



Portfolio Optimization under Solvency II – Implicit Constraints Imposed by the Market Risk Standard Approach

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Overview – Research Question and Procedure

Research Question

- What are the influences of the market risk module of the Solvency II standard approach on the asset allocation of an insurer?
- Can the detected influences be economically justified?

Procedure

1. Starting point: Portfolio Selection in a mu-sigma setting by using empirical data
2. Effects of a) the Solvency II Standard Approach and b) a proposed internal model on efficient and inefficient portfolios are derived
3. Results of a) and b) are compared



Empirical Data

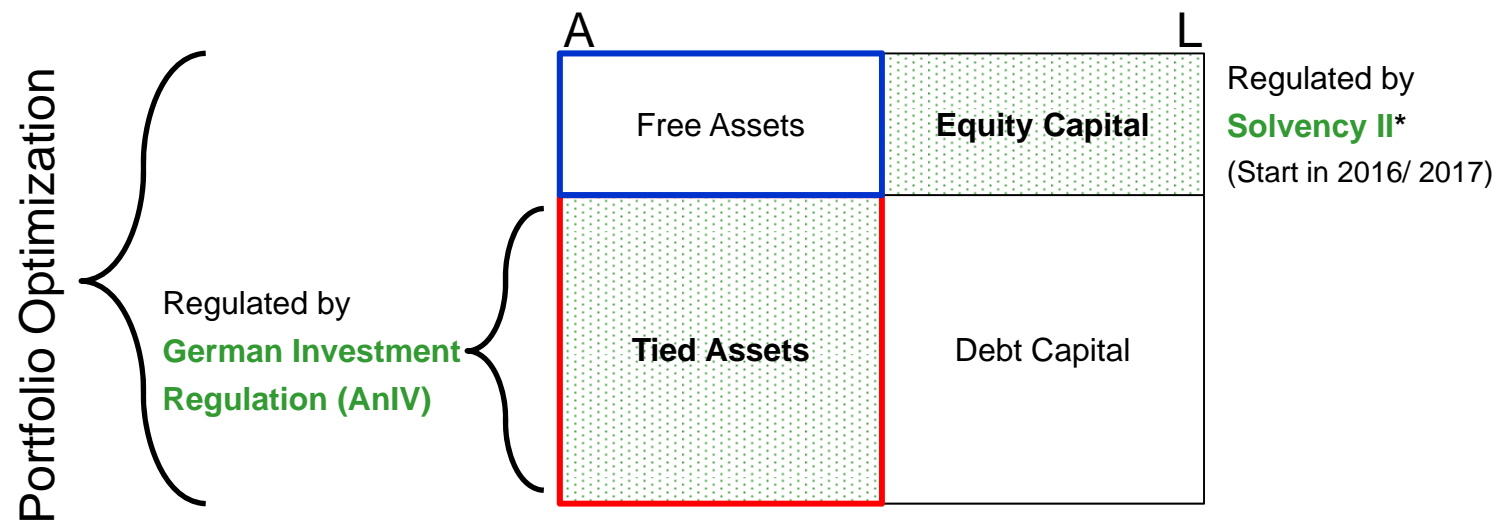
Six asset classes

- Discrete returns for 20-year period from 01/1993 until 12/2012

Stocks	▪ Mixture Index derived from country indices of Germany, France, Italy, and Spain (weights according to cumulated market capitalization)
Government Bonds	▪ German Stock Exchange REX Performance Index (REXP)
Corporate Bonds	▪ Lehman Brothers U.S. Corporate High Yield Index (until 1999)/ FTSE Euro Corporate Bond Index
Real Estate	▪ Real Estate “Grundbesitz” Europa Fund (adjusted for dividends)
Alternatives	▪ HFRI Fund Weighted Composite Index
Money Market	▪ 1-month FIBOR/ EURIBOR



Exemplary Balance Sheet of an Insurance Company

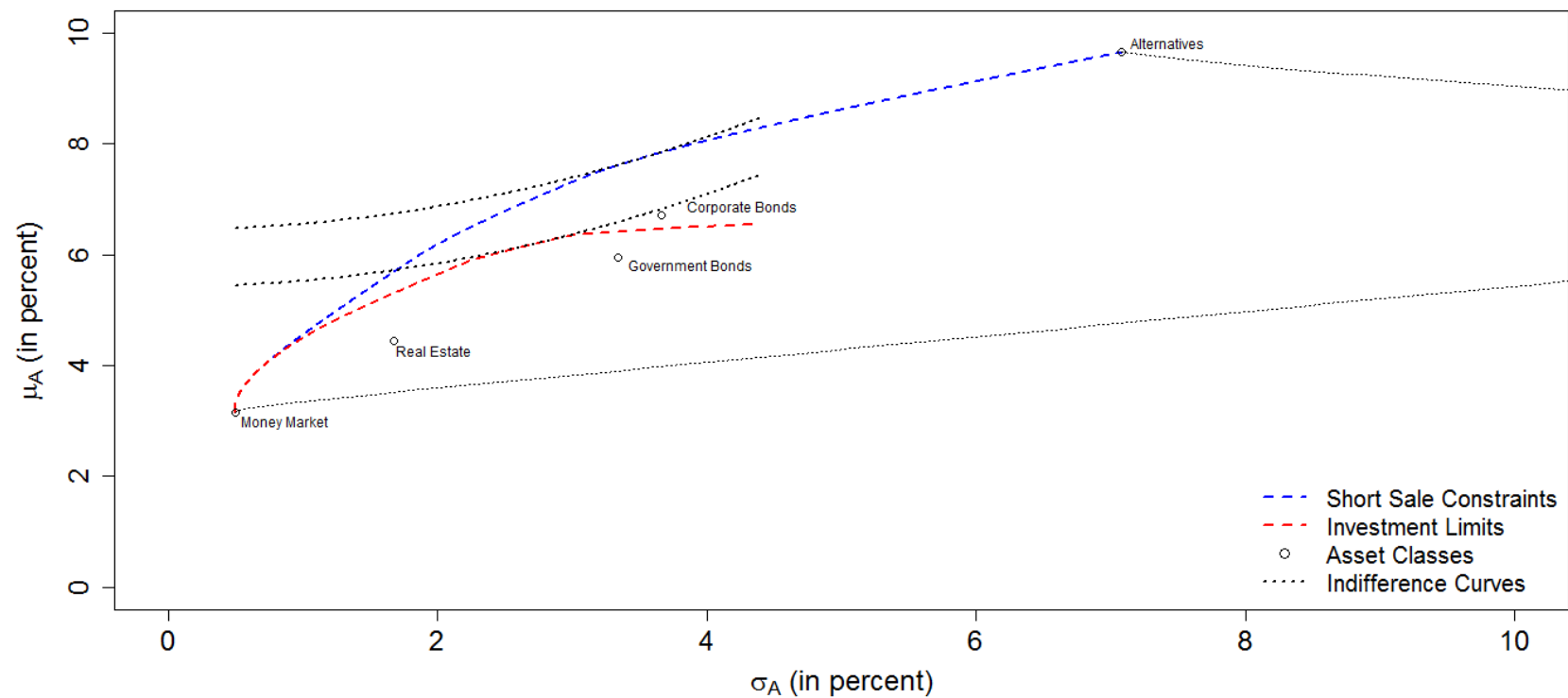


*Capital Requirements of Solvency II

- Standard formula
- Internal model

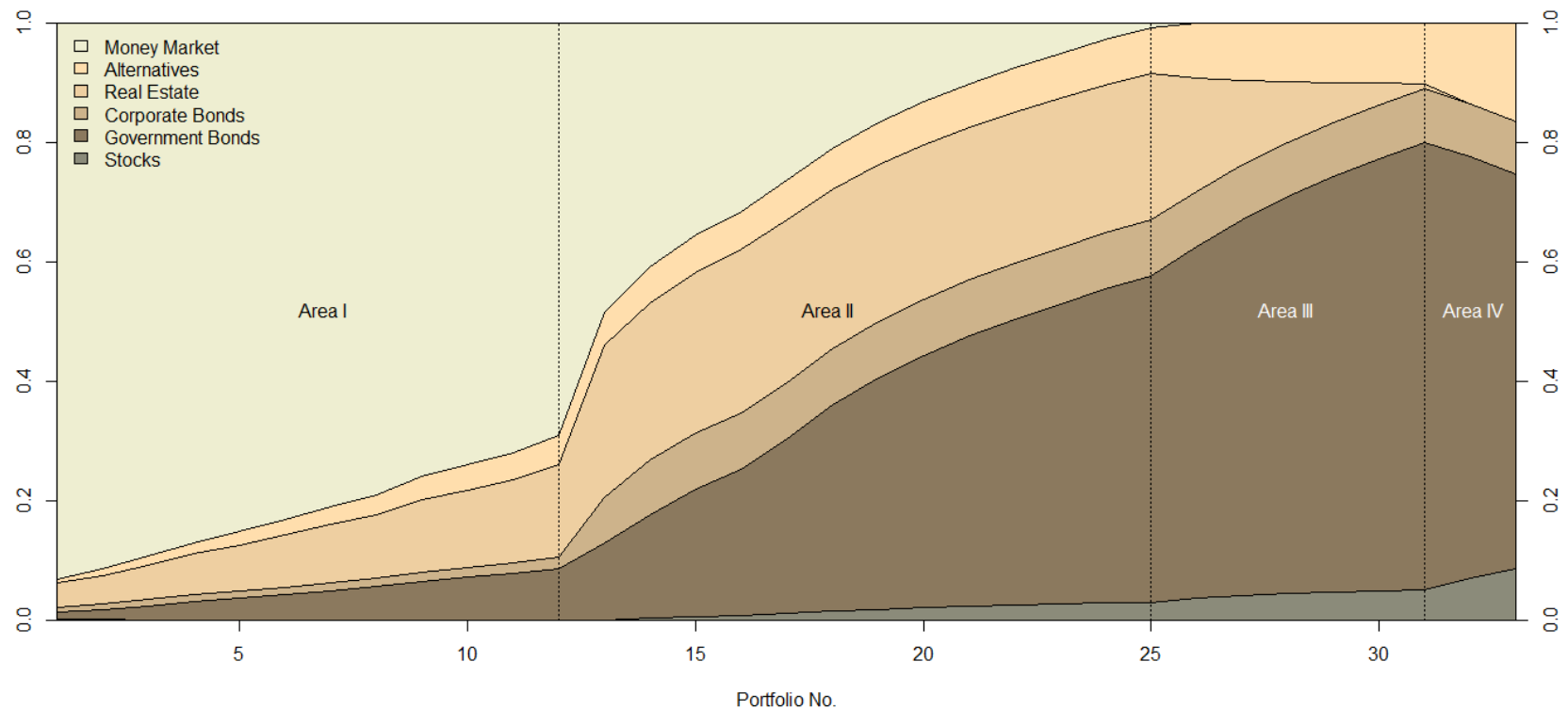


Results (1/5) – Efficient Frontiers in a mu-sigma-Space






Results (2/5) – Portfolio Compositions





Solvency II Standard Approach and Outline of Internal Model

Solvency II Standard Formula

- Simple Δ -NAV approach based on capital market shocks
 - Preset stress factors and correlation values
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- The standard approach does not capture the typical performance characteristics of different investments
 - Stress factor is mainly driven by the asset volatilities

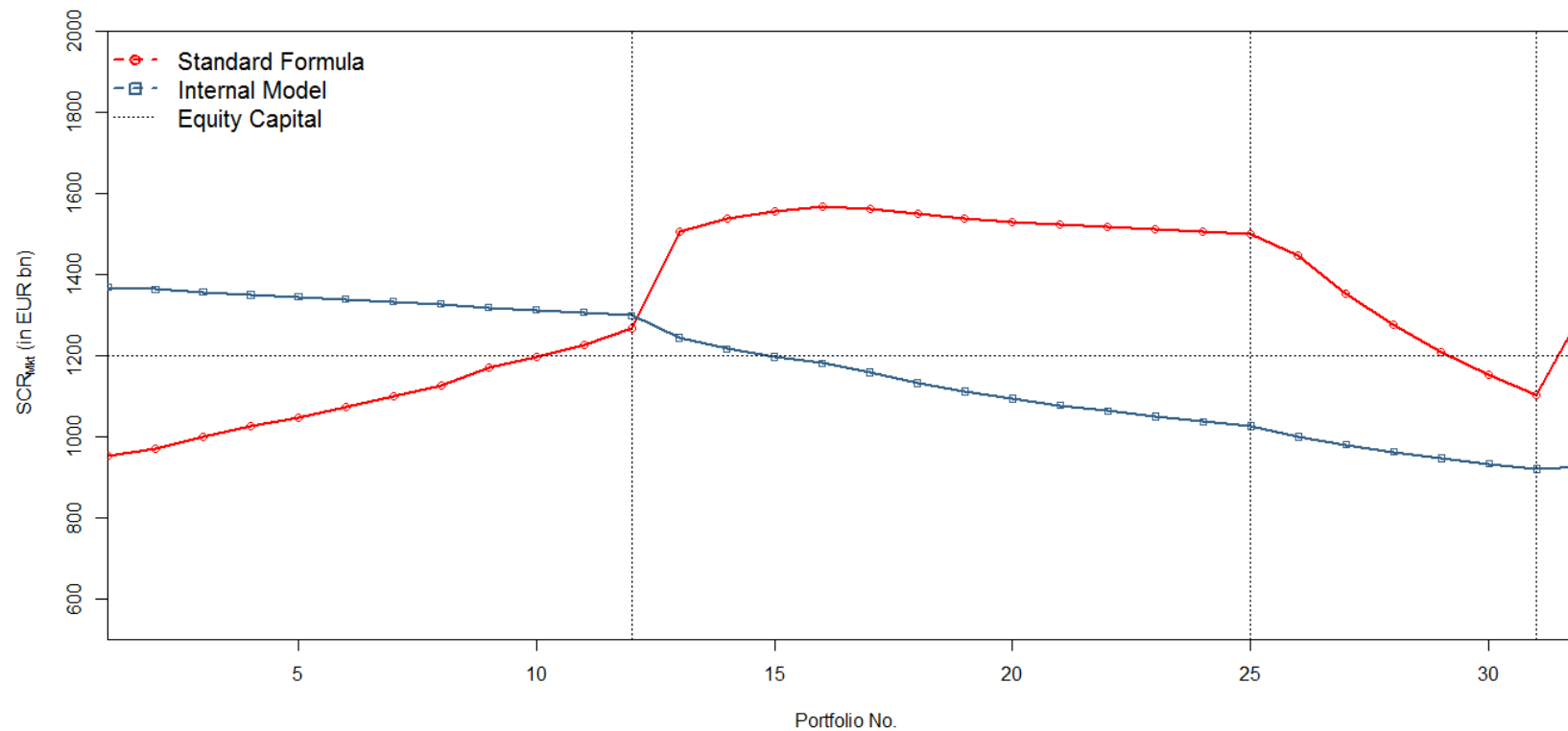
Main concern: Inappropriate capital charges may cause an underrepresentation of asset classes that could be well-suited for portfolio optimization/ diversification!

Internal Model for Market Risk

- Assets and liabilities are stochastically determined (Asset-Liability-Approach)
- Structural model, mu-sigma-approach, flexible calibration with return time series
- Easy to implement due to normally distributed asset returns and liability growth rate



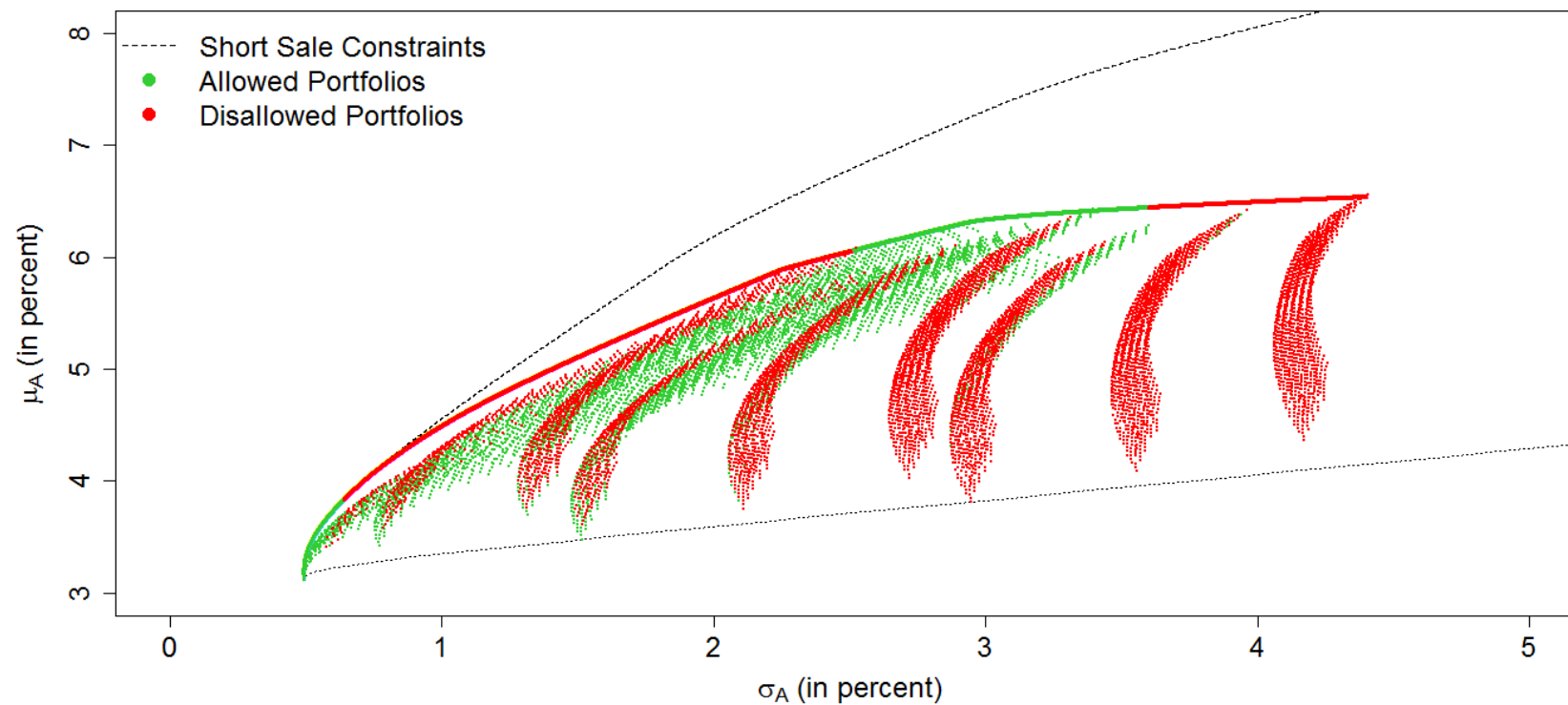
Results (3/5) – Capital Requirements for Individual Portfolios





Results (4/5) – Admissibility of Inefficient Portfolios

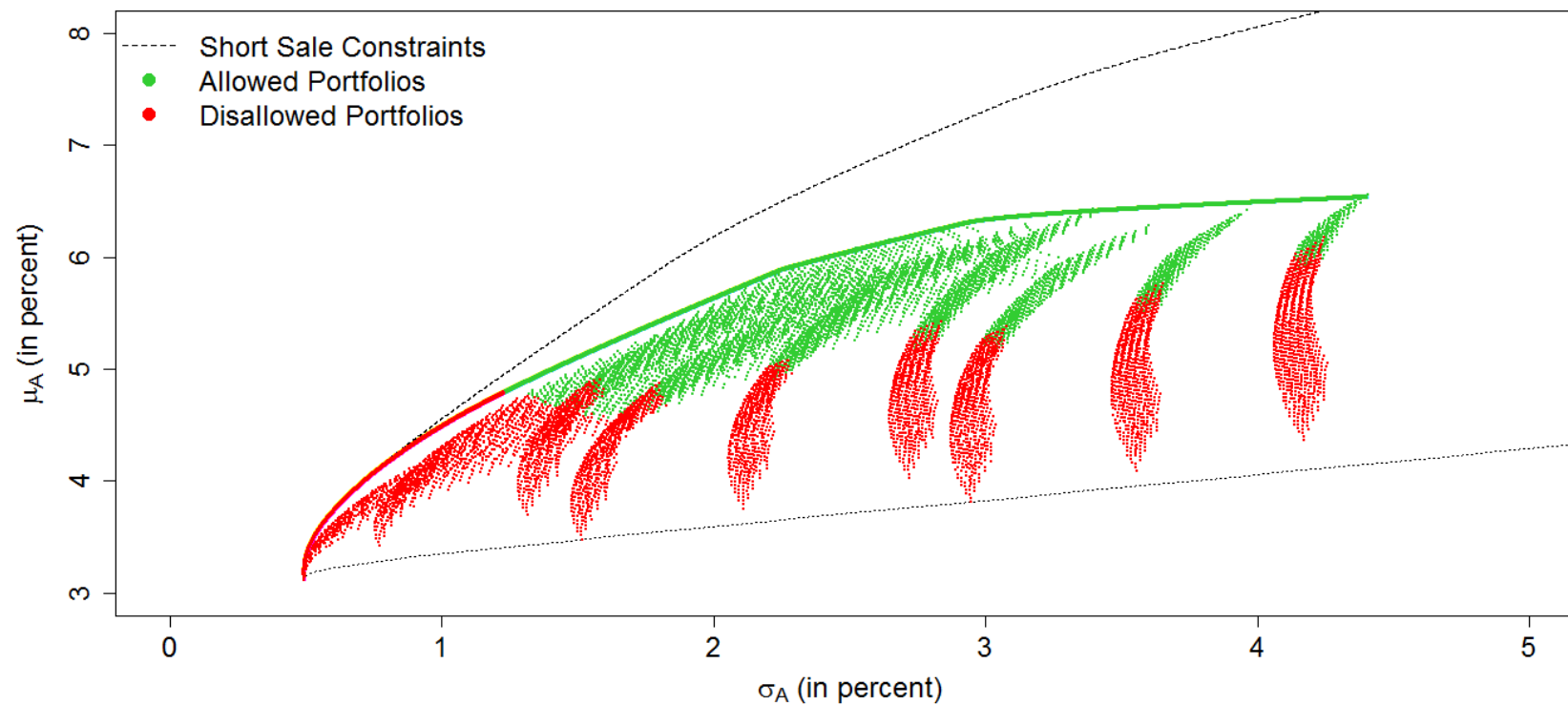
Solvency II Standard Approach





Results (5/5) – Admissibility of Inefficient Portfolios


Internal Model





Summary

Initial Research Question

- What are the influences of the market risk module of the Solvency II standard approach on the asset allocation of an insurer?
 - Can the detected influences be economically justified?
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- 
- Market risk module of the Solvency II standard approach is economically inconsistent
 - Since a majority of European insurers may apply the standard approach, substantial impacts (demand and pricing of asset classes on the financial market) can be expected



Thank you very much for your attention!