



# Impact of Management actions in Life insurance

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# About the speaker



- **Estelle GERONDEAU**
- Actuarial Consultant
- 24 years old, savings and health contracts expertise, modeling



- **ACTUARIS**
- Health
- Savings and pensions
- Property and casualty insurance
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# Context



- ❖ Projection of the « ALM Model » : need to choose model assumptions
  - ❖ The assumptions depend on the insurers
  - ❖ Possibility of using regulatory measures
- Affect the results that are communicated to financial analysts



# Summary



1. **Initial portfolios** p.5
  
2. **Impact of the measures put in place by the EIOPA** p.7
  - *Transitional measure on the « Equity risk »*
  - *Transitional measure on « Technical Provisions »*
  
3. **Impact of model assumptions** p.12
  - *Dynamic surrenders' laws*
  - *The choice of the algorithm used to determine the future revalorization*
  - *The rules of realization of unrealized gains/losses*
  
4. **Impact of the target asset allocation** p.23
  - *Change of the initial allocation of the assets*



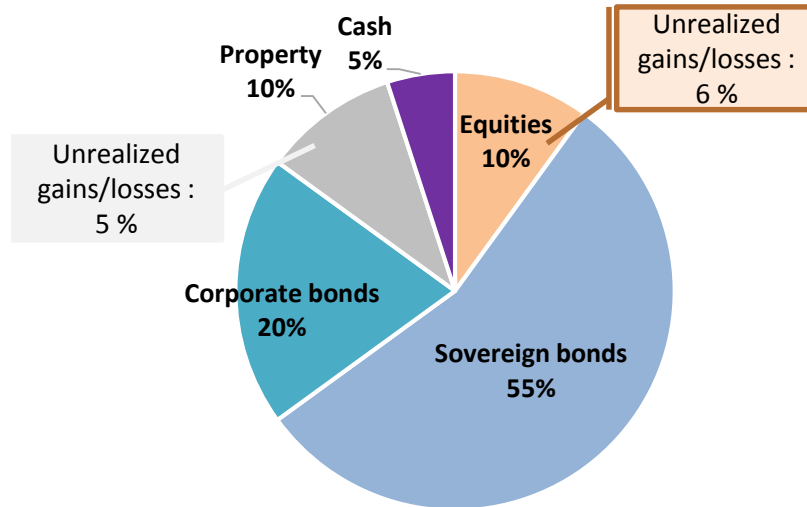
# 1. Initial portfolios



✓ **Liabilities** : Savings contracts

Age	Mathematical Provisions	Minimum Rate Guarantee	Management Fee Rate
40 years old	875 M €	0,60 %	0,40 %
60 years old	655 M €	1,50 %	0,40 %
70 years old	10 M €	4,00 %	0,40 %

✓ **Assets** :



ASSET	LIABILITY
Market Value of assets : <b>2 000 M€</b>	Owens Funds : <b>225,7 M€</b>
	Deferred taxes : <b>20 M€</b>
	<b>BE : 1 732 M€</b>
	Risk Margin : <b>22 M€</b>

❖ Stochastic context in january 2016, the 1<sup>st</sup> → Solvency II ratio: 191 %

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# 2. Impact of the measures put in place by the EIOPA

## 2.1 Introduction



- ❖ These transitional measures are necessary for insurers who do not cover the capital requirements under Solvency II.
  
- ❖ Reduction of financial impacts due to the change of the guidelines
  
- ❖ Various types of measures :
  - Reduction of technical provisions
  - Reduction of the capital requirement



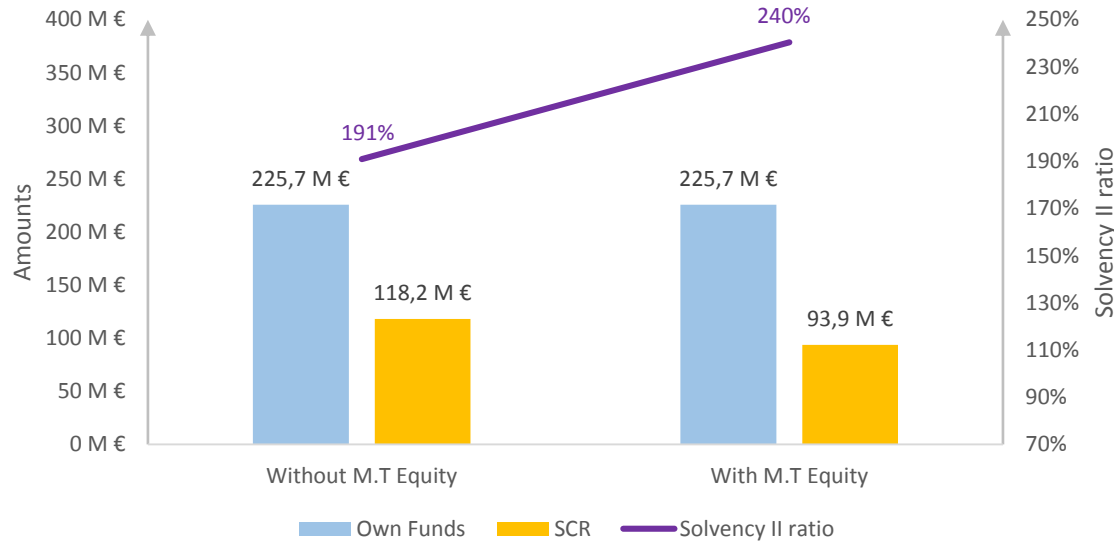
# 2. Impact of the measures put in place by the EIOPA

## 2.2 Transitional measure on the « Equity risk »



### ❖ Reduced shock on equities of type 1 and type 2

$$Equity\ shock_{Year\ n} = \left(1 - \frac{n}{7}\right) * 22\% + \frac{n}{7} * \left(\begin{matrix} 39\% \\ 49\% \end{matrix} + Dampener\right)$$



### ❖ Solvency II ratio : + 25 %

Reminder : Proportion of equities in the portfolio : 10 %



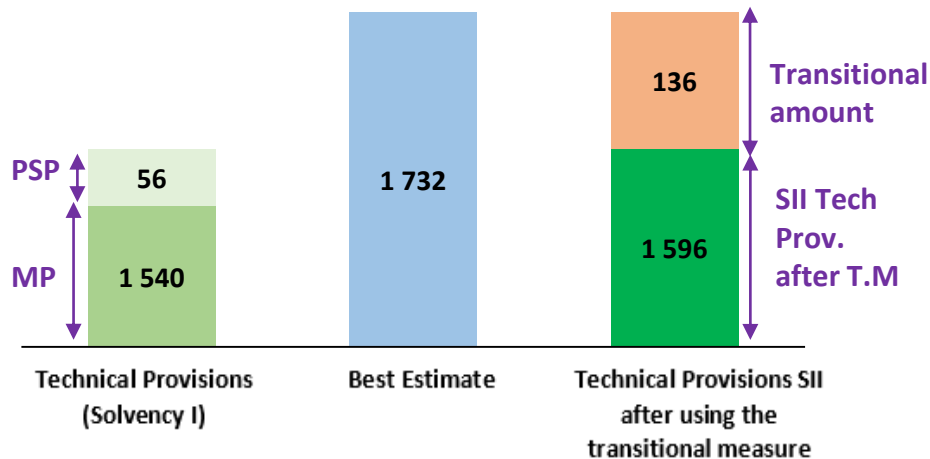
# 2. Impact of the measures put in place by the EIOPA

## 2.3 Transitional measure on « Technical Provisions »



❖ Aims at reducing the gap between technical provisions under Solvency I and Solvency II

$$\text{SII Ratio}_{\text{Year } n} = \frac{\left(\frac{2032 - n}{16}\right) * \text{Transitional amount} + \text{Eligible own funds}}{\text{SCR}}$$



Balance sheet Solvency II using the transitional measure on "Technical Provisions"

ASSET	LIABILITY
Market Value of assets : 2 000 M€	Owns Funds: 225,7 M€
	<b>Transitional amount : 136 M€</b>
	Deferred taxes: 20 M€
	Technical Provisions Solvency II : 1 596 M€
	Risk Margin : 22 M€

❖ SII Ratio : + 60 %.



# 2. Impact of the measures put in place by the EIOPA

## 2.4 Limits



- ❖ These measures are temporary by nature
- ❖ Relative difference of the impact between the two types of measures in different countries
- ❖ Their effects shrink over time
- ❖ Prior agreement of the regulator

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# 3. Impact of model assumptions

## 3.1 Introduction



❖ Model assumptions are necessary when projecting the company's activity

❖ Issues :

- Simulate the insurance company's situation as much as possible
- But this can change the economic results

❖ Examples of model assumptions :

- Modeling of dynamic surrenders
- Modeling the profit sharing
- Realization of unrealized gains/losses

# 3. Impact of model assumptions

## 3.2 Dynamic surrenders



❖ Two types of surrenders :

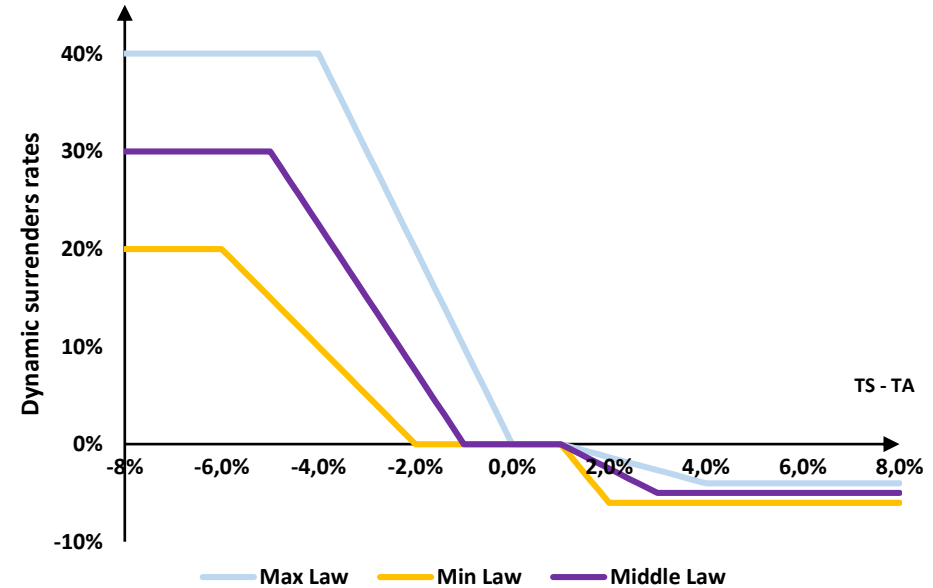
- Structural surrenders
- Dynamic surrenders

❖ Dynamic surrenders are difficult to quantify

❖ Dynamic surrenders laws, advocated by the French regulator, depends on the rate credited to policyholders (TS) and the rate expected by policyholders

$$TA = \max(90\% \text{ Interest rate}_{n-1}, TME_n)$$

*TME = average 10 year government bond yield observed in the market*



# 3. Impact of model assumptions

## 3.2 Dynamic surrenders

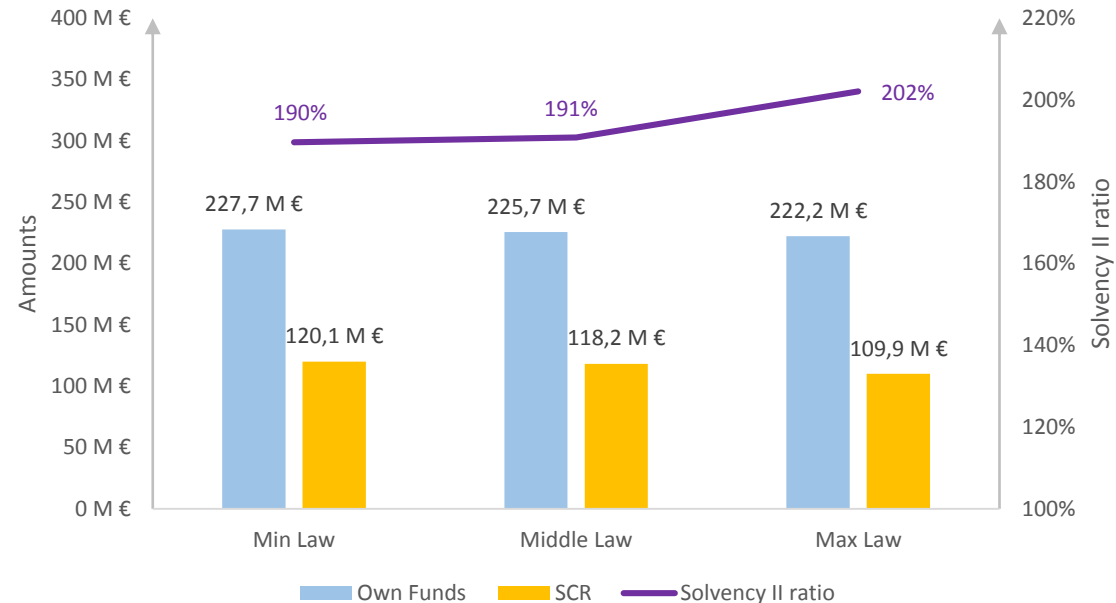


❖ Impacts of dynamic surrenders law on economic indicators

❖ The laws advocated by the French regulator and studied in the paper are :

- The minimum law
- The middle law
- The maximum law

❖ Solvency II ratio increases by 12 percentage point with the maximum law.



# 3. Impact of model assumptions

## 3.2 Dynamic surrenders



❖ The decline of the underwriting risk has a double effect

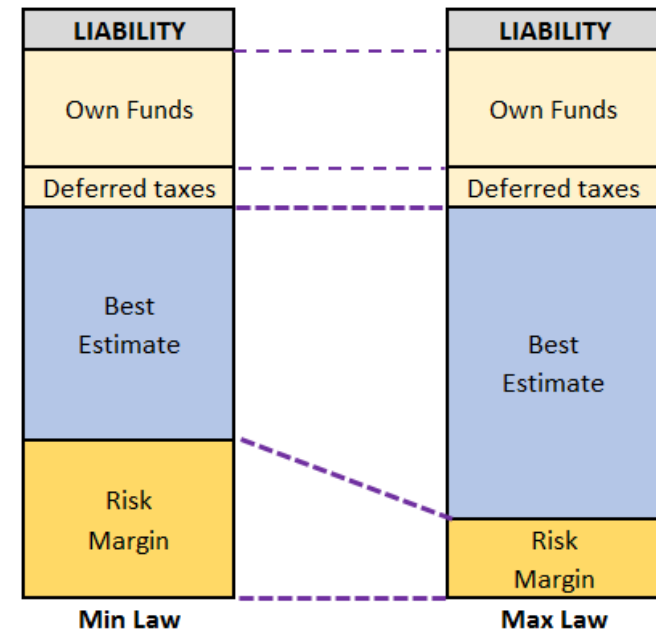
on the Solvency II ratio ( $= \frac{\text{Own funds}}{\text{SCR}}$ ):

- In the denominator : decline of the global SCR
- In the numerator : decline of the risk margin

$$\text{Risk margin} = \text{CoC} * \text{Duration}_{\text{liabilities}} * \text{SCR}_{RU}$$

❖ Increase of the solvency II ratio :

Own funds	SCR	SII ratio
≈	↘↘	↗



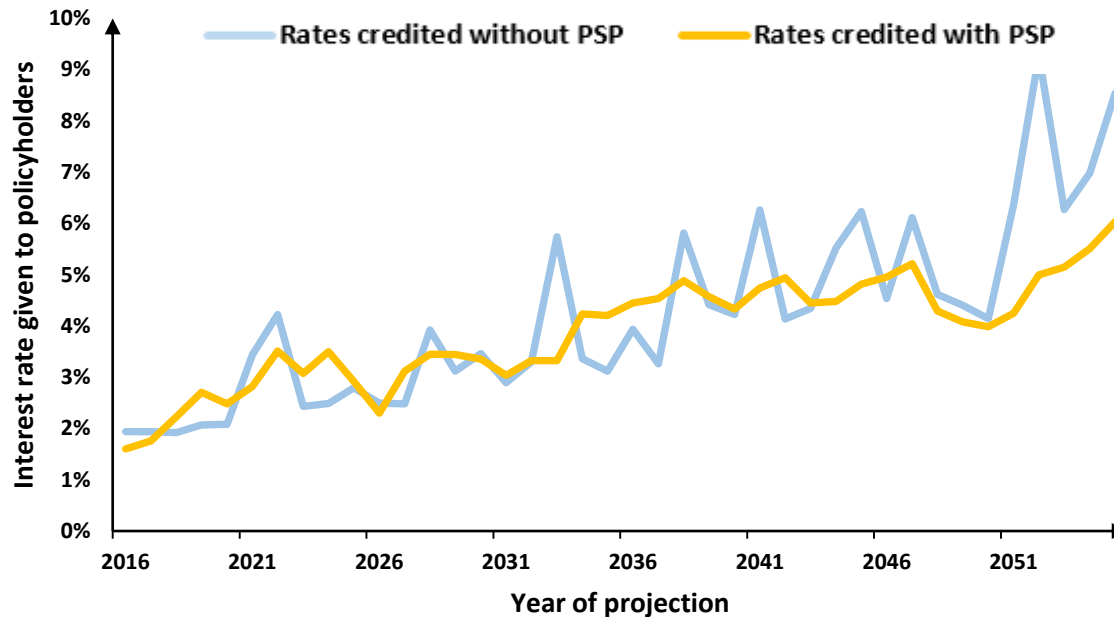
# 3. Impact of model assumptions

## 3.3 Profit Sharing Provision



❖ Profit sharing =  
 $(85 \% \text{ financial result} + 90 \% \text{ technical result}) - \text{Technical Interests}$

❖ Possibility of keeping a part of the profit sharing in a provision : PSP



# 3. Impact of model assumptions

## 3.3 Profit Sharing Provision



❖ PSP : Time constraint and threshold

❖ Issues of the threshold:

- Can neutralize the PSP in stochastic scenarios
- Modify the rates credited to policyholders

❖ Which threshold has to be chosen ?

❖ Test of two thresholds = 4 % of the MP VS 25 % of the MP

# 3. Impact of model assumptions

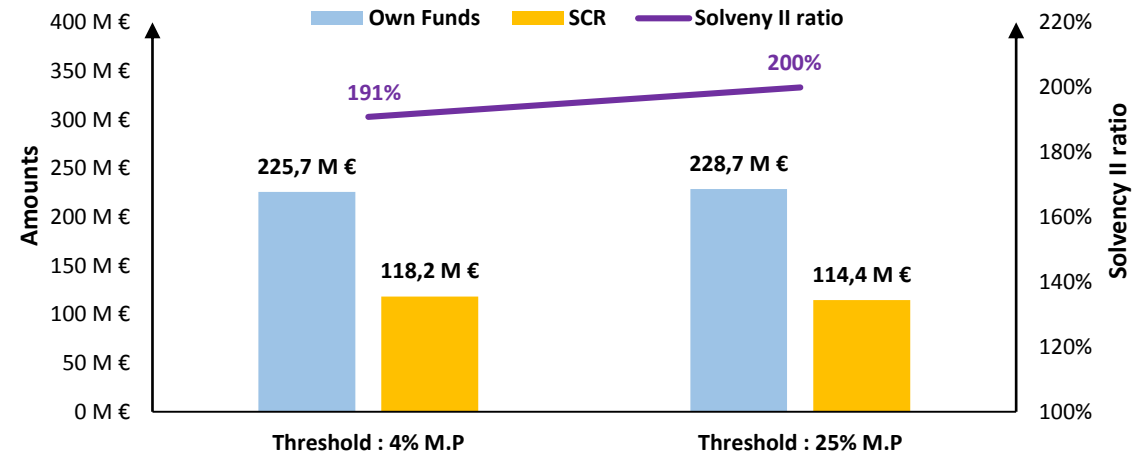
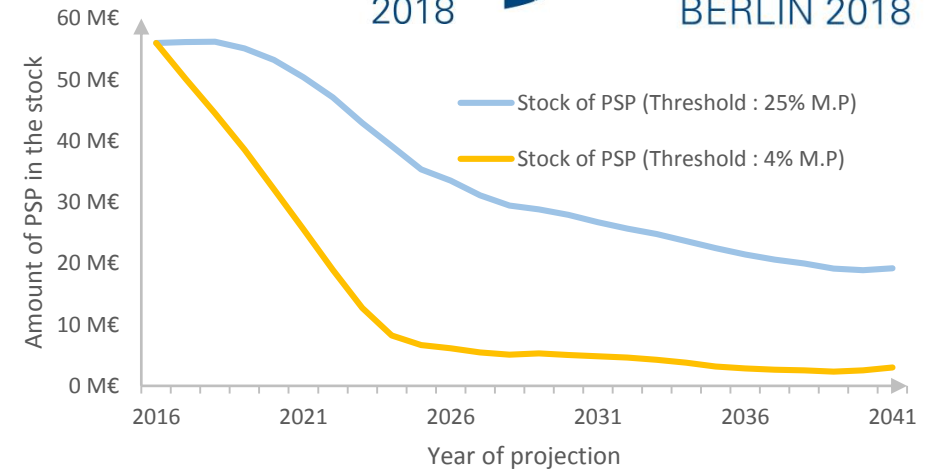
## 3.3 Profit Sharing Provision

### ❖ Increase in the PSP's threshold :

- Pay an interest rate closer to the target
- Keep a 'safety cushion' in order to increase the profit sharing when it's initially lower than the target

### ❖ Decrease of the TVFOGs

### ❖ Increase of the Solvency II ratio



# 3. Impact of model assumptions

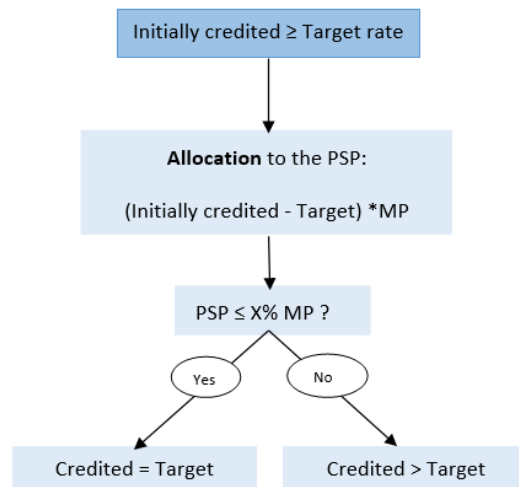
## 3.4 Realization of unrealized gains/losses



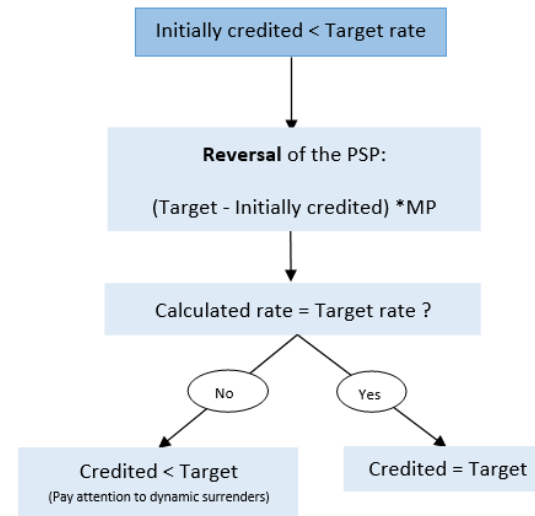
❖ Realization of unrealized gains/losses on equity assets

❖ Issues : Modify the financial results and *specifically*, the rates credited to policyholders

### CASE 1



### CASE 2



# 3. Impact of model assumptions

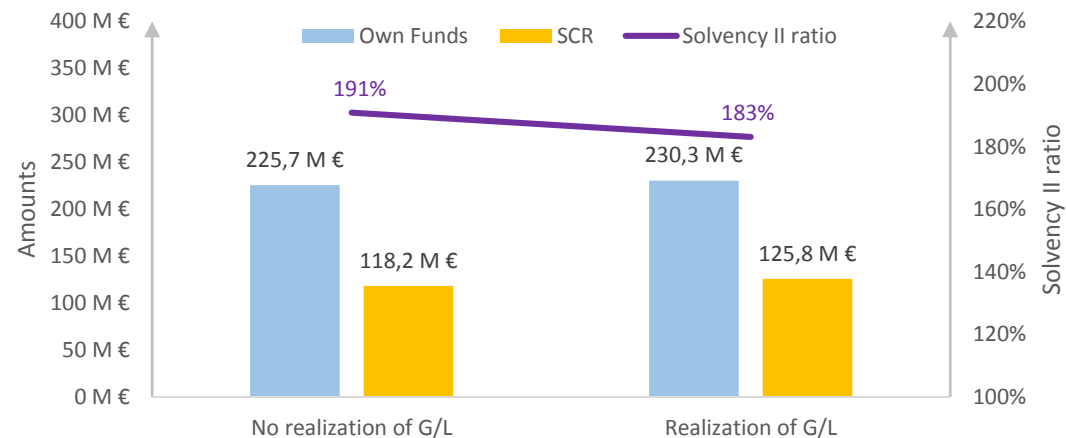
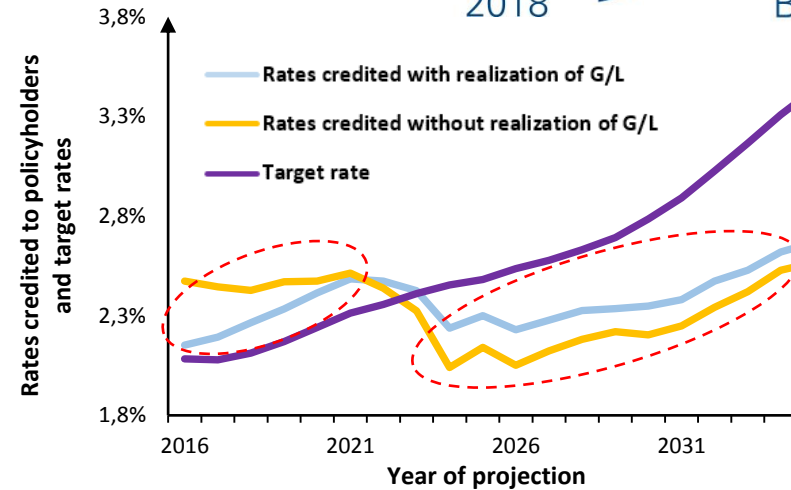
## 3.4 Realization of unrealized gains/losses



❖ Rates credited to policyholders are closer to the target

❖ Decrease of TVFOGs ...

❖ ... But the loss-absorbing capacity of the technical provisions is penalized



# 3. Impact of model assumptions

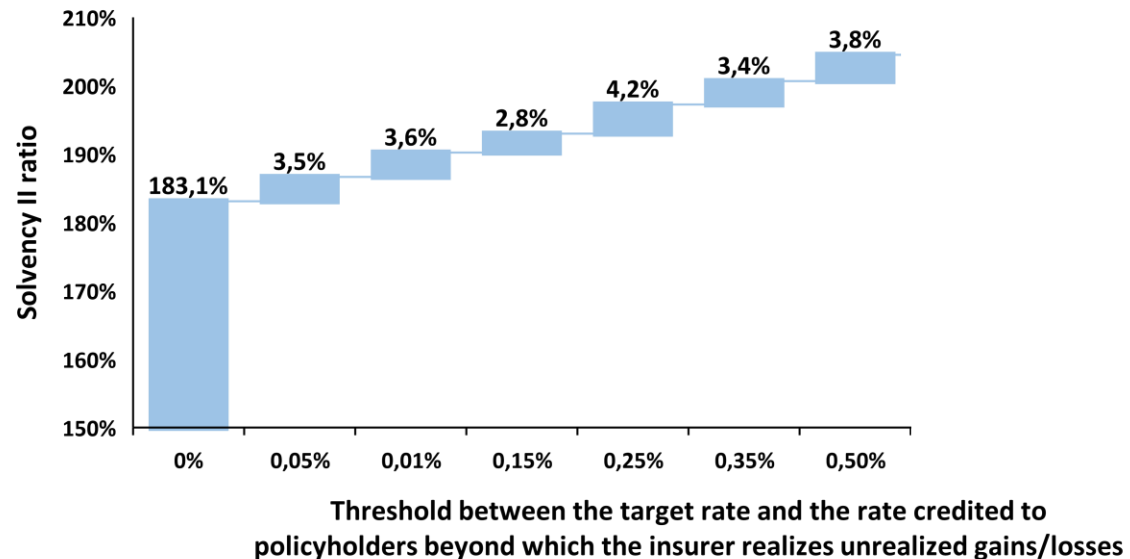
## 3.4 Realization of unrealized gains/losses



### ❖ Choice between :

- Avoiding dynamic surrenders but decreasing the Solvency II ratio
- Do not use the algorithm but enduring an important number of surrenders

### ❖ Implementation of another algorithm : Realize unrealized gains only when dynamic surrender are too important.



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# 3. Impact of the target asset allocation

## Modification in the target asset allocation

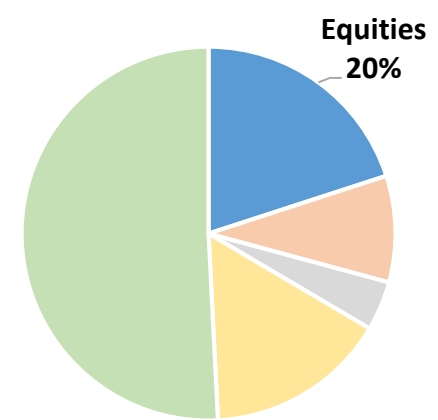
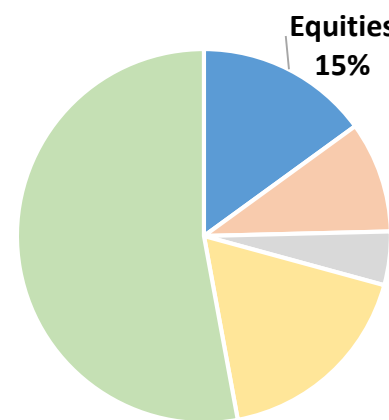
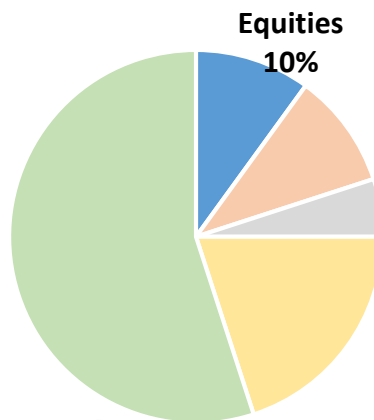
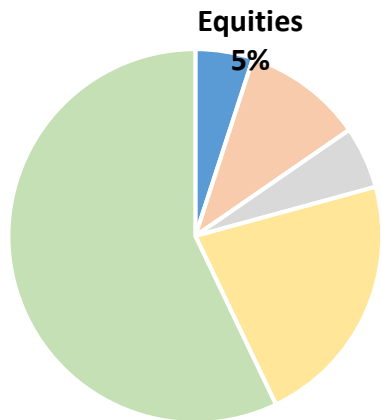


❖ Possibility of investing in several asset classes with different characteristics.

❖ Issues : modify the financial results

❖ Study of 4 equities' allocations

- Equities
- Property
- Cash
- Sovereign bonds
- Corporate bonds



# 3. Impact of the target asset allocation

## Modification in the target asset allocation



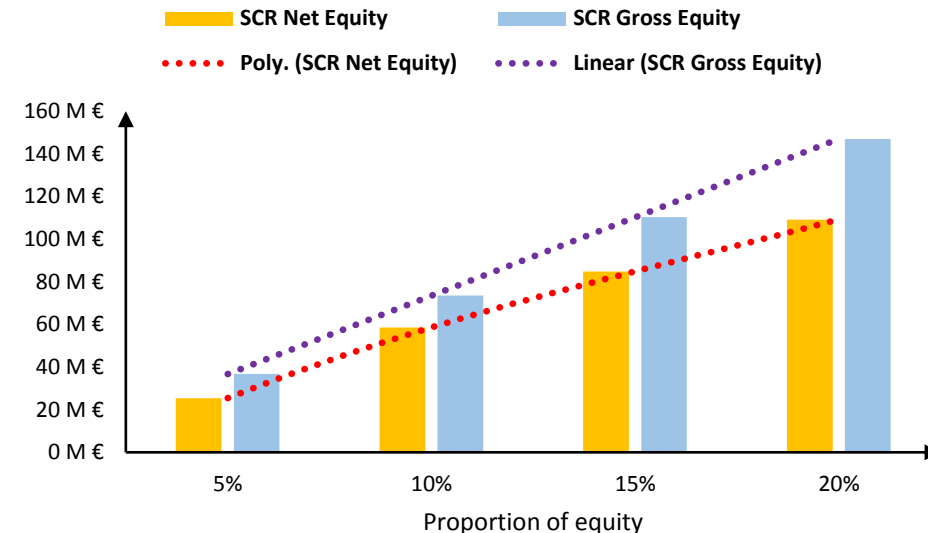
❖ TVFOGs increase proportionally with the level of equities in the portfolio

	Initial allocation n°1	Benchmark allocation	Initial allocation n°3	Initial allocation n°4
BEL	- 1,35 %	-	1,09 %	3,46 %
FDB	- 10,56 %	-	8,11 %	28,62 %

❖ Risks related to the equities' volatility

❖ Function of SCR Equity Gross linear

❖ Function of SCR Equity Net concave

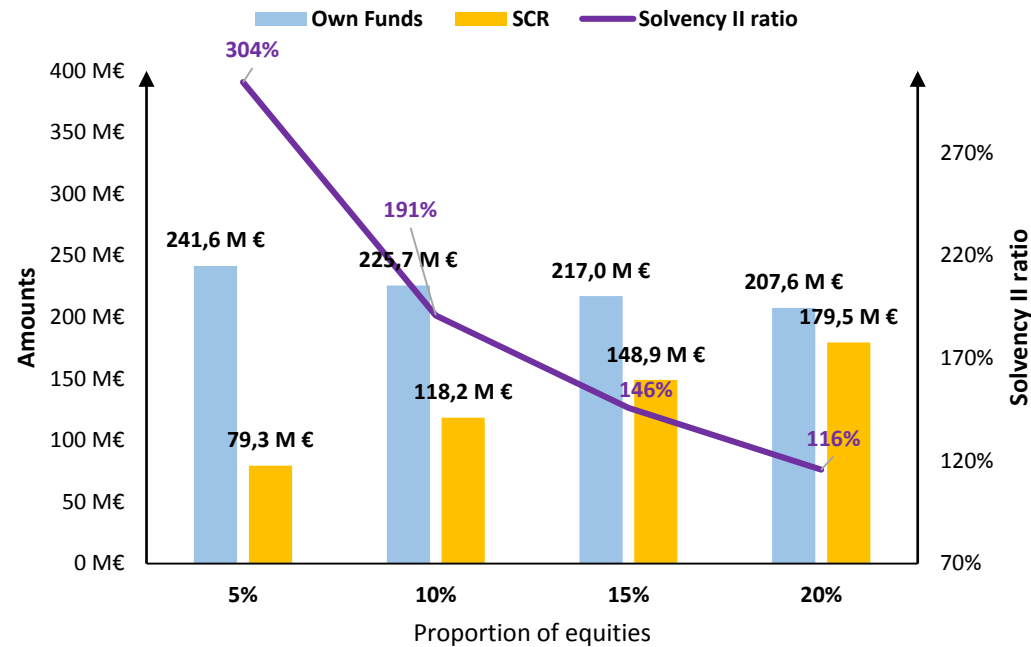


# 3. Impact of the target asset allocation

## Modification in the target asset allocation



- ❖ Solvency II ratio increases when the equity proportion in the portfolio decreases



- ❖ Limits : Market returns can be insufficient?

- ❖ Optimize the risk-return combinations

# Comparison



Choice of the management rules	Impact on the Solvency II ratio
Transitional measure « Actions »	++
Transitional measure on « Technical provisions »	++
Dynamic surrenders : Maximum law/Minimum law	+
PSP's threshold	+
Realization of unrealized gains/losses	-
Realization of unrealized gains/losses only when the gap between the target rate and the one initially credited to policyholders is too important	+

- ❖ Impact can be non-intuitive
- ❖ Strong interactions between assets and liabilities
- ❖ Sensibility of the Solvency II ratio

# Limits of the study



## ❖ Other management rules could have been studied as:

- ❖ A more sophisticated implementation of the target rate
- ❖ The target profit sharing rate
- ❖ The transfer of a portion of the portfolio
- ❖ The establishment of a reinsurance program
- ❖ The use of the Volatility Adjustment
- ❖ Etc.

## ❖ Other indicators could have been studied: MCEV, etc...

## ❖ Results are meaningful for initial portfolios presented in these slides

## ❖ The choice of the hypothesis has to be as fair as possible

**Thank you very much for your attention!**

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