible
    - reduce the guarantees if policyholders deviate from their scheduled premium pattern
  - surrender and partial surrender
    - if possible, include rather high surrender charges during the first years in order to avoid early surrender in the case of increasing stock markets.
    - (partially) charge guarantee fees upfront
    - Include ratchets in order to avoid options being deeply out of the money (ideally such that surrender is never optimal from a client’s perspective)
Risk Management by product design – a few examples – Variable Annuities

- Risk Management of client options within Variable Annuities
  - withdrawals
    - for GMWB contracts: often, an optimal pattern is to annually withdraw the guaranteed withdrawal amount and to surrender if the account value exceeds some high level
    - provide incentives for policyholders to postpone withdrawals to some later stage
      - include market-based or deterministic step-ups into the product such that the optimal policyholder behavior still is to immediately start withdrawing
  - annuitization
    - annuitization in many European countries is incentivized by the government, e.g. in Germany via tax-privileges
    - Thus, rational annuitization behavior should be assumed for such markets (depending on the product design: 100% annuitization rational?)
    - Incentivize postponements of the annuitization decision by offering increasing lifelong annuities if the policyholders wait for another year
  - Avoid mix calculation (age, fund mix, premium payment)

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**Risk Management by product design – a few examples – Dynamic Hybrid Products**

- **Dynamic Hybrid Products – trading frequency and amount**
  - Risk Management of trading frequency and trading amount, i.e. reduction of asset transactions into the traditional assets
  - Needs to be part of product development

- **In what follows: example of two different product designs**
  - Almost similar risk return profile from a client’s perspective
  - Significant different risk for the insurer
  - Assumption of new business for 5 years
  - Stochastic simulation of asset movements into and out of the insurer's traditional assets
Dynamic Hybrid Products – trading frequency and amount – Product 1

Trading volume of the insurer’s general assets (positive number = increases)
**Risk Management by product design – a few examples – Dynamic Hybrid Products**

- **Dynamic Hybrid Products – trading frequency and amount – Product 2**
  - Trading volume of the insurer’s general assets (positive number = increases)

![Graph showing trading volume of insurer's general assets](image-url)
Current challenges for insurers selling guarantee products

Short overview over different guarantee products

Risk Management by product design – a few examples

Outlook
Outlook

- Current challenges for guarantee products
  - Low interest rates and high volatilities
  - Rather high and long term guarantees “in the money”

- At the same time
  - Demand for high guarantees still existent

- Convergence of risk management and product development
  - Re-designing of traditional products
  - De-Risking of Variable Annuities
  - Re-designing of CPPI structures including dynamic hybrid products

- Many product developments of the upcoming years will be driven by risk management
Thank you for your attention

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The Institute for Finance and Actuarial Sciences

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