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

Alexander Kling
Institut für Finanz- und Aktuarwissenschaften
Ulm, Germany

Ri$kMinds Insurance
Geneva, February 2012

Helmholtzstraße 22
D-89081 Ulm
phone +49 731 50-31230
fax +49 731 50-31239
email ifa@ifa-ulm.de

Agenda

Current challenges for insurers selling guarantee products

Short overview over different guarantee products

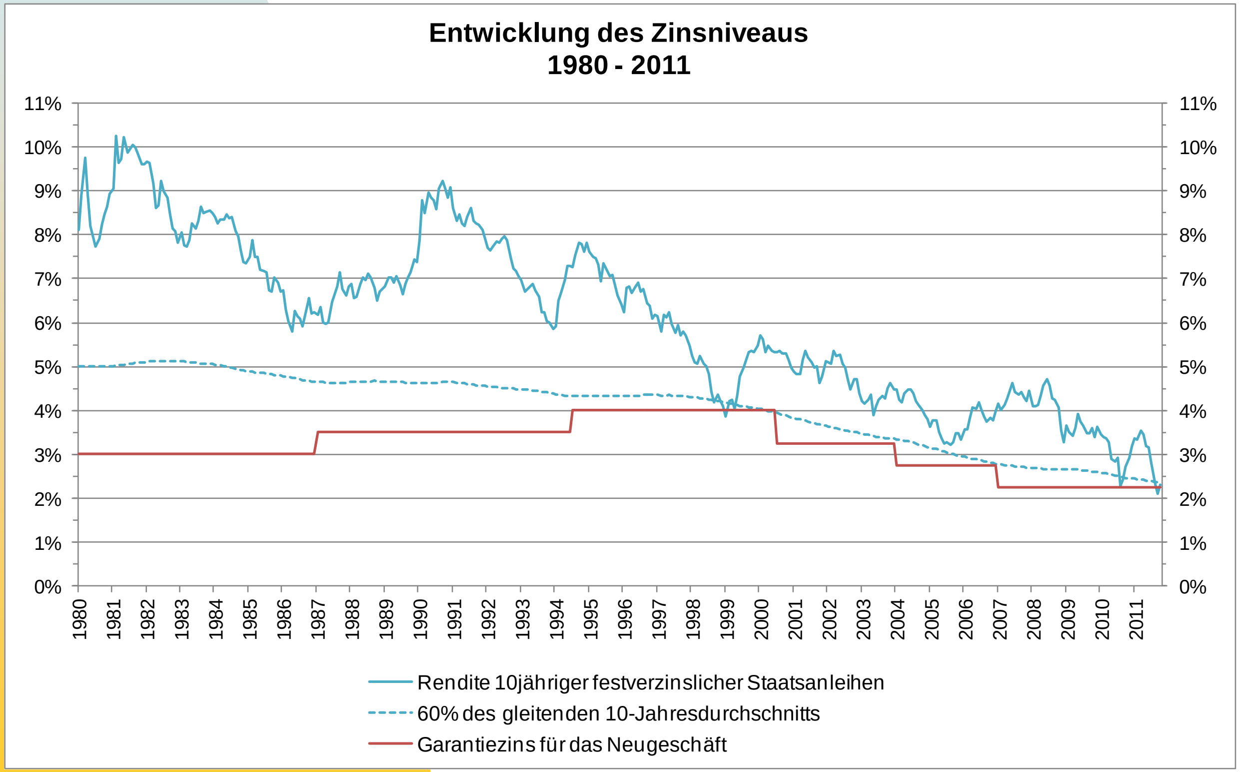
Risk Management by product design – a few examples

Outlook

ifa Institut für Finanz- und Aktuarwissenschaften

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)**



ifa
Institut für Finanz- und Aktuarwissenschaften

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

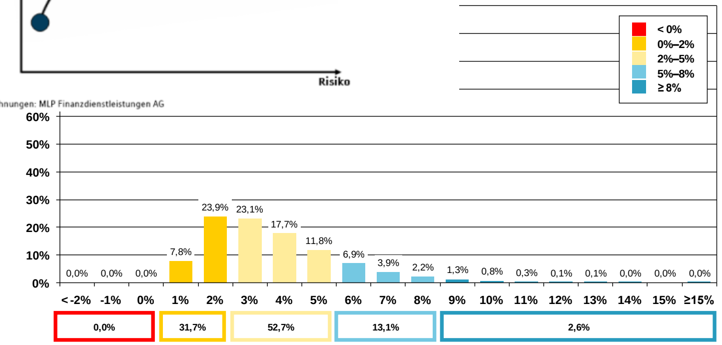
- Several Examples of misunderstood consumer protection
- e.g. Unisex
- e.g. guaranteed surrender values
- Potential to threaten the whole system

Current challenges for insurers selling guarantee products

New and upcoming transparency rules

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



Agenda

Current challenges for insurers selling guarantee products

Short overview over different guarantee products

Risk Management by product design – a few examples

Outlook

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

ifa
Institut für Finanz- und Aktuarwissenschaften

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).

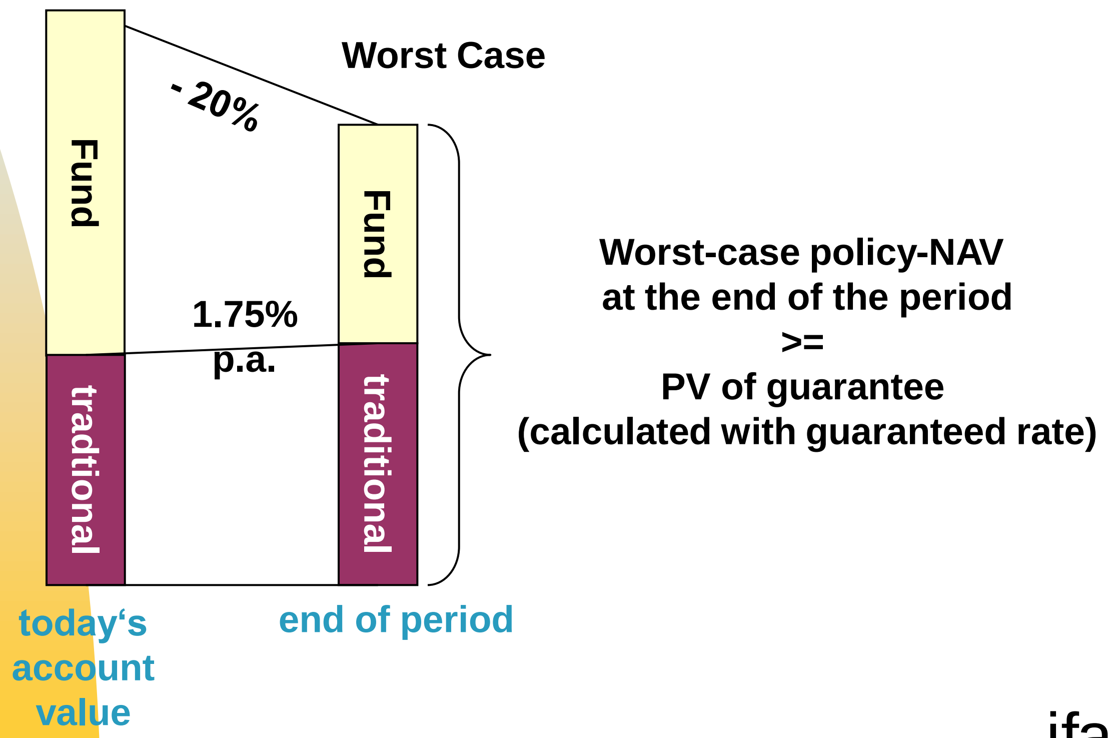
Recent developments

- 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

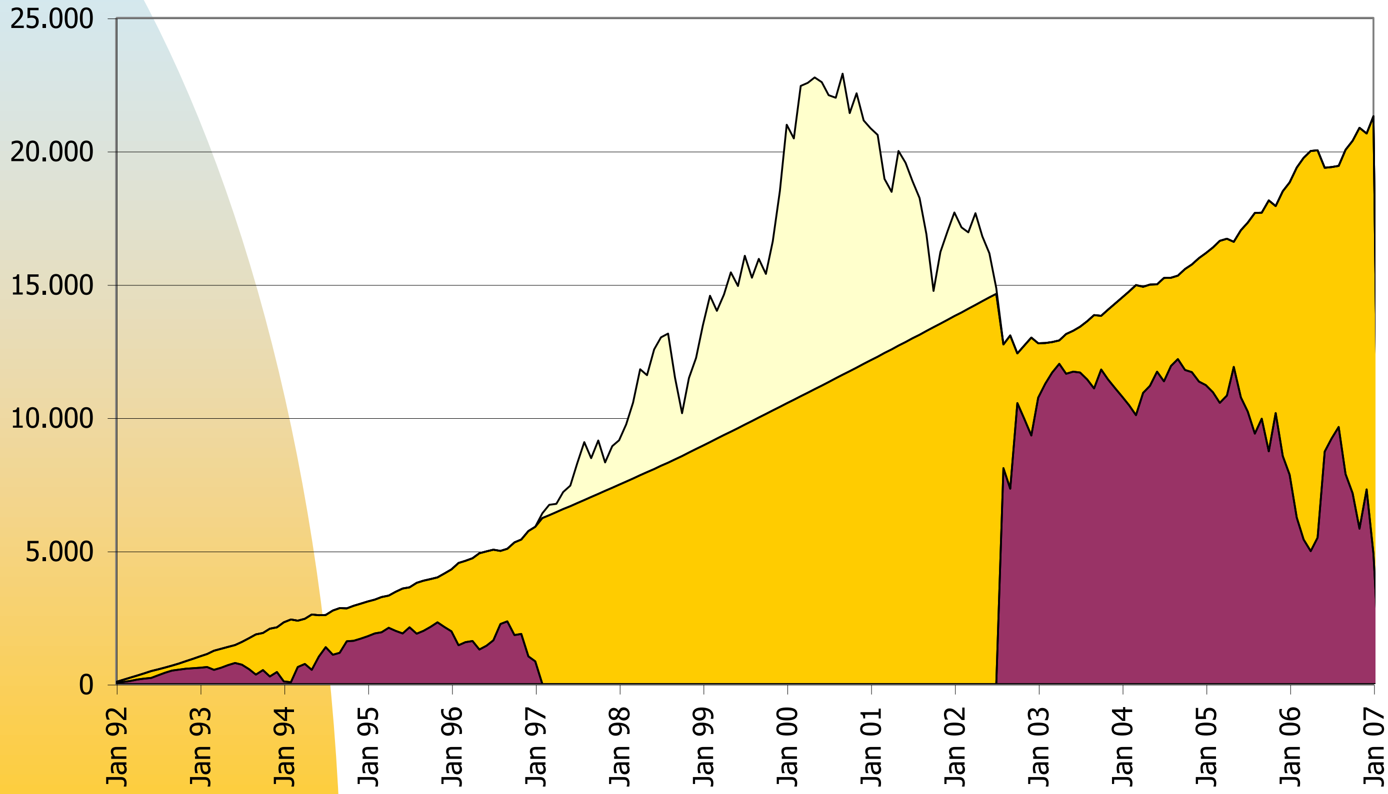
Challenges in the current environment

- 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:



Dynamic Hybrid Products – illustrative backtest



ifa
Institut für Finanz- und Aktuarwissenschaften

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

Agenda

Current challenges for insurers selling guarantee products

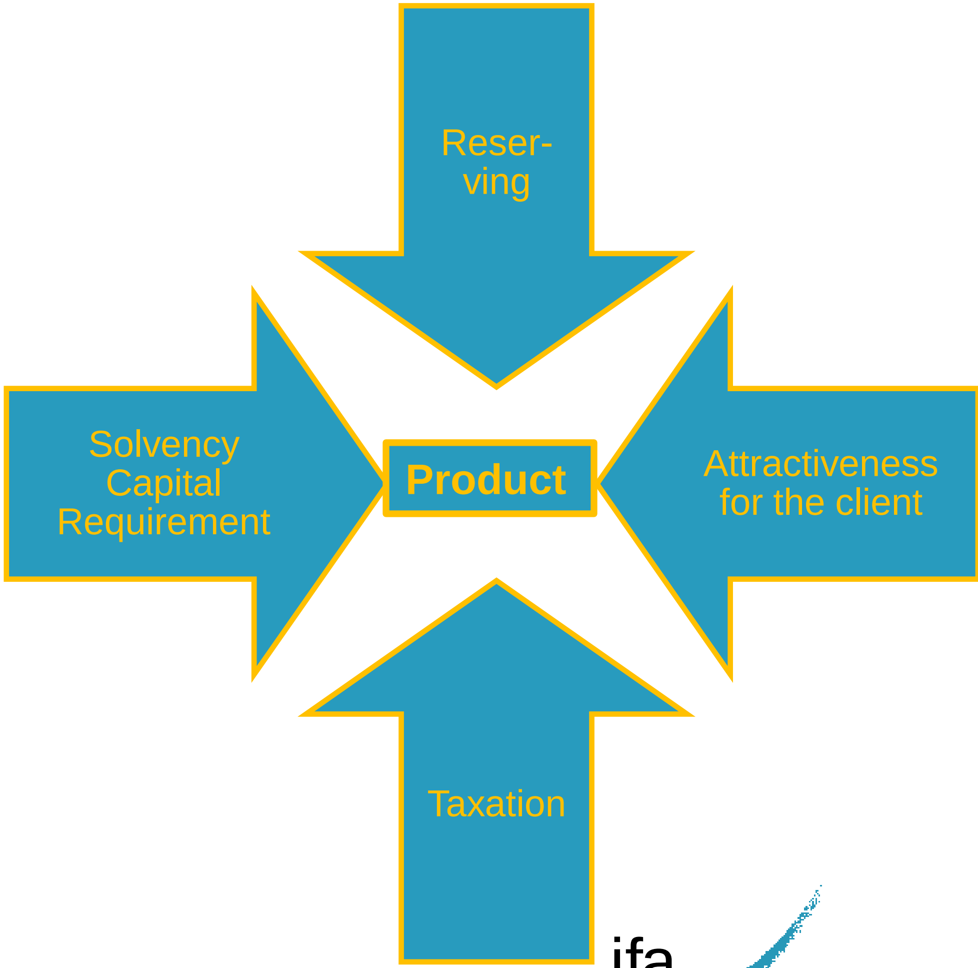
Short overview over different guarantee products

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**



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

- **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

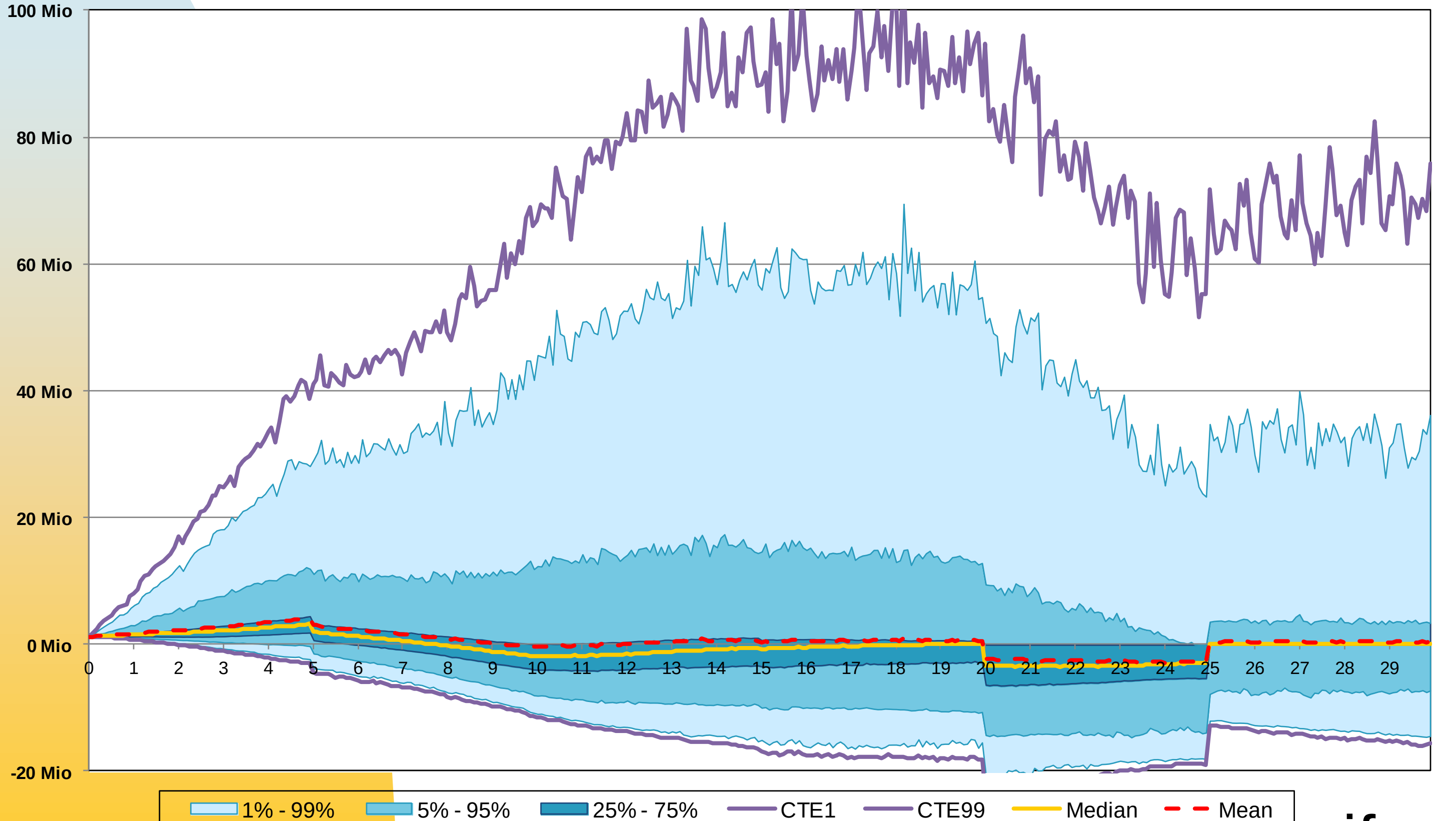
- **Risk Management of client options within Variable Annuities**
  - withdrawals
    - for GMWB contracts: often, an optimal pattern is to annually withdraw the guaranteed withdrawal amount and to surrender if the account value exceeds some high level
    - provide incentives for policyholders to postpone 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)

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

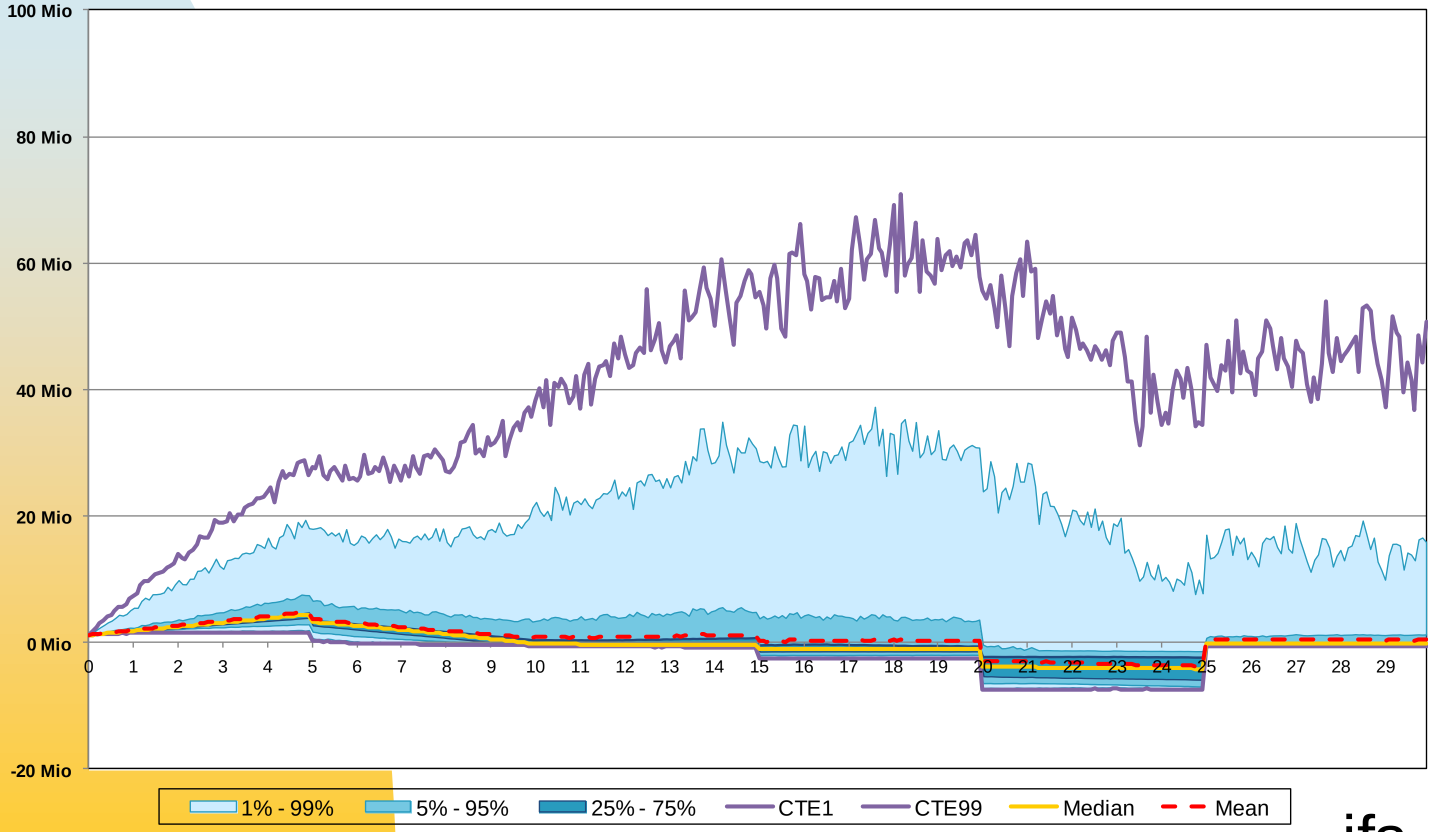
- **Dynamic Hybrid Products – trading frequency and amount – Product 1**
  - Trading volume of the insurer's general assets (positive number = increases)



ifa
Institut für Finanz- und Aktuarwissenschaften

Dynamic Hybrid Products – trading frequency and amount – Product 2

- Trading volume of the insurer's general assets (positive number = increases)



ifa
Institut für Finanz- und Aktuarwissenschaften

Agenda

Current challenges for insurers selling guarantee products

Short overview over different guarantee products

Risk Management by product design – a few examples

Outlook

ifa

Institut für Finanz- und Aktuarwissenschaften

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**

Institut für Finanz- und Aktuarwissenschaften

Helmholtzstraße 22
D-89081 Ulm
phone +49 (0) 731/50-31230
fax +49 (0) 731/50-31239
email ifa@ifa-ulm.de

www.ifa-ulm.de

- **Thank you for your attention**

Dr. Alexander Kling

+49 (731) 50-31242

a.kling@ifa-ulm.de

The Institute for Finance and Actuarial Sciences

ifa
Institut für Finanz- und Aktuarwissenschaften

Helmholtzstraße 22
D-89081 Ulm
phone +49 (0) 731/50-31230
fax +49 (0) 731/50-31239
email ifa@ifa-ulm.de
www.ifa-ulm.de

- **Actuarial consulting**
  - Development and design of innovative life insurance and pension products
  - Market entry by foreign insurance companies
  - Questions at the “intersection” of investment banking and life insurance
  - Actuarial/Finance-related questions regarding traded life insurance policies
  - Asset-Liability-Management, DFA and Risk Management
  - Embedded Value (traditional, EEV, MCEV) and Value Based Management
  - Solvency II, QIS x and Internal Models
  - Actuarial consulting in non-life insurance
  - Actuarial/Finance-related questions in private health insurance
  - Mergers & Acquisitions
  - Preparation or actuarial testing of IT-concepts
  - Applications of data mining methods on insurance data
- **Actuarial Services**
  - Major actuarial projects
  - Migration of insurance contracts
  - Introduction of new policy administration systems
- **Project Coordination and Strategic Consulting**
  - Introduction of new products
  - Market entries