

SAV Mitgliederversammlung  
30. August 2019



# Impacts of Taxes on the Solvency Ratio

**Fabian Uffer**

Head of Group Financial Modelling and Risk Analysis  
SCOR

## Disclaimer

---

Any views and opinions expressed in this presentation or any material distributed in conjunction with it solely reflect the views of the authors and nothing herein is intended to, or should be deemed, to reflect the views or opinions of the employer of the presenters.

The information, statements, opinions, documents or any other material which is made available to you during this presentation are without any warranty, express or implied, including, but not limited to, warranties of correctness, of completeness, of fitness for any particular purpose.

# Introduction to SCOR

## Profitability target

Normalized RoE of 9.4%<sup>1</sup> exceeds the 800 bps above 5-year risk-free rate target

## Solvency target

Estimated solvency of 215% in the upper part of the 185%-220% solvency range

€ 15.3 billion  
GWP in 2018



5th largest  
reinsurer

## Optimal diversification



**S&P Global**  
Ratings

**AA-**

Stable outlook

**FitchRatings**

**AA-**

Stable outlook



**aa-**

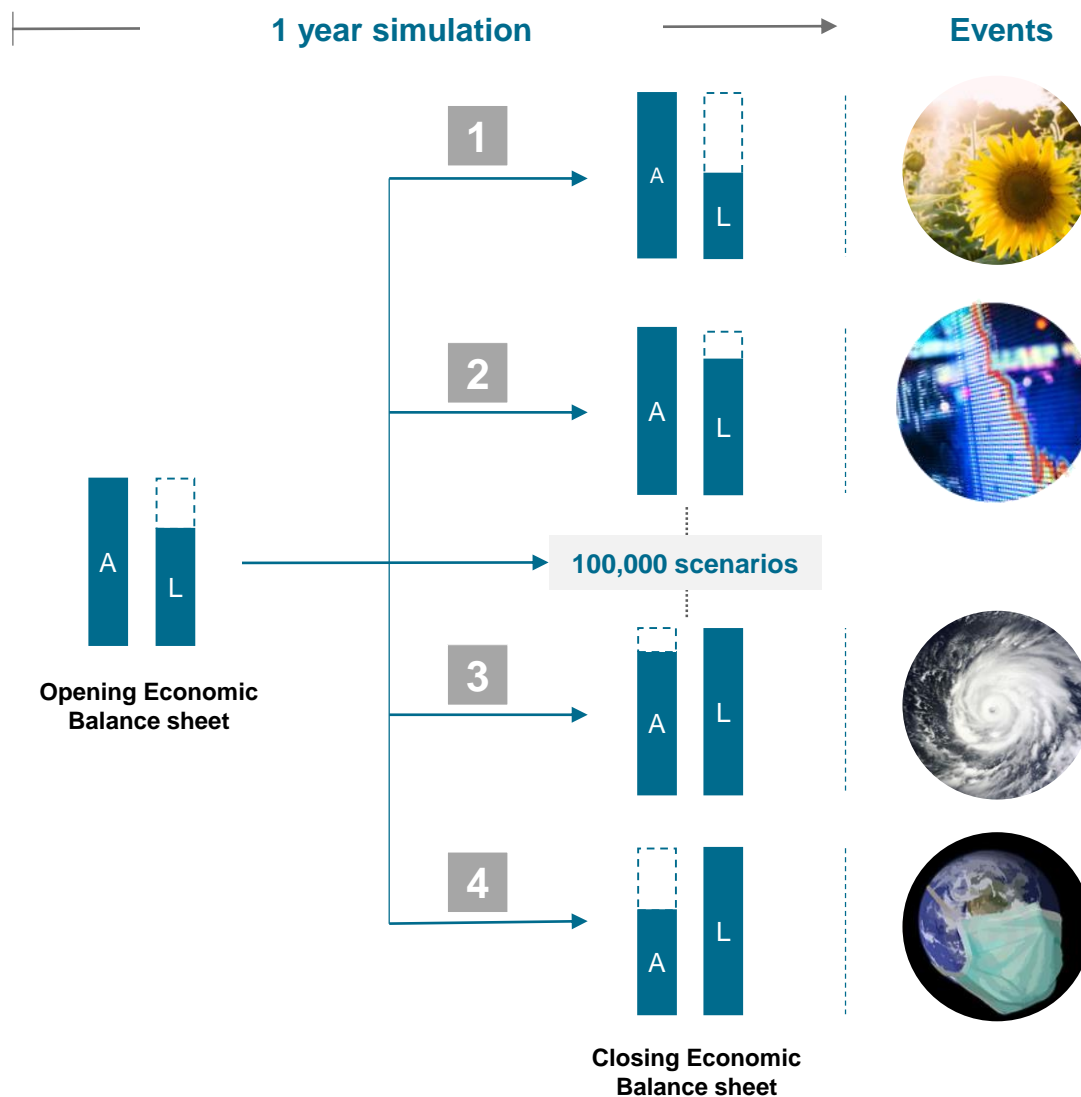
Stable outlook

**MOODY'S**

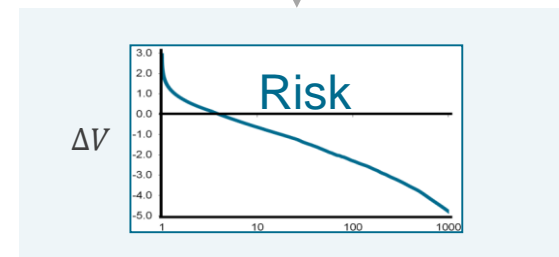
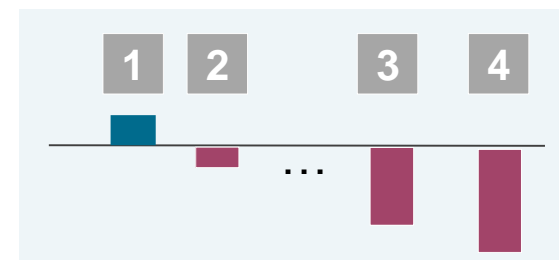
**Aa3**

Stable outlook

# “Classical” full stochastic Internal Model



## Change in economic value



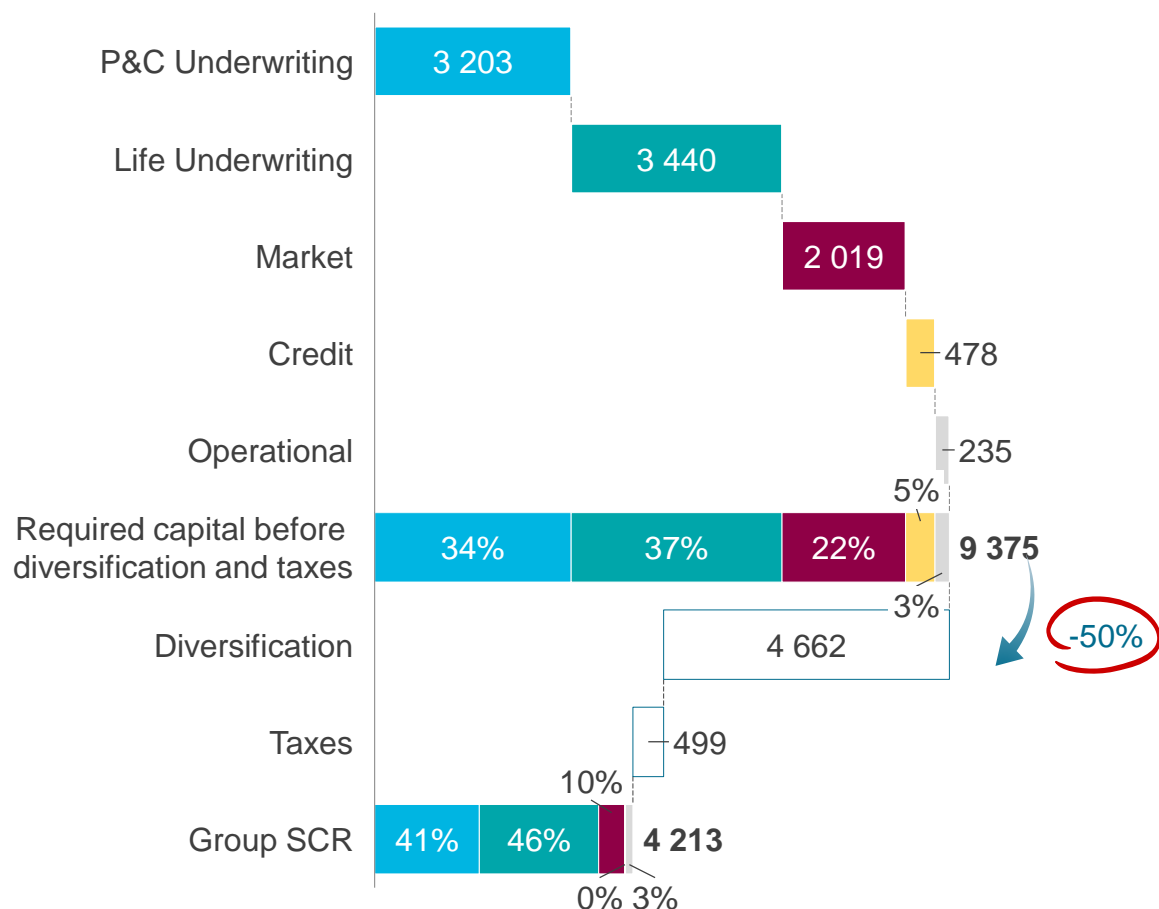
We assume that  $\Delta V$  is the pre-Tax change in economic value distribution and  $\Delta \hat{V}$  post-tax change in value distribution

What is the function  $f_{tax}$  that does the right transformation?

# Well-balanced portfolio continues to create strong diversification

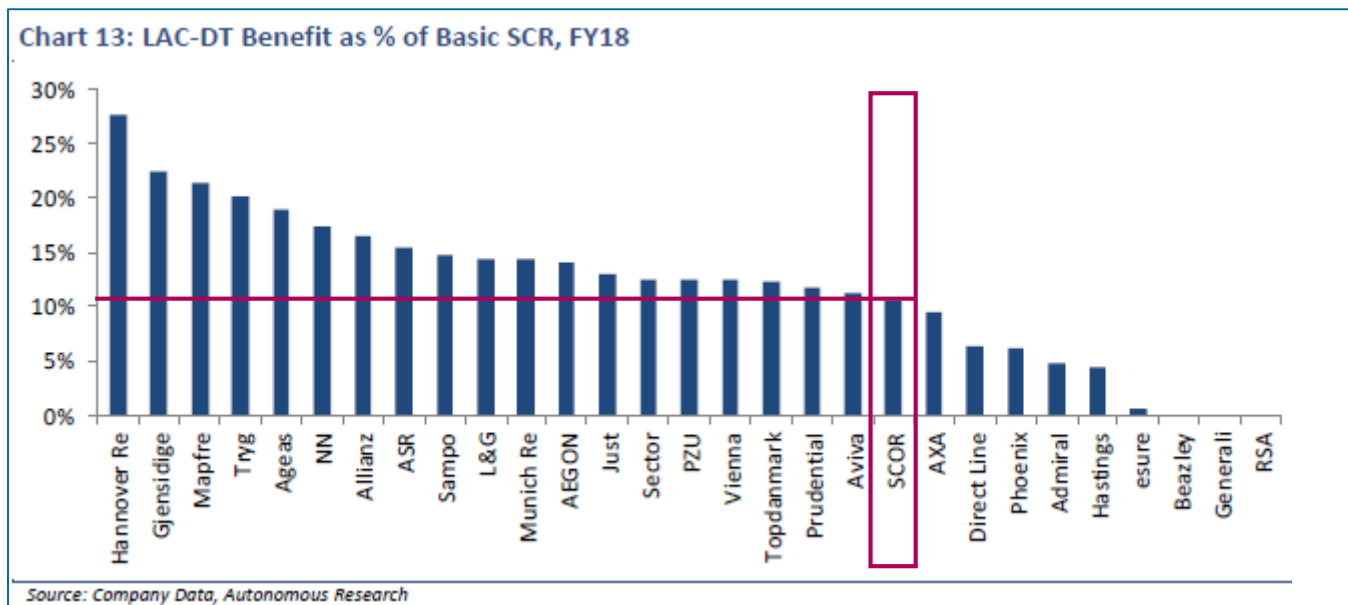
## YE 2018 risk capital breakdown by risk category

In € millions (rounded)



- Underwriting risks are stable year-on-year
- Market risk increase is driven by higher credit spread volatility and strengthening of USD
- Group diversification slightly improves, as increased market risk continues to diversify strongly

# Loss Absorbing Capacity of deferred Taxes in Solvency



- Companies publish under Solvency II a wide range of tax impacts of on their solvency capital requirement
- This is driven by four factors:
  - 1) Tax Law under which the companies operate
  - 2) Individual Risk Situation of the Companies
  - 3) Different Tax Models and the corresponding parameterizations
  - 4) Non convergence of supervisory practice

# Taxes is one of the key difference of capital requirements between SST and S2



- Overall solvency capital requirements are reducing from SST to Solvency 2 significantly.
- Taxes and the difference in risk measure are the most important drivers
- Other contains difference in operational risk, scenarios and other minor adjustments

●●●○○ CH 4G

21:37

72% 

< Messages

Fabian

Contact

Hi, I asked myself why is the SST a pre-tax framework? Any ideas?

Fabian, nice to hear from you we should go for Lunch. You know Tax modelling is complicated!

Sure, it's not easy, but we model extreme events for the SST actually even dependence structures between them, but not taxes? I mean it's an important economic reality, you can't steer a company pre-tax!

But that's different... I mean no one knows the the full distributions and their dependency structures so you can't be wrong. That's different with taxes, there is a tax law and you can be wrong. And anyway it's more conservative.

Not convincing... wrong choice of the SST? Let's see what people vote at the SAV Tagung in Luzern. 😊

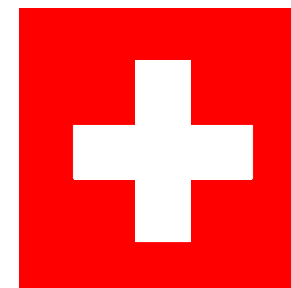


Text Message





# Voting Risk Measure: Who does a better job, the EU or Switzerland?



## Risk Measure

Taxes

Operational Risk

## Value at Risk

Yes

Yes

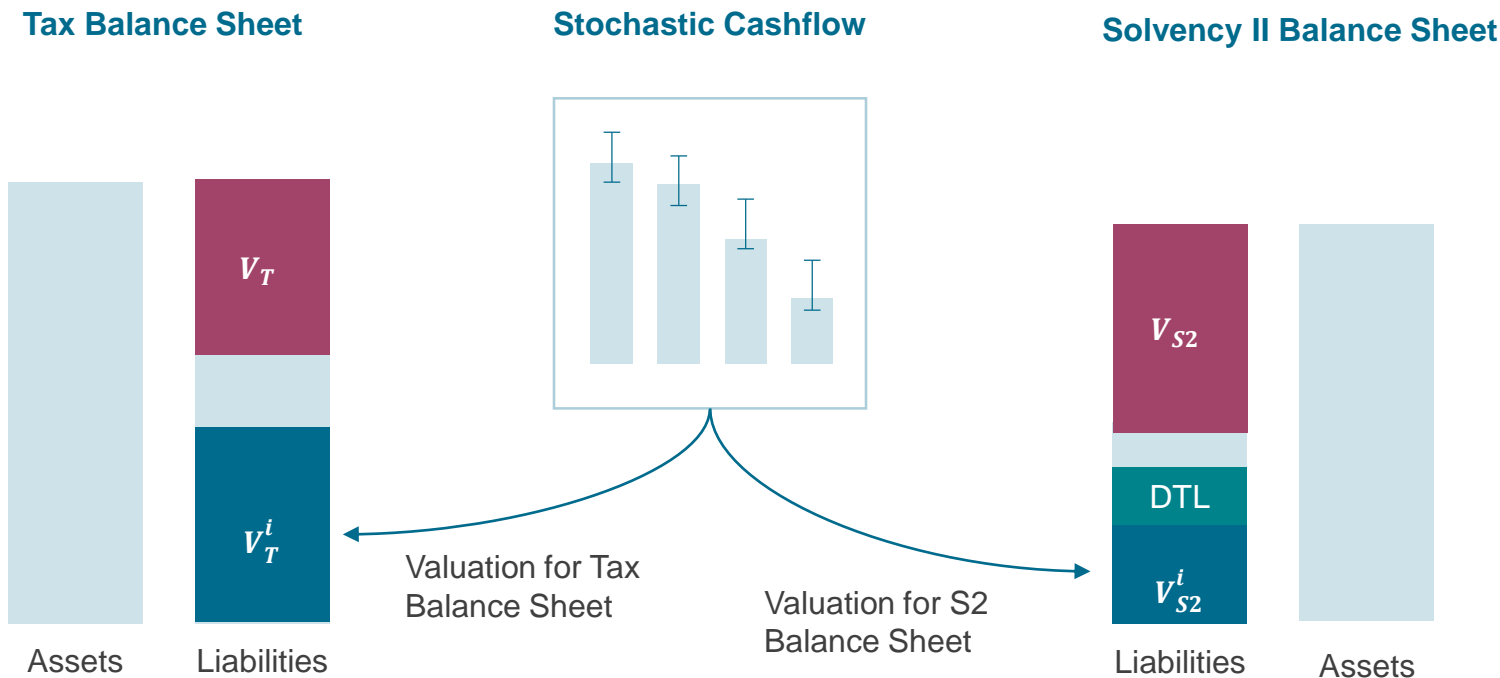
## Expected Shortfall

No

No

# What do we need to consider in a Tax Model?

## Difference in Valuation and profit earnings lead to DTL



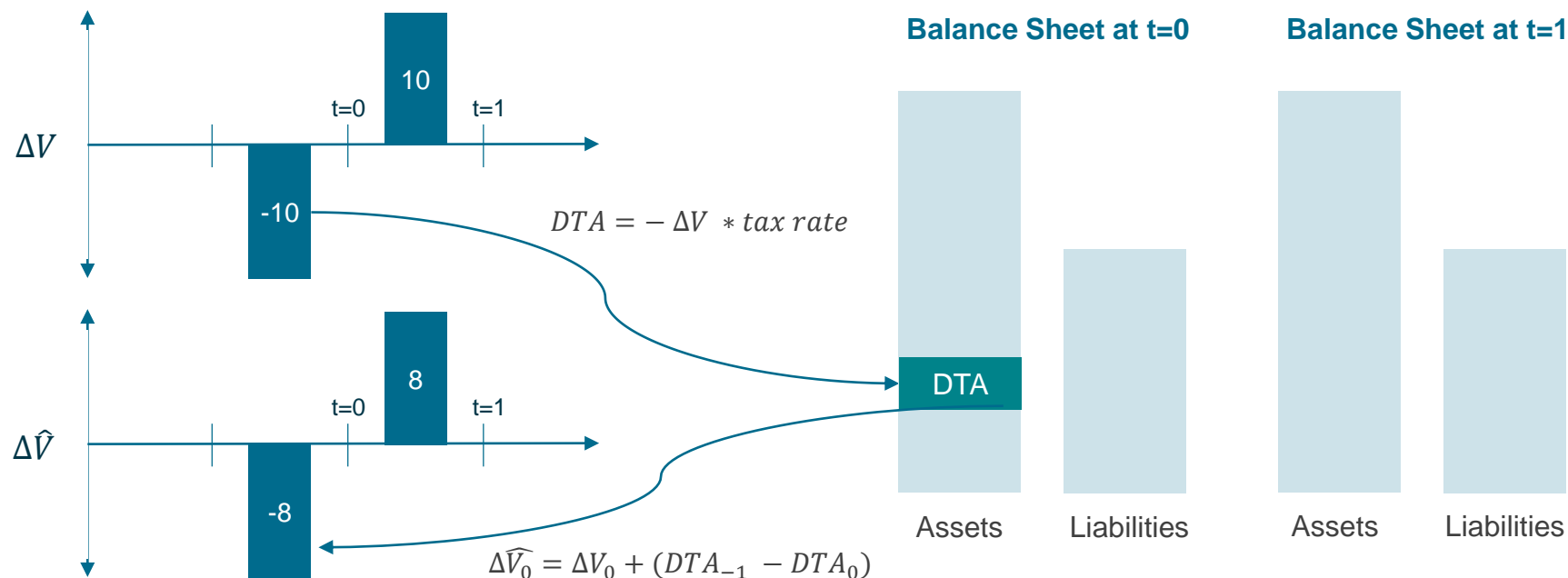
Timing difference in profit recognition in the different valuation schemes lead to a deferred tax liability (DTL)

$$DTL = \text{tax rate} * (V_{S2} - V_T)$$

This is usually used to calculate the Own Funds under Solvency 2. To incorporate this in a stochastic setting one needs to project not only the S2 balance sheet but also a tax balance sheet since the «state of the world» at  $t=1$  acts differently on the different balance sheets.

# What do we need to consider in a Tax Model?

## Tax losses can be used to offset taxable profits



If a company makes a loss in a financial year, it is entitled to use that loss in order to lower its taxable income in the following years. This “compensation” right has a value and needs to be reflected as a deferred tax asset (DTA) on the balance sheet.

This asset can be created depending on:

- when the loss occurred, e.g. certain tax jurisdiction limit the numbers of years that losses can be carried forward
- when there exist more likely than not future profits that can be used

# Example 1

# Deferred Tax Assets – Example 1

## Startup Company – Making Profits

	0	1	2	3	4	5
$\Delta V$		10	10	10		
$l_0$	0					
$l_1$	0					
$l_2$	0					
$DTA$	0					
$TP$						
$\Delta \hat{V}$						

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 1

## Startup Company – Making Profits

	0	1	2	3	4	5
$\Delta V$		10	10	10	10	
$l_1$	0	0				
$l_2$	0	0				
$l_3$	0	0				
$DTA$	0	0				
$TP$		2				
$\Delta \hat{V}$		8				

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 1

## Startup Company – Making Profits

	0	1	2	3	4	5
$\Delta V$		10	10	10	10	10
$l_1$	0	0	0			
$l_2$	0	0	0			
$l_3$	0	0	0			
$DTA$	0	0	0			
$TP$		2	2			
$\Delta \hat{V}$		8	8			

Tax-Rate is assumed to be 20%

Median “expected” profits

# Example 2



# Deferred Tax Assets – Example 2 – Case “enough” Future Profits

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	10	10	10	
$l_1$	0	-10				
$l_2$	0	0				
$l_3$	0	0				
$DTA$	0	2				
$TP$		0				
$\Delta \hat{V}$		-8				

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 2 – Case “not enough” Future Profits

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	2	2	2	
$l_1$	0	-10				
$l_2$	0	0				
$l_3$	0	0				
$DTA$	0	1.2				
$TP$		0				
$\Delta \hat{V}$		-8.8				

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 2 – Case no Future Profits

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	0	0	0	
$l_1$	0	-10				
$l_2$	0	0				
$l_3$	0	0				
$DTA$	0	0				
$TP$		0				
$\Delta \hat{V}$		-10				

Tax-Rate is assumed to be 20%

Median “expected” profits

# Example 3

# Deferred Tax Assets – Example 3

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	10	10	10	
$l_1$	0	-10				
$l_2$	0	0				
$l_3$	0	0				
$DTA$	0	2				
$TP$		0				
$\Delta \hat{V}$		-8				

# Deferred Tax Assets – Example 3

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	5	10	10	10
$l_1$	0	-10	0			
$l_2$	0	0	-5			
$l_3$	0	0	0			
$DTA$	0	2	1			
$TP$		0	0			
$\Delta \hat{V}$		-8	4			

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 3 – Alternative Scenario at t=2

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	-10	10	10	10
$l_1$	0	-10	-10			
$l_2$	0	0	-10			
$l_3$	0	0	0			
$DTA$	0	2	4			
$TP$		0	0			
$\Delta \hat{V}$		-8	-8			

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 3 – Alternative Scenario at t=2

## Startup Company – Making a Loss

	0	1	2	3	4	5
$\Delta V$		-10	-10	2	2	10
$l_1$	0	-10	-10			
$l_2$	0	0	-10			
$l_3$	0	0	0			
$DTA$	0	2	2.8			
$TP$		0	0			
$\Delta \hat{V}$		-8	-9.2			

Tax-Rate is assumed to be 20%

Median “expected” profits



# Examples 4-6

# Deferred Tax Assets – Example 4

## Running Company

	t-1	t	t+1	t+2	t+3
$\Delta V$		15	0	0	10
$l_1$	-10	0			
$l_2$	-10	-10			
$l_3$	-10	-5			
$DTA$	6	0			
$TP$		0			
$\Delta \hat{V}$		9			

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 5

## Running Company

	t-1	t	t+1	t+2	t+3
$\Delta V$		5	0	0	0
$l_1$	-10	0			
$l_2$	-10	-10			
$l_3$	-10	-10			
$DTA$	6	0			
$TP$		0			
$\Delta \hat{V}$		-1			

Tax-Rate is assumed to be 20%

Median “expected” profits

# Deferred Tax Assets – Example 6

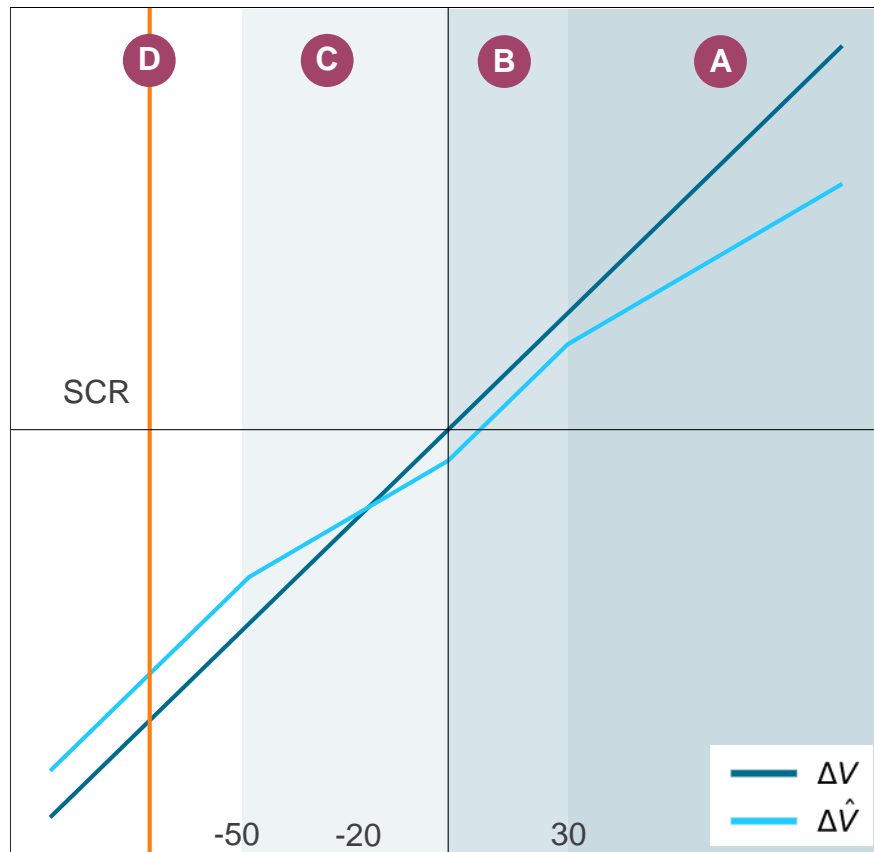
## Running Company

	t-1	t	t+1	t+2	t+3
$\Delta V$		$\Delta V$	20	20	20
$l_1$	-10				
$l_2$	0				
$l_3$	-30				
$DTA$	16				
$TP$					
$\Delta \hat{V}$		$\Delta \hat{V}$			

should be a function of  $\Delta V$   
we keep them constant

# How does the tax function now look like?

$\Delta \hat{V}$  as a function of  $\Delta V$   
with unchanged Future Profit assumption



A

Enough profits to use the full «on balance sheet DTA» and pay additional taxes for the amount above, which leads to

B

Profit in the year is not enough to compensate last element of the loss vector, thus

C

Loosing “last Loss for future compensation” but can still build up DTA for all other losses

D

Loosing “last Loss for future compensation” and future profits are not enough to build up DTA for all past losses

# What kind of approaches are used in the industry?

## Deterministic Models

- Typically used for Standard Formula but also for Internal Models
- In the SCR scenario a loss absorbing effect is calculated as a function of the tax rate, past losses, on balance profits for existing business and expected future profit assumptions for new business

## Stochastic Models

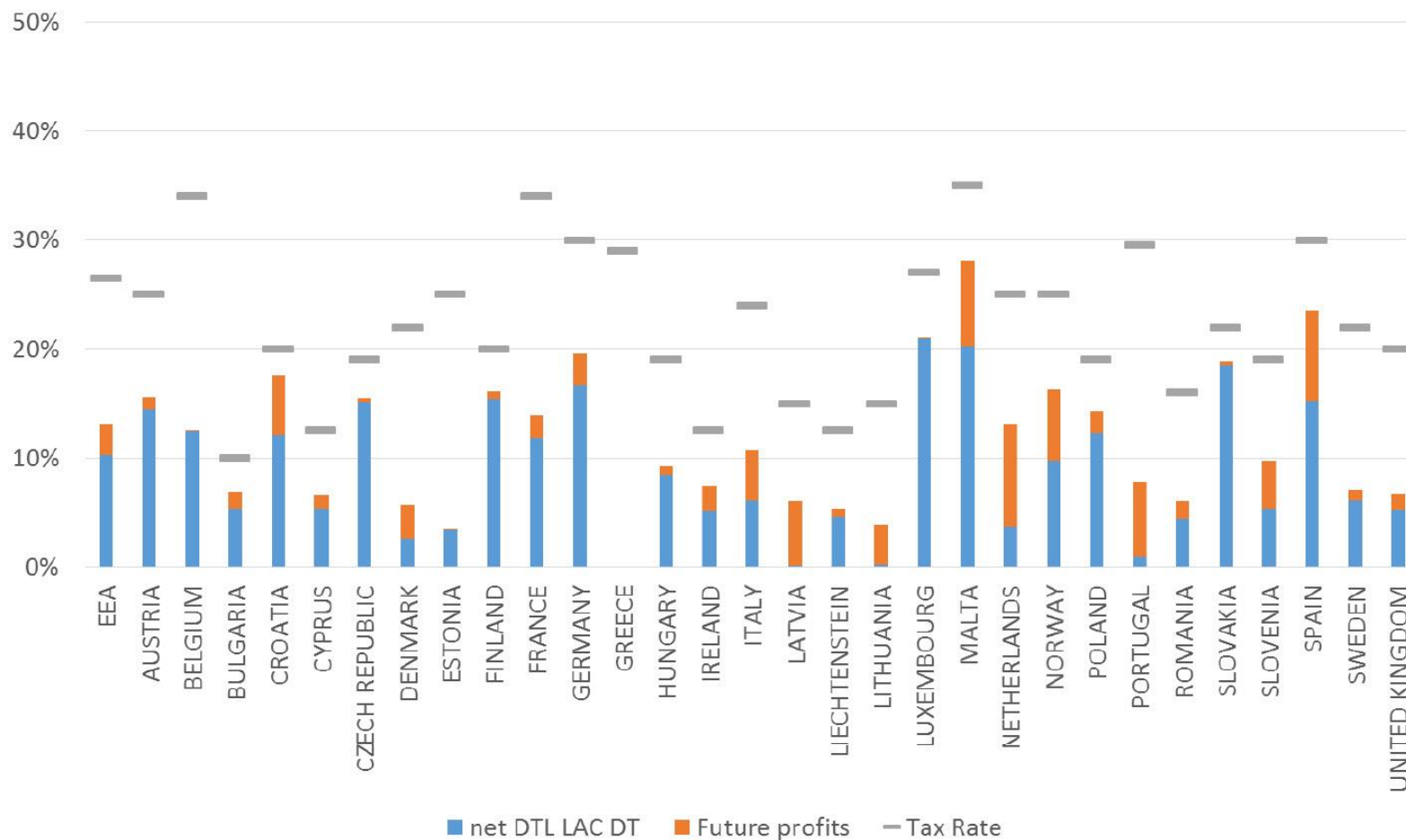
- Used in Internal Models
- Models capture the sketched DTA dynamic and change for example the assumption on future profits as a function of the modelled loss
- Often revaluation DTL is treated in simplistic way (e.g. not using a tax balance sheet in every simulation scenario)
- Some degree of simplification in respect of Branches vs Legal Entities

## Stochastic Models with Multi-Balance Sheets

- Used in Internal Models
- Models capture the full DTL/DTA dynamic with multi-balances for branches

# Comparison of Loss Absorbing Capacity by EU member states

## LAC DT by net DTL and future profits plus tax rates



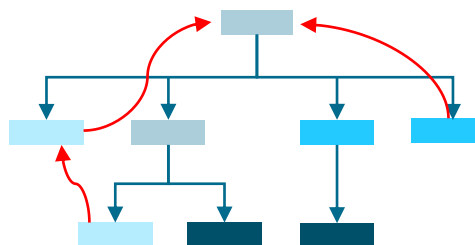
# At least three Open Problems

## Notation

- Different Accounting Schemes
- «Proper» Economic Valuation
- Taking into account DTA, DTL
- Homework

## Optimization

- Optimize the capital with Legal Entity Structure and the corresponding branches that operate in different tax environments (boxes with colors)
- You can also do internal/external retro (red arrows)
- By the way there are pre-tax Solvency regimes in your group



## Tax Allocation

- Translate the «Capital Allocation Problem» to taxes
- Define what is a «fair allocation scheme», e.g. how do you distribute taxes between different risks with different Loss/Profit profiles under a non-linear tax function
- Needs a multi-year model



# Conclusion

---

1 Taxes are an important economic reality for companies

2 While tax law can be complicated, there are models (obviously with certain simplification) that capture the main effects

3 The specific company situation (e.g. past losses, tax regime, future expected profits from existing and new business) change the probability of being able to fulfill future obligations and should thus be captured in the solvency capital requirement