After Basel 3: building capital rules that make sense

Duc Dam Hieu, BNP Paribas
Georges Duponcheele, BNP Paribas
Alexandre Linden, BNP Paribas
William Perraudin, Risk Control Limited

June 2016

The views expressed are the authors' own and not necessarily those of BNP Paribas nor of those with whom we had discussions or their firms.

Agenda

Introduction

- Analysis of key components of securitisation risks
    1. Granularity (N) Effect on Loss Distribution
    2. Default Correlation (PD) Effect on Loss Distribution
    3. Loss Given Default (LGD) on Loss Distribution
    4. Probability of Default (PD) on Loss Distribution
    5. Securitisation Capital – The Basics
- Converting Capital into Risk Weights (RW)
- Converting Attachment Points into Pool Capital Multiplier (PCM)
- Official Basel Views of Risk (and sources of regulatory arbitrage)
- How future European Securitisation frameworks could evolve

Introduction

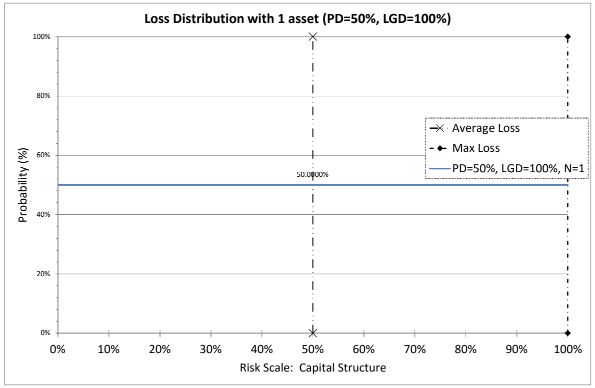
- The slides in this section describe an alternative basis for securitisation capital drawing on our extensive research on the topic.
- We show how the different models applied in Basel differ crucially in the slope they imply for the relation between thin-tranche capital and the attachment point of the tranche in question.
- We show how the slope changes with pool granularity, pool correlation, probability of default (PD) and loss given default (LGD).
- The Basel II Supervisory Formula Approach (SFA), currently applied, implies a steep decline in capital for tranches with attachment points in the vicinity of the pool capital level, K_{IRB}.
- We argue that a high slope implies instability of capital and greater arbitrage incentives for tranches attaching close to K_{IRB}.
- In the SSFA models employed in Basel III rules, slope and total capital level are tightly connected and, in particular, a steep slope is required if total capital is not to balloon to implausible levels.

We argue that a straightforward approach that we label the Pool Capital Multiplier Approach (PCMA) breaks the link between instability-inducing slope and prudent levels of capital and represents a better way of developing capital rules for securitisations.

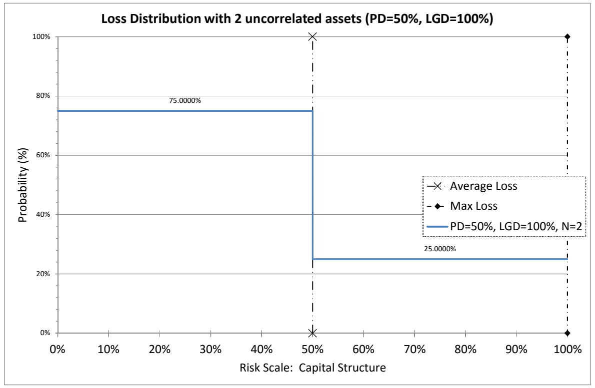
Analysis of key components of securitisation risks

1: Granularity (N) Effect on Loss Distribution

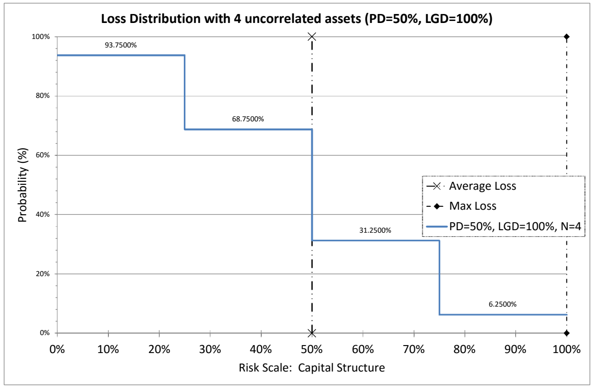
1.1: N = 1 asset (with PD = 50% and LGD = 100%)



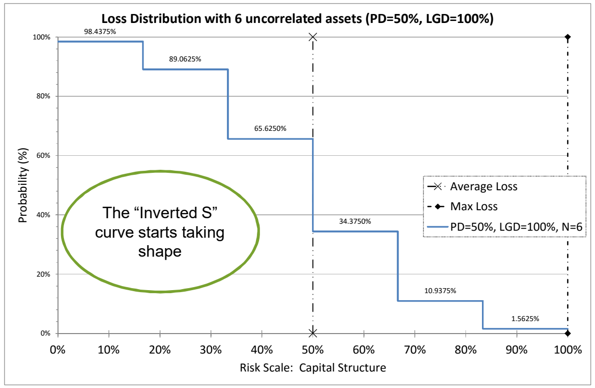
1.2: N = 2 assets



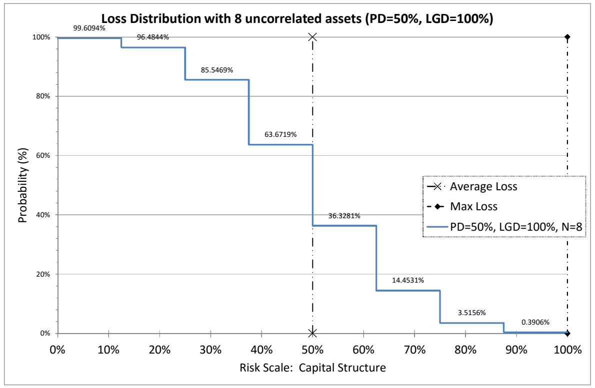
1.3: N = 4 assets



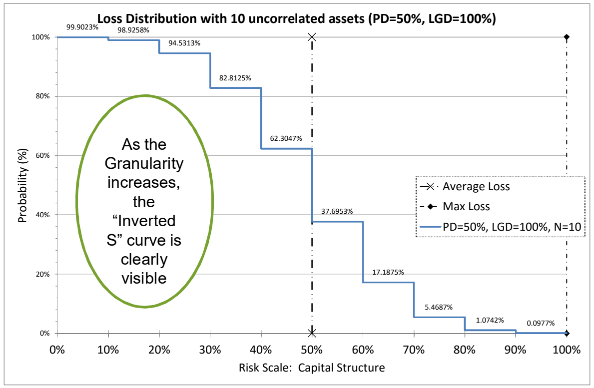
1.4: N = 6 assets



1.5: N = 8 assets

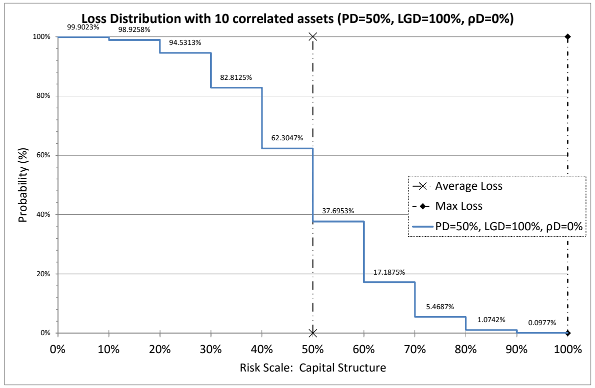


1.6: N = 10 assets

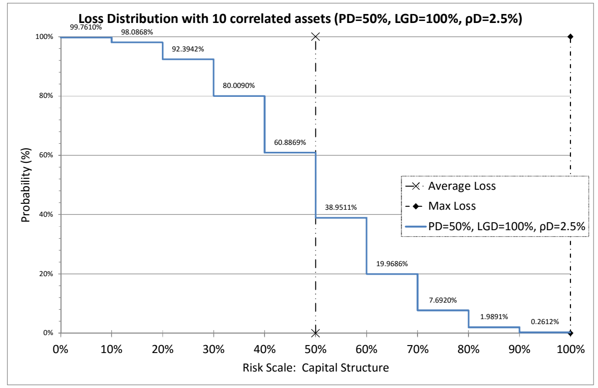


2: Default Correlation (ρ_D) Effect on Loss Distribution

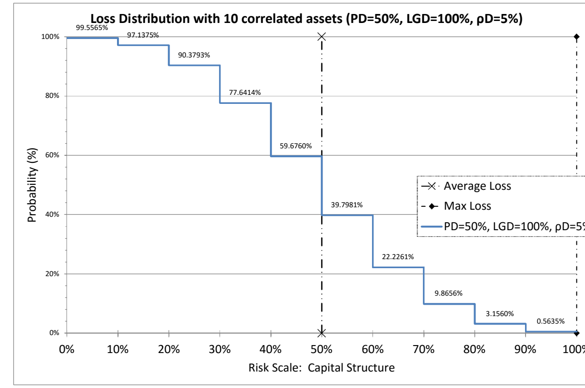
2.1: ρ_D = 0%



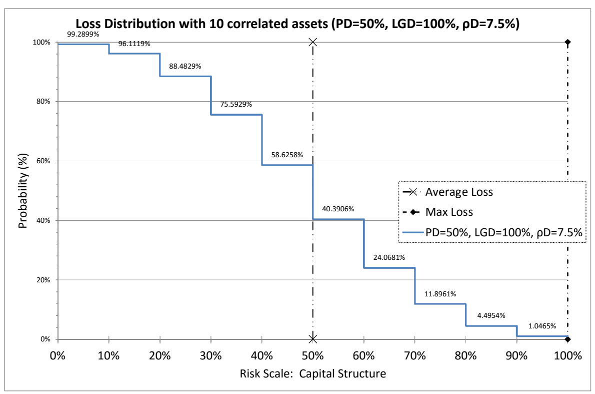
2.2: ρ_D = 2.5%



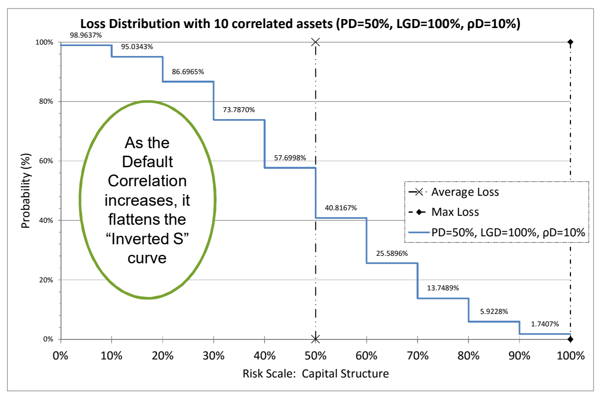
2.3: ρ_D = 5%



2.4: ρ_D = 7.5%



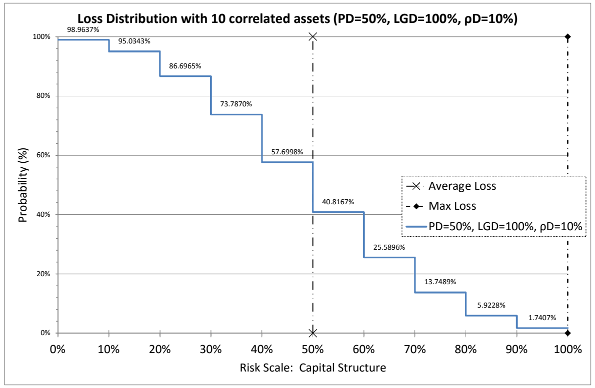
2.5: ρ_D = 10%



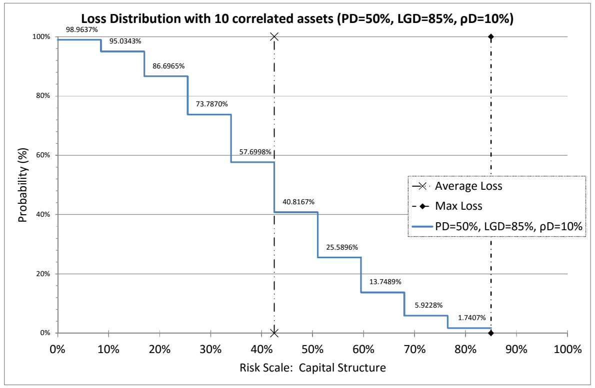
Analysis of key components of securitisation risks

3: Loss Given Default (LGD) on Loss Distribution

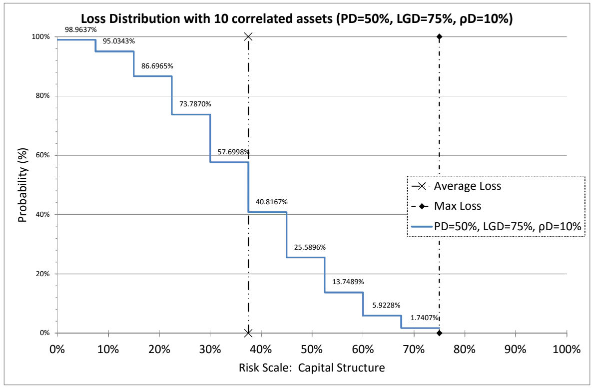
3.1: LGD = 100%



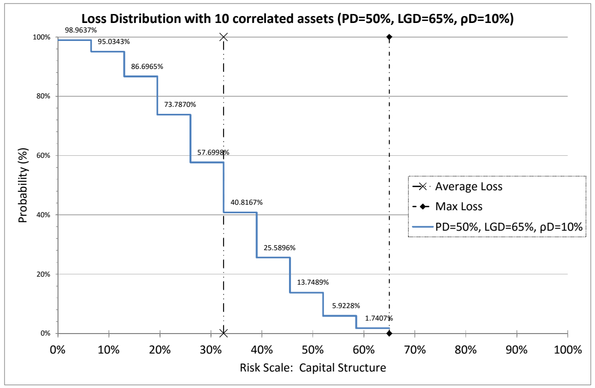
3.2: LGD = 85%



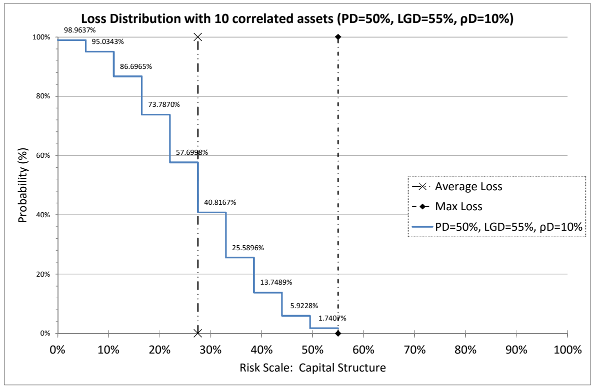
3.3: LGD = 75%



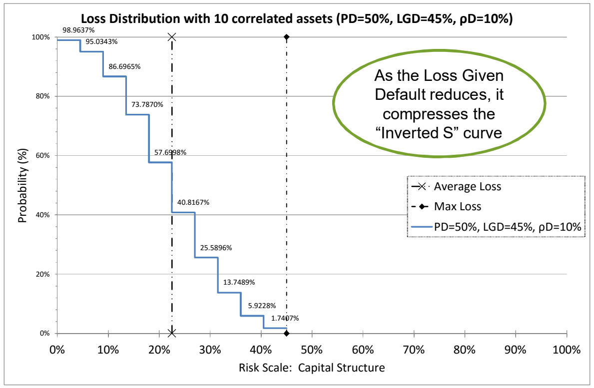
3.4: LGD = 65%



3.5: LGD = 55%



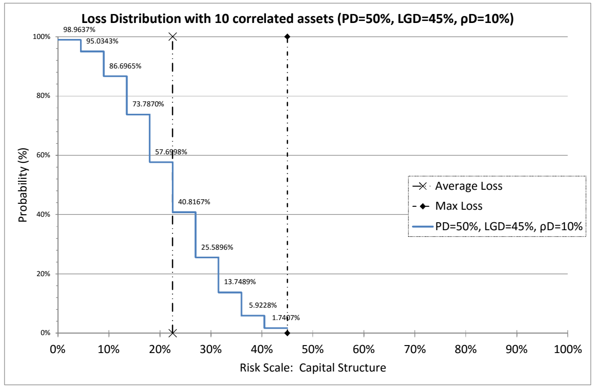
3.6: LGD = 45%



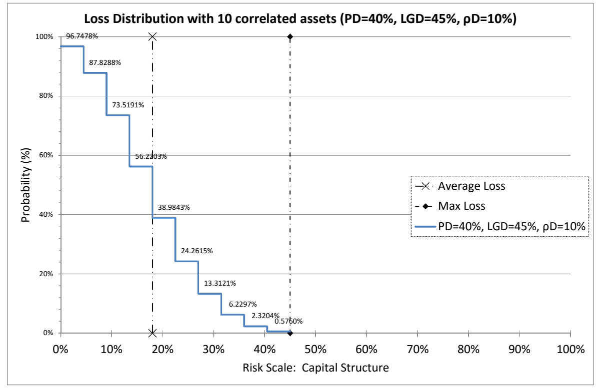
Analysis of key components of securitisation risks

4: Probability of Default (PD) on Loss Distribution

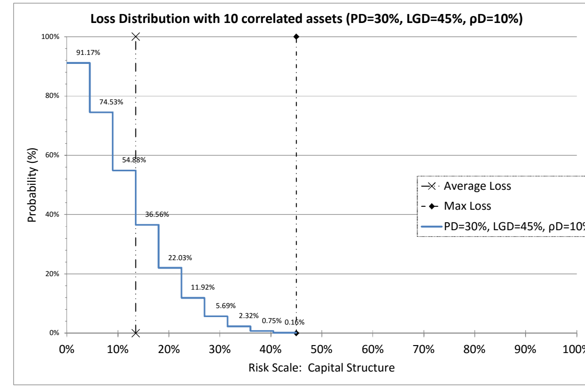
4.1: PD = 50%



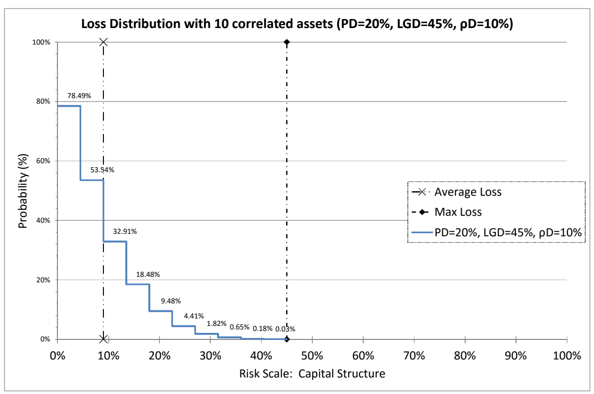
4.2: PD = 40%



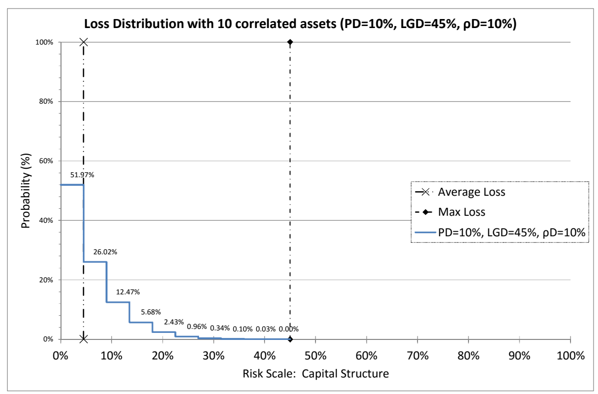
4.3: PD = 30%



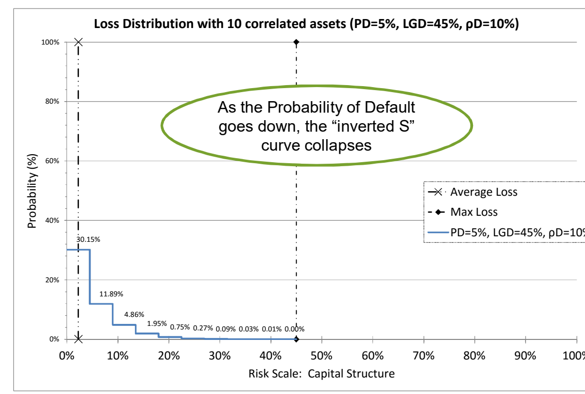
4.4: PD = 20%



4.5: PD = 10%

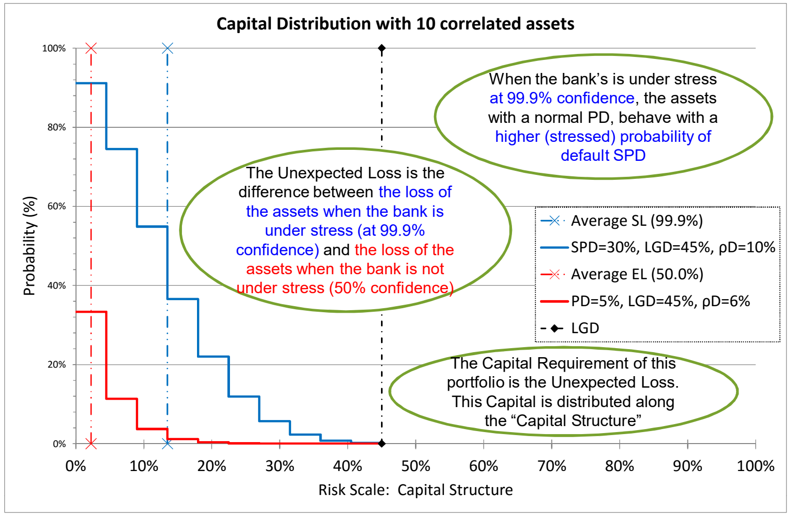


4.6: PD = 5%

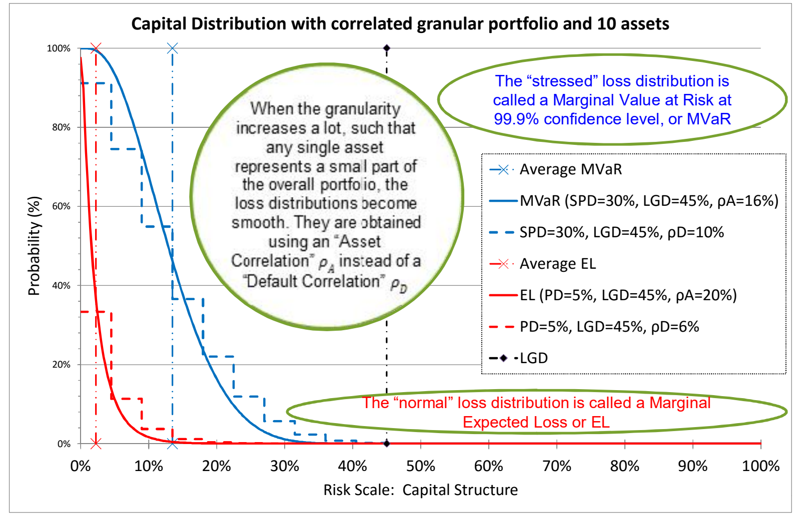


5: Securitisation Capital – The Basics

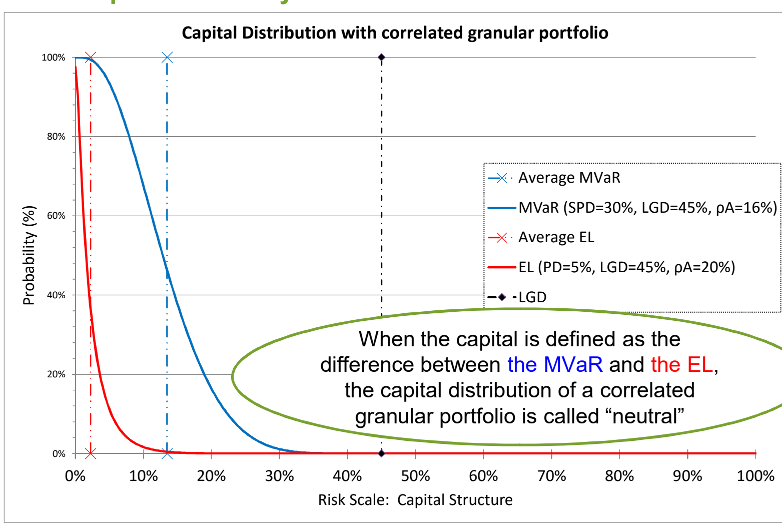
5.1: Unexpected Loss = Stressed (99.9%) Loss – Expected (50.0%) Loss



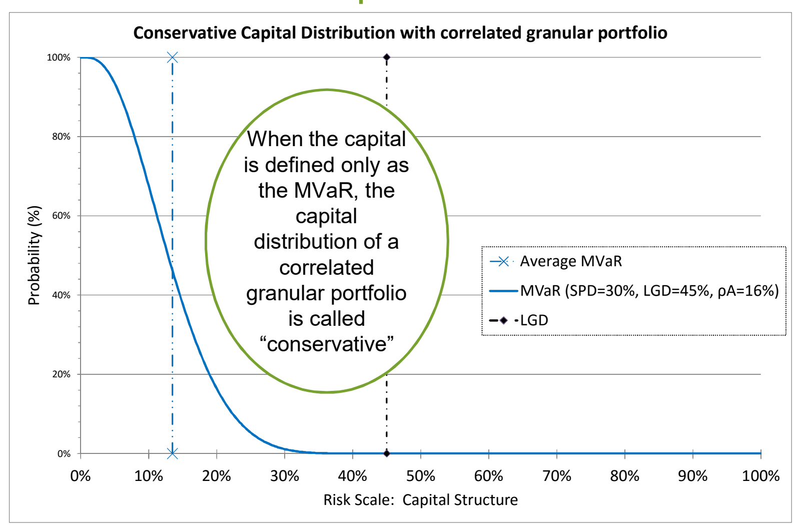
5.2: Pool Capital = MVaR - EL



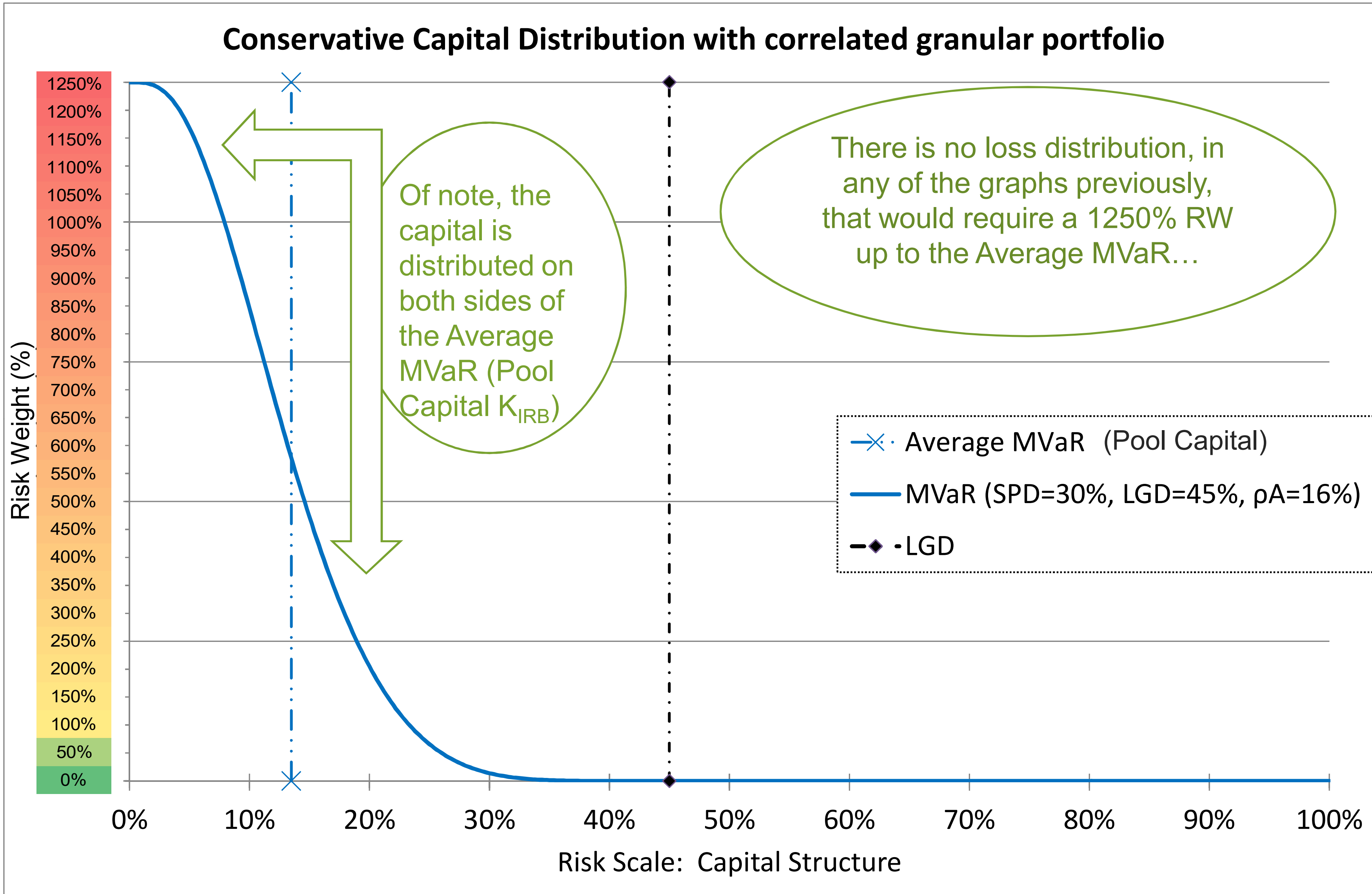
5.3: Capital Neutrality



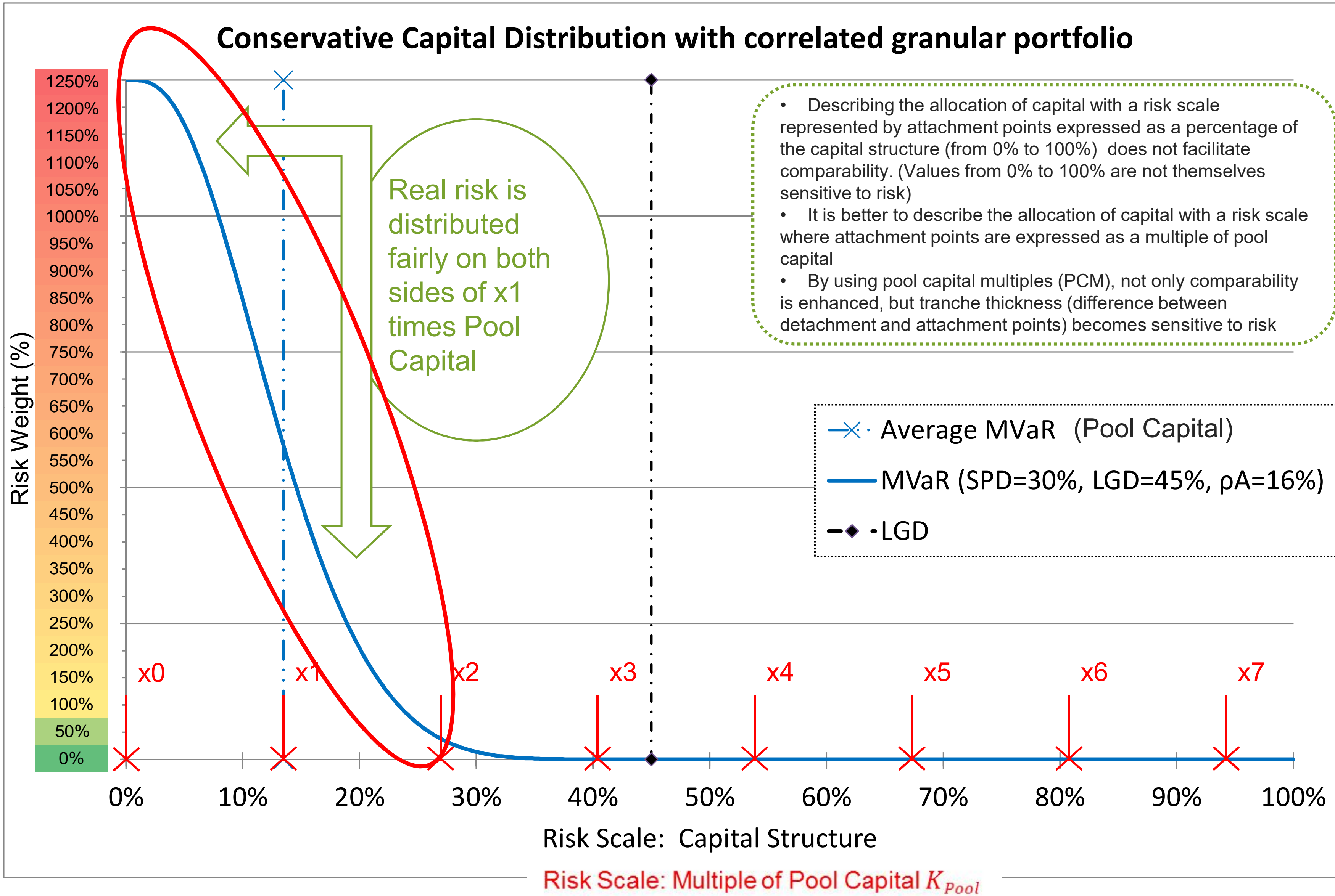
5.4: Conservative Pool Capital = MVaR



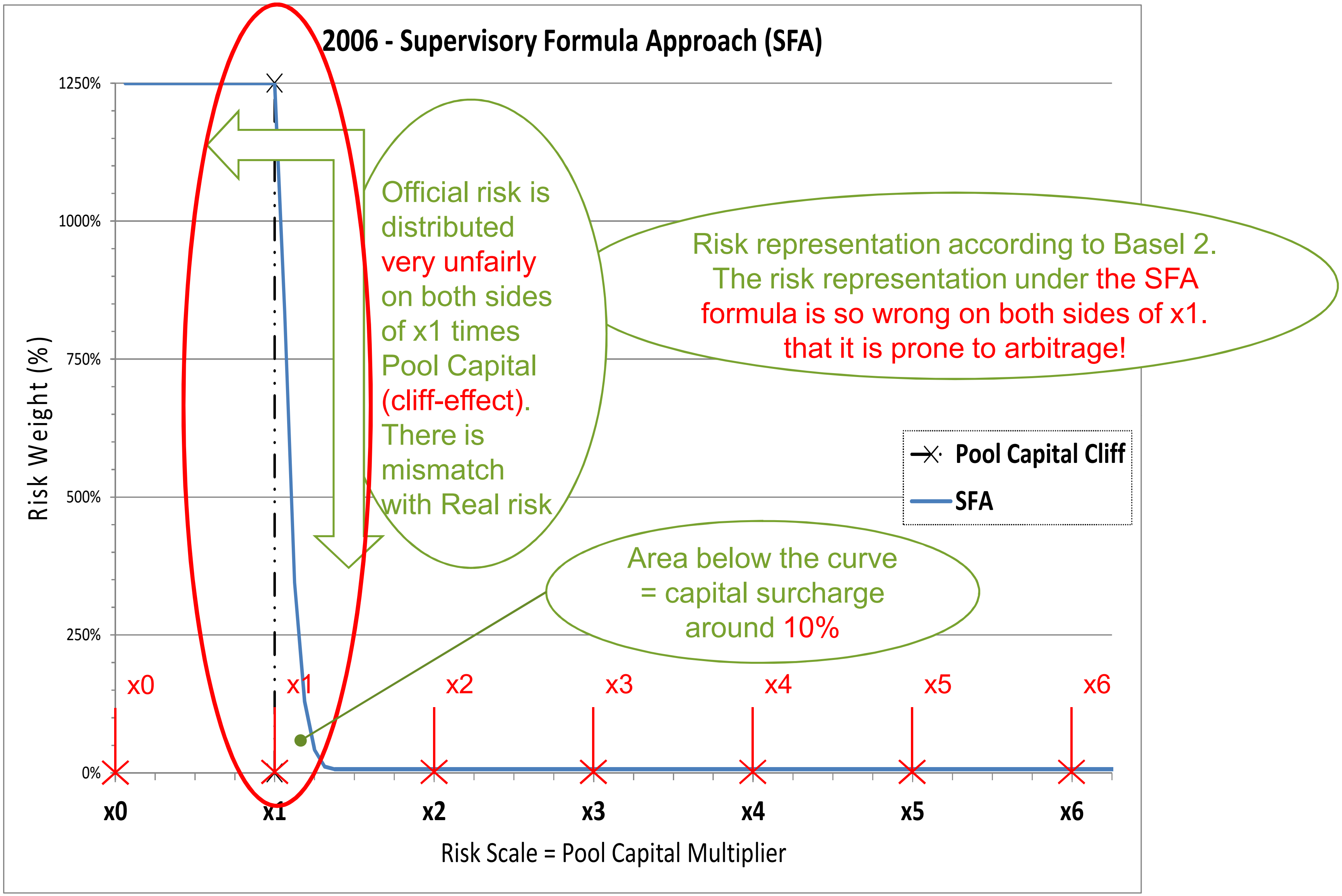
Y-axis: Converting Capital into Risk Weight (RW)



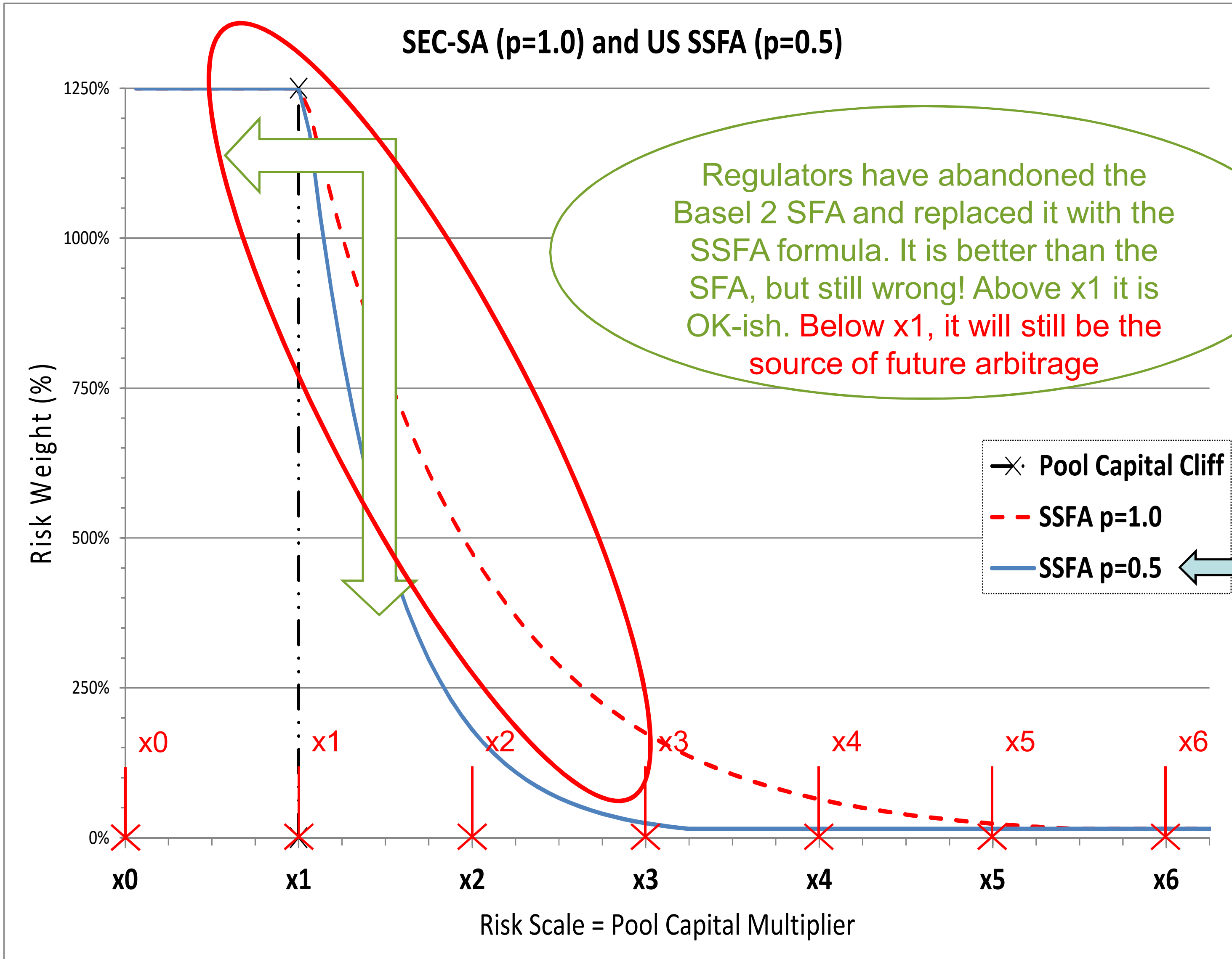
X-axis: Risk Scale as Pool Capital Multiplier (PCM)



Comparison with the Official View of Risk: Basel 2

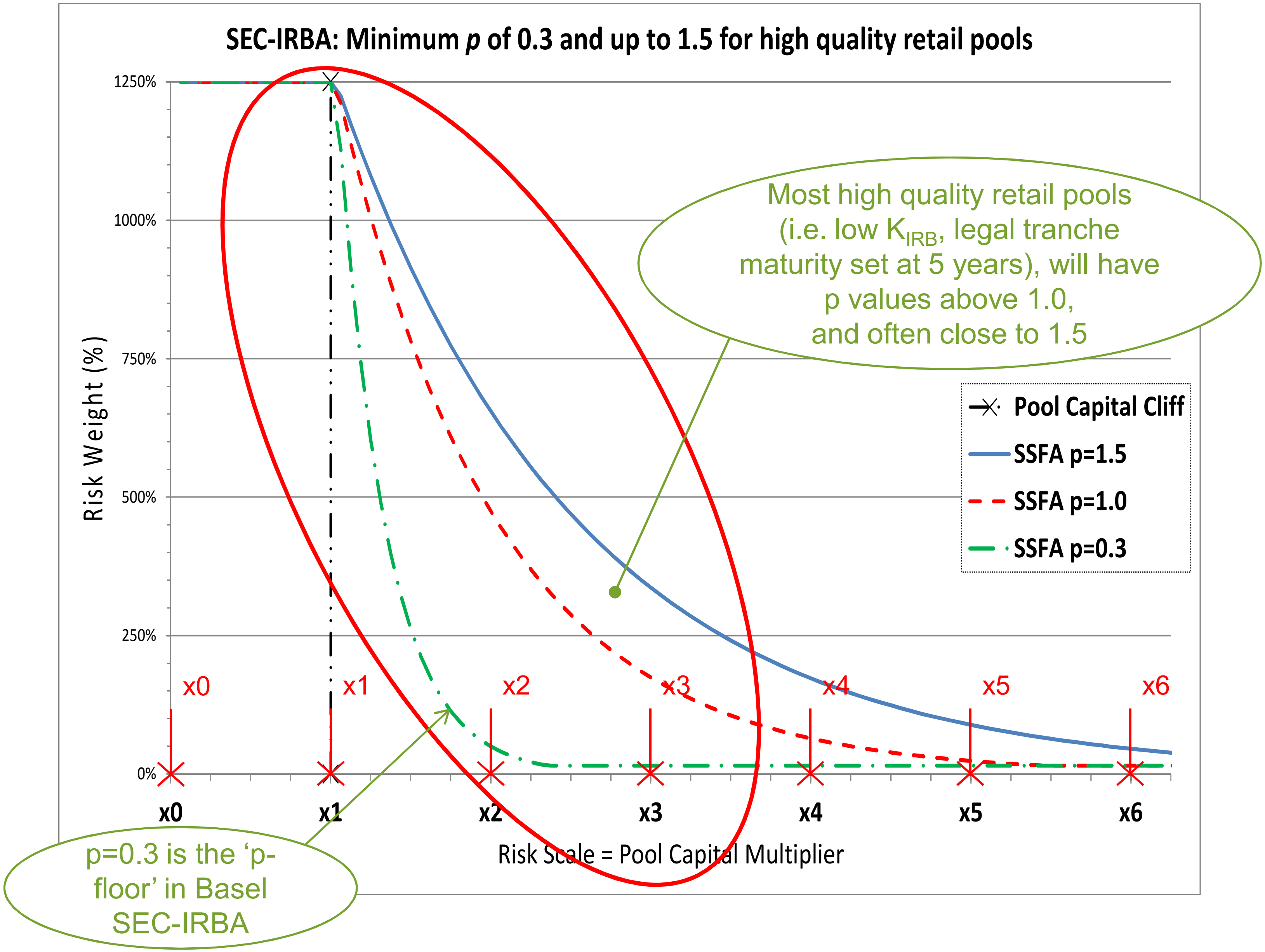


Comparison with the Official View of Risk: Basel 3



Current US SEC-SA
Proposed European STS

Comparison with the Official View of Risk: Basel 3



Basel 4… or 5…: a Future Opportunity to Correct Basel 3?

There is no need to replicate the errors of the SFA (Basel 2) or SSFA (Basel 3) by requiring 1250% RW up to x1.00 Pool Capital. Requiring this implies either cliff effects and consequent capital arbitrage (Basel 2) or big deviations from capital neutrality (Basel 3). Both create negative distortions in the market

To avoid those negative effects, adopting a non formulaic approach such as the "Pool Capital Multiplier Approach" (PCMA) would address the problems at their core

There will be a point in the future where (European?) policy makers will realise that to have a proper functioning market, one will either need to have a nationalised state-backed guaranteed market (such as in the US, by ignoring the securitisation framework altogether) or a market where the rules themselves need to be simple, transparent and standardised or comparable

Such simple, transparent, standardised or comparable rules, based on Sensitivity Steps (defined as portions of the securitisation structure expressed as multiple of the underlying pool capital) could look like that (see next slides for further explanations):

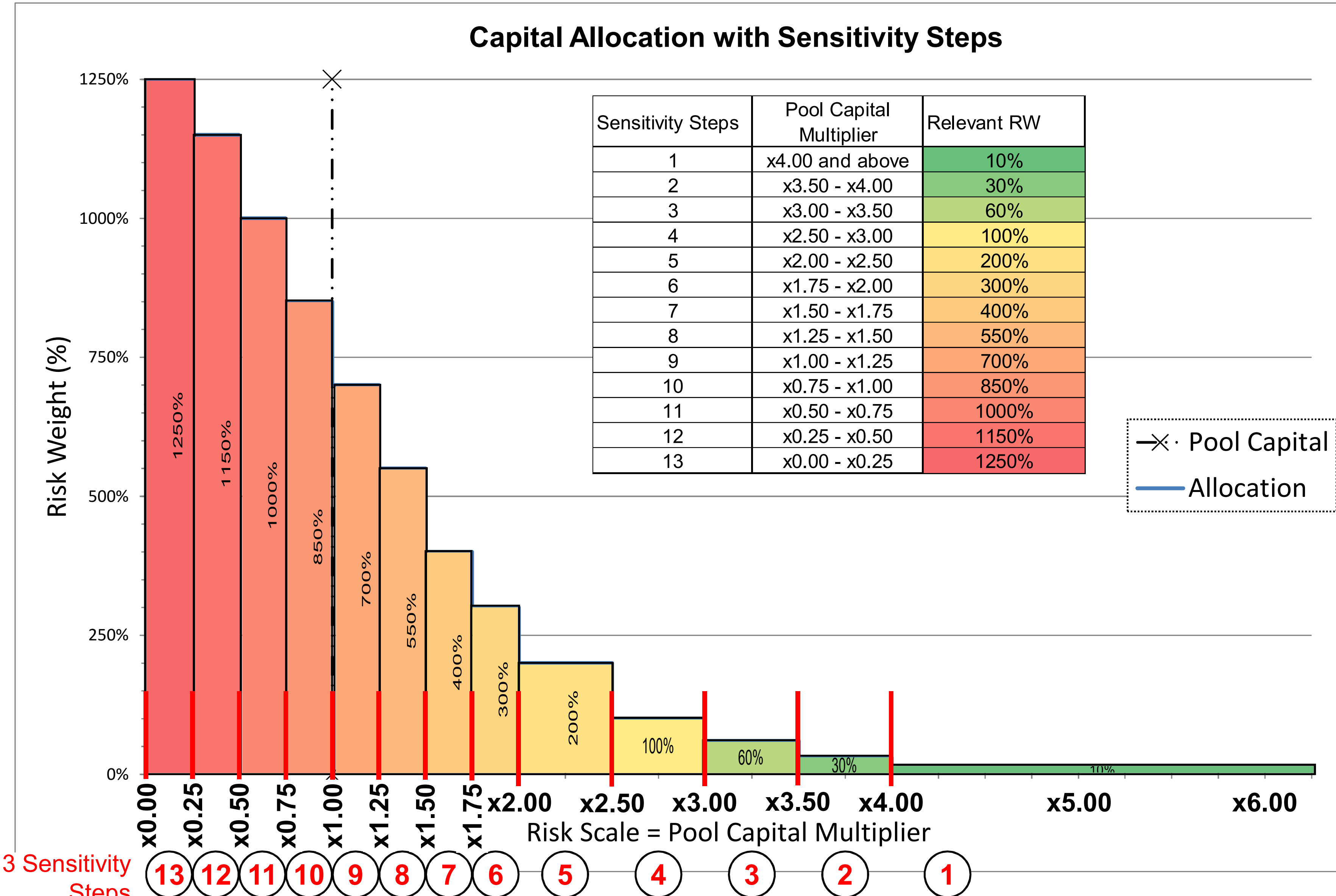
Example for IRB

Sensitivity Steps	Pool Capital Multiplier	Relevant RW
1	x4.00 and above	7%
2	x3.50 - x4.00	12%
3	x3.00 - x3.50	25%
4	x2.50 - x3.00	55%
5	x2.00 - x2.50	115%
6	x1.75 - x2.00	185%
7	x1.50 - x1.75	280%
8	x1.25 - x1.50	400%
9	x1.00 - x1.25	525%
10	x0.75 - x1.00	700%
11	x0.50 - x0.75	900%
12	x0.25 - x0.50	1100%
13	x0.00 - x0.25	1250%

Example for SA

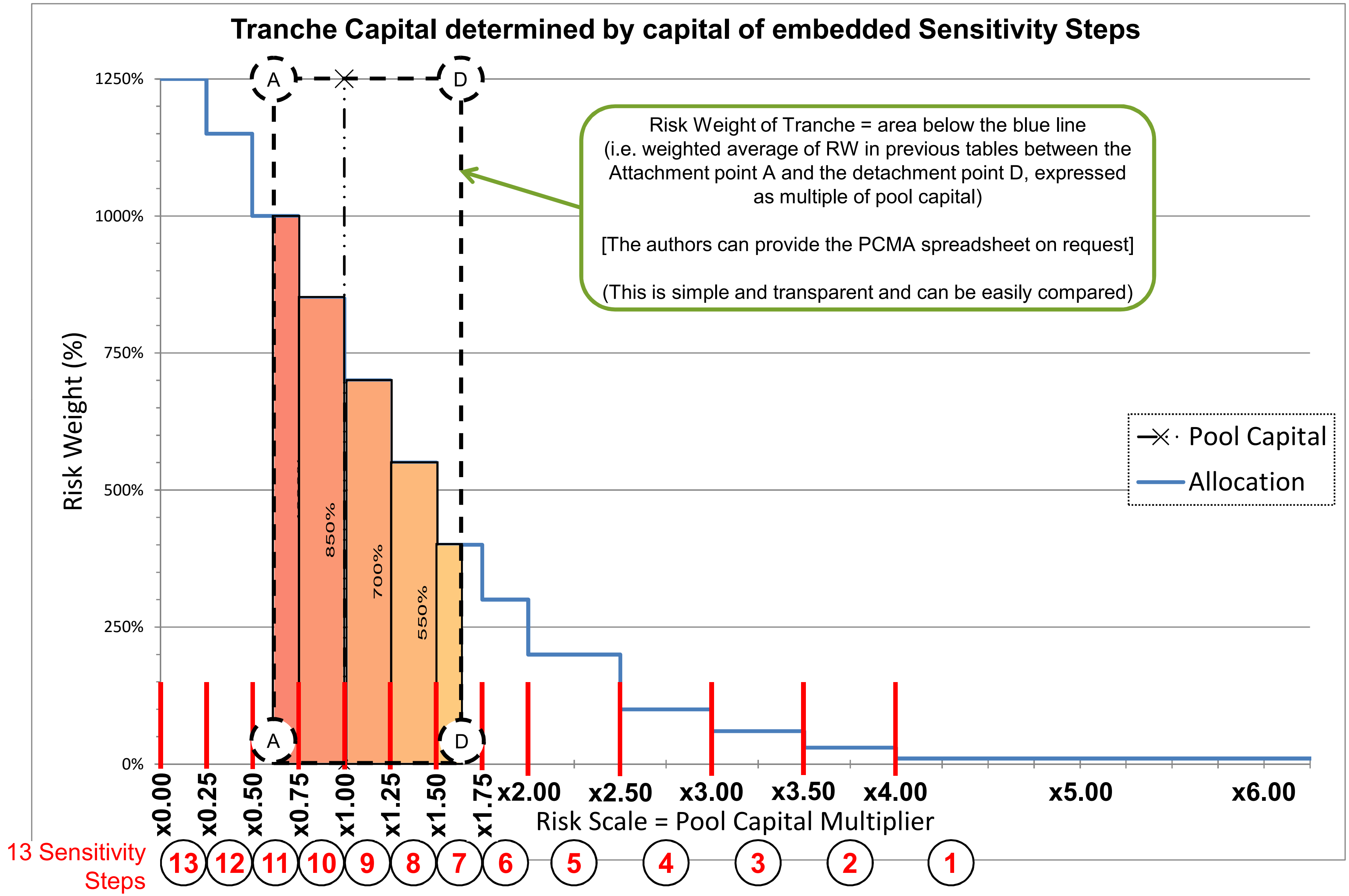
Sensitivity Steps	Pool Capital Multiplier	Relevant RW
1	x4.00 and above	10%
2	x3.50 - x4.00	30%
3	x3.00 - x3.50	60%
4	x2.50 - x3.00	100%
5	x2.00 - x2.50	200%
6	x1.75 - x2.00	300%
7	x1.50 - x1.75	400%
8	x1.25 - x1.50	550%
9	x1.00 - x1.25	700%
10	x0.75 - x1.00	850%
11	x0.50 - x0.75	1000%
12	x0.25 - x0.50	1150%
13	x0.00 - x0.25	1250%

PCMA (SA) – Allocation of Pool Capital + Capital Surcharge

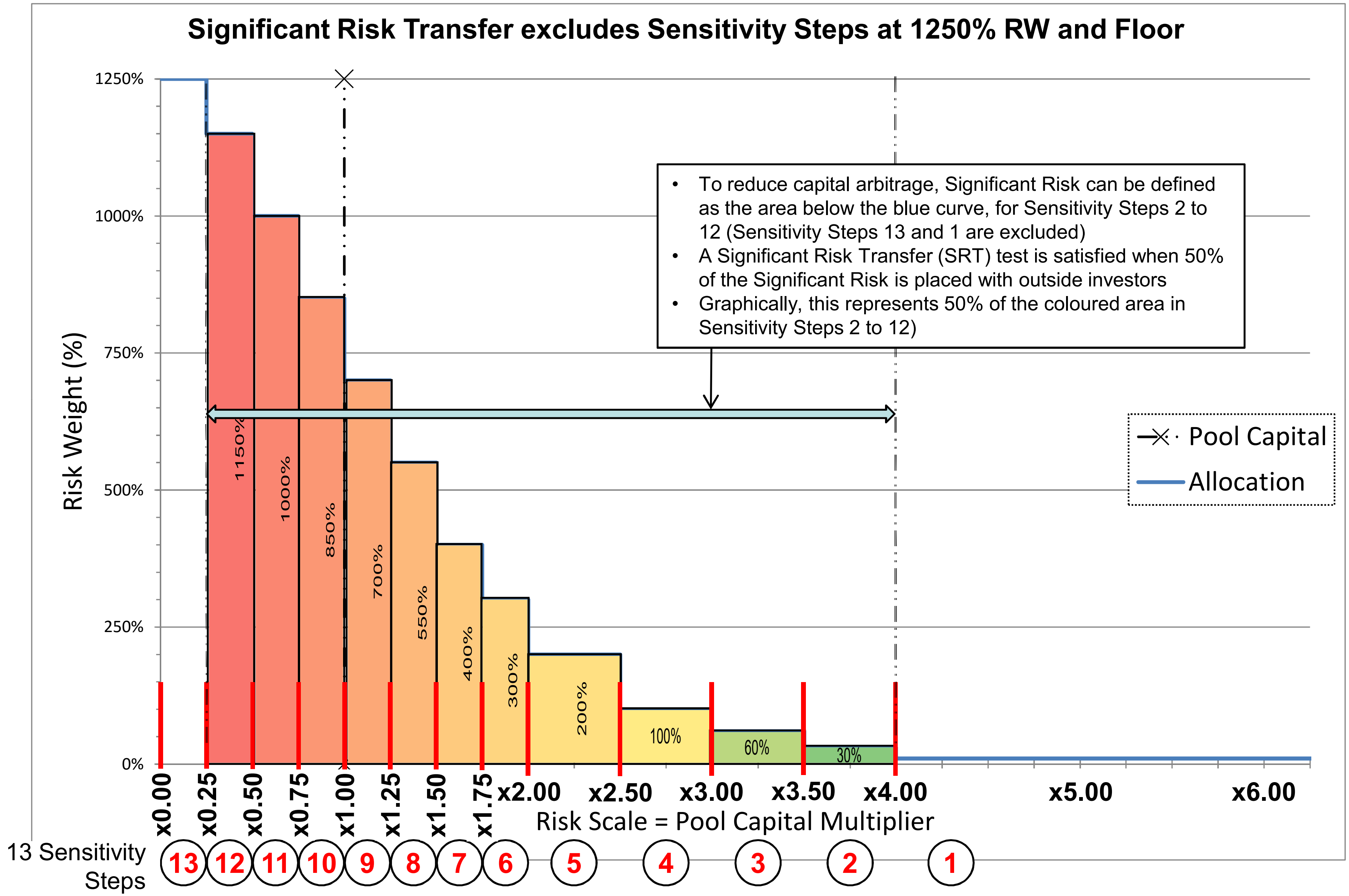


Sensitivity Steps	Pool Capital Multiplier	Relevant RW
1	x4.00 and above	10%
2	x3.50 - x4.00	30%
3	x3.00 - x3.50	60%
4	x2.50 - x3.00	100%
5	x2.00 - x2.50	200%
6	x1.75 - x2.00	300%
7	x1.50 - x1.75	400%
8	x1.25 - x1.50	550%
9	x1.00 - x1.25	700%
10	x0.75 - x1.00	850%
11	x0.50 - x0.75	1000%
12	x0.25 - x0.50	1150%
13	x0.00 - x0.25	1250%

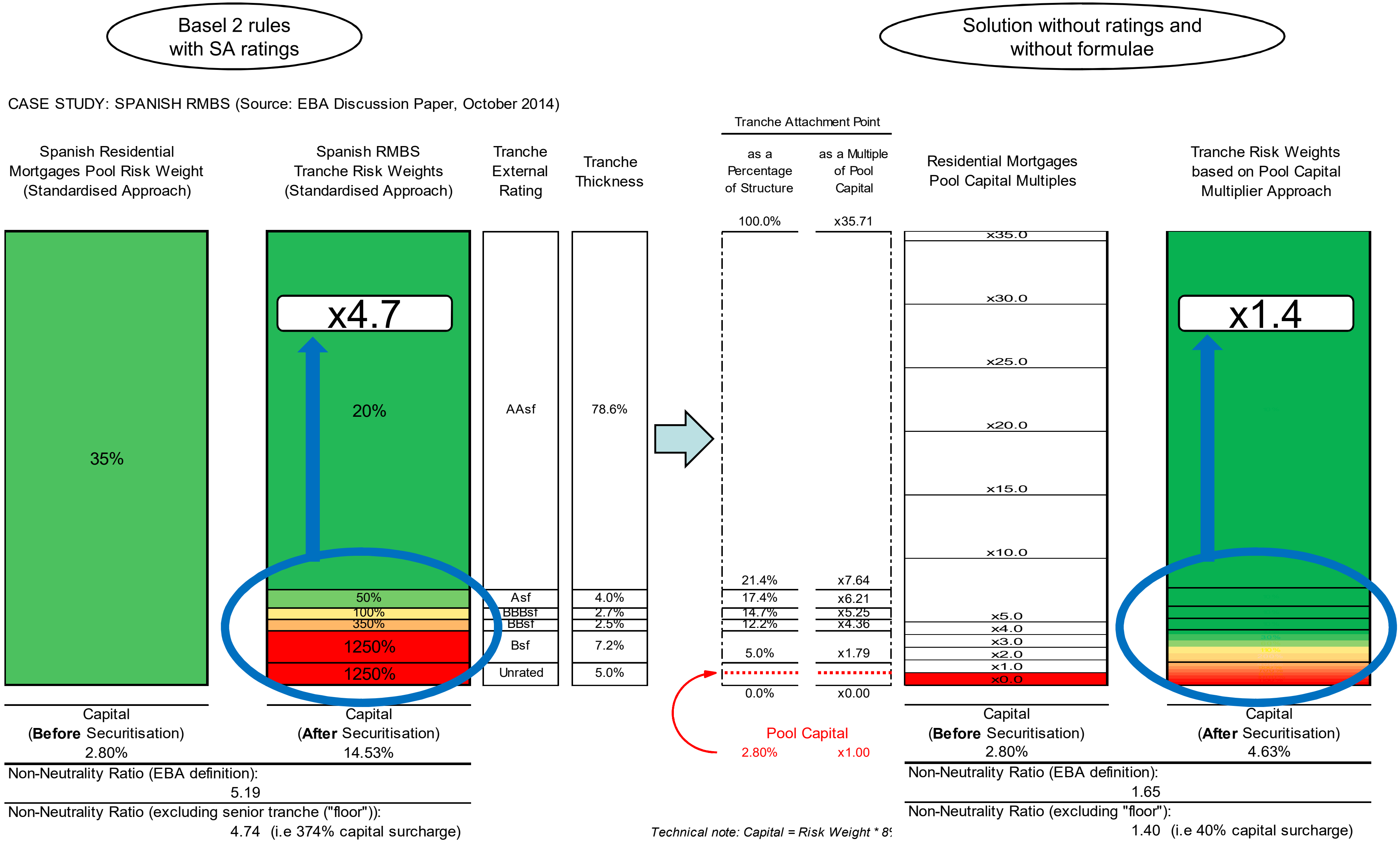
PCMA (SA) – Capital Allocation to a Securitisation Tranche



PCMA (SA) – Application to SRT



Pool Capital Multiplier Approach (PCMA): a practical example



Step 1: STS Calibration: what is the right level of the capital surcharge for European STS securitisations?

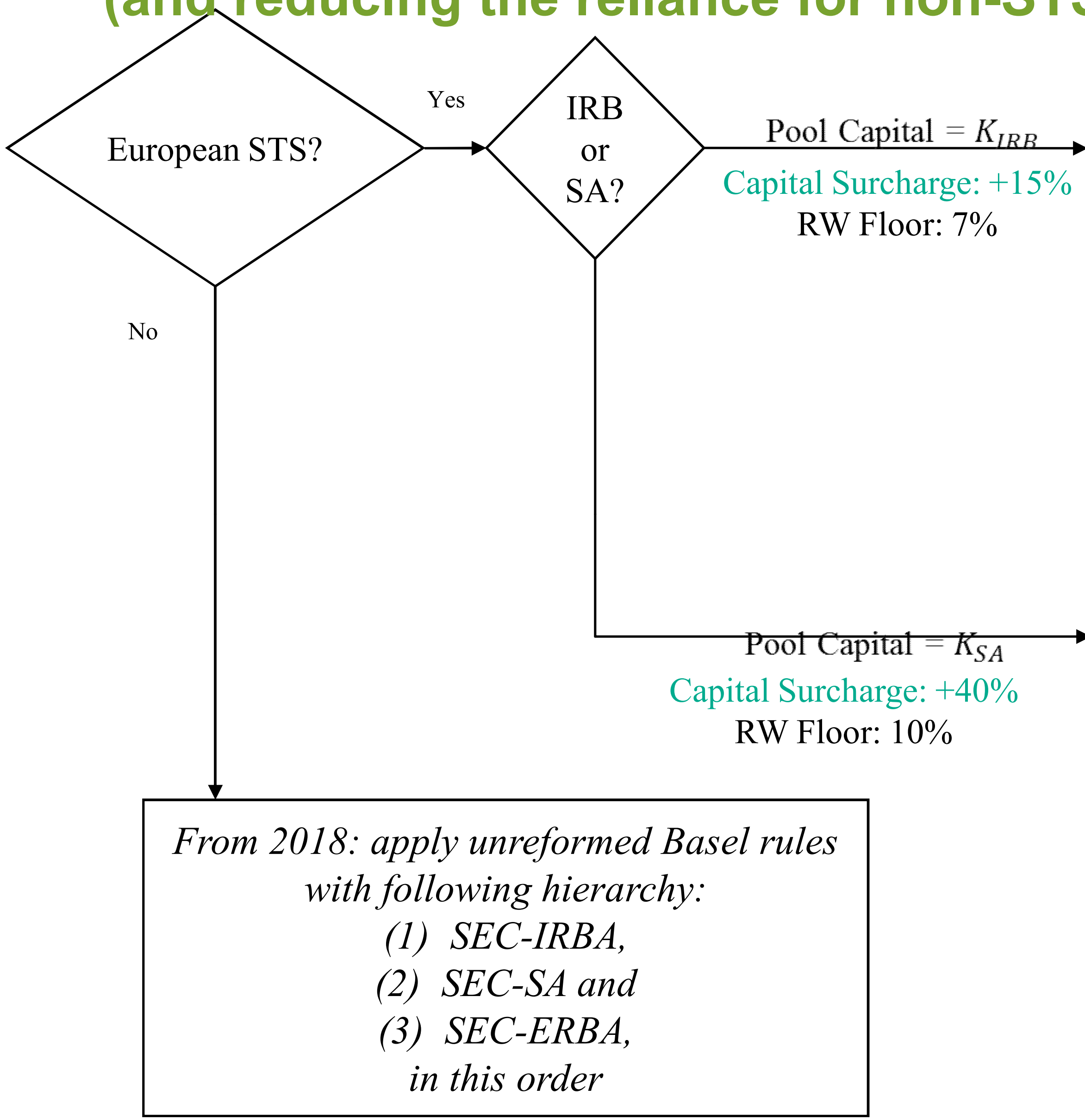
European legislators should decide the appropriate level of capital surcharge (same notion as level of “non-neutrality” as expressed by the EBA paper) for Simple, Transparent and Standardised securitisations that is reasonable for the high quality of European assets

Sensitivity Steps	Mapping to Pool Capital Multiplier	Floor Target										
1 (Floor)	x4.00 and above	7%	7%	7%	7%	7%	7%	10%	10%	10%	10%	10%
Sensitivity Steps	Mapping to Pool Capital Multiplier	Capital Surcharge Target										
		No Surcharge	+5% Surcharge	+10% Surcharge	+15% Surcharge	+20% Surcharge	+25% Surcharge	+30% Surcharge	+35% Surcharge	+40% Surcharge	+45% Surcharge	+50% Surcharge
2	x3.50 - x4.00	8%	9%	10%	12%	15%	18%	20%	25%	30%	35%	40%
3	x3.00 - x3.50	15%	18%	20%	25%	30%	35%	40%	50%	60%	70%	80%
4	x2.50 - x3.00	35%	40%	45%	55%	65%	75%	85%	95%	110%	125%	140%
5	x2.00 - x2.50	80%	90%	100%	110%	120%	140%	160%	180%	200%	220%	240%
6	x1.75 - x2.00	140%	150%	165%	185%	205%	225%	250%	275%	300%	325%	350%
7	x1.50 - x1.75	220%	240%	260%	280%	300%	325%	350%	375%	400%	425%	450%
8	x1.25 - x1.50	310%	340%	370%	400%	430%	460%	490%	520%	550%	580%	610%
9	x1.00 - x1.25	405%	450%	495%	535%	575%	610%	645%	675%	700%	725%	750%
10	x0.75 - x1.00	560%	605%	650%	690%	730%	765%	795%	825%	850%	875%	900%
11	x0.50 - x0.75	790%	830%	870%	900%	930%	950%	970%	985%	1000%	1015%	1030%
12	x0.25 - x0.50	1050%	1070%	1090%	1105%	1120%	1130%	1140%	1145%	1150%	1155%	1160%
13	x0.00 - x0.25	1250%	1250%	1250%	1250%	1250%	1250%	1250%	1250%	1250%	1250%	1250%
Non-Neutrality Ratio (excluding Floor)		1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50

Technical notes:

- numbers can be slightly rounded up or down for the sake of clarity, without creating a material change to the calibration
- the Target Capital Surcharge excludes the additional capital derived from the application of the risk weight floor.
- the risk weight of Sensitivity Step 1 (i.e. x4.00 and above) is de facto a risk weight floor.
- For illustration purpose, the next slide uses 1.15 non-neutrality ratio for IRB STS, and 1.40 non-neutrality ratio for SA STS.

Step 2: removing the reliance on external ratings for STS (and reducing the reliance for non-STS)



Proposal for IRB mode		
Sensitivity Steps	Mapping to Pool Capital Multiplier	Sensitivity Step Risk Weight
1 (Floor)	x4.00 and above	7%
2	x3.50 - x4.00	12%
3	x3.00 - x3.50	25%
4	x2.50 - x3.00	55%
5	x2.00 - x2.50	110%
6	x1.75 - x2.00	185%
7	x1.50 - x1.75	280%
8	x1.25 - x1.50	400%
9	x1.00 - x1.25	535%
10	x0.75 - x1.00	700%
11	x0.50 - x0.75	900%
12	x0.25 - x0.50	1100%
13	x0.00 - x0.25	1250%

Proposal for SA mode		
Sensitivity Steps	Mapping to Pool Capital Multiplier	Sensitivity Step Risk Weight
1 (Floor)	x4.00 and above	10%
2	x3.50 - x4.00	30%
3	x3.00 - x3.50	60%
4	x2.50 - x3.00	110%
5	x2.00 - x2.50	200%
6	x1.75 - x2.00	300%
7	x1.50 - x1.75	400%
8	x1.25 - x1.50	550%
9	x1.00 - x1.25	700%
10	x0.75 - x1.00	850%
11	x0.50 - x0.75	1000%
12	x0.25 - x0.50	1150%
13	x0.00 - x0.25	1250%

Example of possible design

References

1. Duponcheele, Georges, William Perraudin and Daniel Totouom-Tangho (2013a) “A Principles-Based Approach to Regulatory Capital for Securitisations,” BNP Paribas mimeo, April, available at: http://www.riskcontrollimited.com/insights/a-principles-based-approach-to-regulatory-capital-for-securitisations/

2. Duponcheele, Georges, William Perraudin and Daniel Totouom-Tangho (2013b) “The Simplified Arbitrage-Free Approach: Calculating Securitisation Capital based on Risk Weights Alone,” BNP Paribas mimeo, July, available at: http://www.riskcontrollimited.com/insights/the-simplified-arbitrage-free-approach/

3. Duponcheele, Georges, William Perraudin and Daniel Totouom-Tangho (2013c) “Maturity Effects in Securitisation Capital: Total Capital Levels and Dispersion Across Tranches,” BNP Paribas mimeo, September, available at: http://www.riskcontrollimited.com/insights/maturity-effects-in-securitisation-capital-total-capital-levels-and-dispersion-across-tranches/

4. Duponcheele, Georges, William Perraudin, Alastair Pickett and Daniel Totouom-Tangho (2013d) “Granularity, Heterogeneity and Securitisation Capital,” BNP Paribas mimeo, September, available at: http://www.riskcontrollimited.com/insights/granularity-heterogeneity-and-securitisation-capital/

5. Duponcheele, Georges, William Perraudin and Daniel Totouom-Tangho (2014a) “Reducing the Reliance of Securitisation Capital on Agency Ratings,” BNP Paribas mimeo, February, available at: http://www.riskcontrollimited.com/insights/reducing-the-reliance-of-securitisation-capital-on-agency-ratings/

6. Duponcheele, Georges, William Perraudin and Daniel Totouom-Tangho (2014b) “Calibration of the Simplified Supervisory Formula Approach,” BNP Paribas mimeo, March, available at: http://www.riskcontrollimited.com/insights/calibration-of-the-simplified-supervisory-formula-approach/

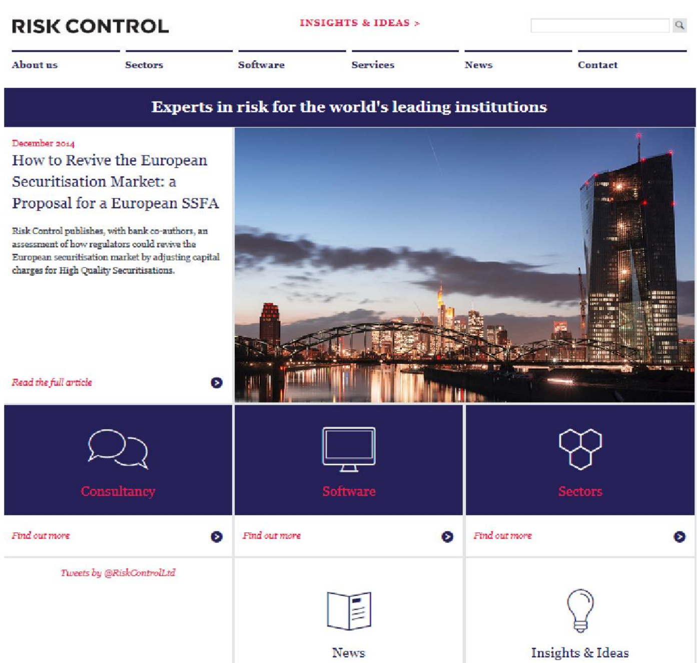
7. Duponcheele, Georges, Alexandre Linden, William Perraudin and Daniel Totouom-Tangho (2014c) “Calibration of the CMA and Regulatory Capital for Securitisations,” BNP Paribas mimeo, April, available at: http://www.riskcontrollimited.com/insights/calibration-of-the-cma-and-regulatory-capital-for-securitisations/

References

8. Duponcheele, Georges, Alexandre Linden and William Perraudin (2014d) “How to Revive the European Securitisation Market: a Proposal for a European SSFA,” BNP Paribas mimeo, November, available at: http://www.riskcontrollimited.com/insights/how-to-revive-the-european-securitisation-market-a-proposal-for-a-european-ssfa/

9. William Perraudin (2015) “Default Probability Risk and Securitisation Capital,” Risk Control Paper, April, available at: http://www.riskcontrollimited.com/insights/default-probability-risk-and-securitisation-capital/

10. Duponcheele, Georges, Alexandre Linden and William Perraudin (2015) “Comments on the Commission’s Proposals for Reviving the European Securitisation Market,” BNP Paribas mimeo, October, available at: http://www.riskcontrollimited.com/insights/comment-commission-proposals-securitisation/



Joint papers from BNP Paribas and Risk Control Limited are available on the Risk Control Limited website:

www.riskcontrollimited.com