Establishing and embedding a Risk Appetite Framework

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Agenda

- Risk Appetite Definition
- Risk Appetite Stakeholders
- Risk Appetite Design
- Risk Appetite Execution

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Risk Appetite Definition

What is Risk Appetite?

"Risk appetite is the amount of risk, on a broad level, an organization is willing to accept in pursuit of value. Each organization pursues various objectives to add value and should broadly understand the risk it is willing to undertake in doing so."
The Committee of Sponsoring Organizations of the Treadway Commission (COSO).

"The level of aggregate risk that an organization chooses to take in pursuit of its objectives."
Actuarial Standard's Board (ASB)

"…amount and type of risk that an organization is willing to pursue or retain."
International Organization for Standardization (ISO)

"…the degree of comfort and preference for accepting a series of interconnected uncertainties about achieving corporate goals."
Actuarial Profession: Allan, Cantle, Yin, Godfrey, 2012

"The level of risk that an organization is prepared to accept, before action is deemed necessary to reduce it. It represents a balance between the potential benefits of innovation and the threats that change inevitably brings."
Wikipedia: http://en.wikipedia.org/wiki/Risk_appetite

No common definition!!

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Risk Appetite Definition

Contrast with Risk Tolerance

Perhaps the best way to understand risk appetite is to contrast it against the related concept of **Risk Tolerance**:

"Acceptable level of variation an entity is willing to accept regarding the pursuit of its objectives."
The Committee of Sponsoring Organizations of the Treadway Commission (COSO).

"The aggregate risk-taking capacity of an organization."
Actuarial Standard's Board (ASB)

"…organization's or stakeholder's readiness to bear the risk after risk treatment in order to achieve its objectives."
International Organization for Standardization (ISO)

Again no common definition!!

Risk Appetite Definition

One way to think about Risk Appetite / Tolerance

Basically, Risk Appetite usually contains high level statements of a company's how much risk a company is willing to take whereas Risk Tolerance usually refers to a certain product or risk type.

Risk Appetite	Risk Tolerance
The organization has a higher risk appetite related to strategic objectives and is willing to accept higher losses in the pursuit of higher returns.	While we expect a return of 18% on this investment, we are not willing to take more than a 25% chance that the investment leads to a loss of more than 50% of our existing capital.
The organization has a low risk appetite related to risky ventures and, therefore, is willing to invest in new business but with a low appetite for potential losses.	We will not accept more than a 5% risk that a new line of business will reduce our operating earnings by more than 5% over the next ten years.
A health services organization places patient safety amongst its highest priorities. The organization also understands the need to balance the level of immediate response to all patient needs with the cost of providing such service. The organization has a low risk appetite related to patient safety but a higher appetite related to response to all patient needs.	We strive to treat all emergency room patients within two hours and critically ill patients within 15 minutes. However, management accepts that in rare situations (5% of the time) patients in need of non-life-threatening attention may not receive that attention for up to four hours.
A retail company has a low risk appetite related to the social and economic costs for sourced products from foreign locations that could be accused of being child sweatshops or having unhealthy working conditions.	For purchasing agents, the risk tolerance is set at near zero for procuring products that do not meet the organization's quality and sourcing requirements.
A manufacturer of engineered wood products operates in a highly competitive market. To compete, the company has adopted a higher risk appetite relating to product defects in accepting the cost savings from lower-quality raw materials.	The company has set a target for production defects of one flaw per 1,000 board feet. Production staff may accept defect rates up to 50% above this target (i.e., 1.5 flaws per 1,000 board feet) if cost savings from using lower-cost materials is at least 10%.

Enterprise Risk Management — Understanding and Communicating Risk Appetite, COSO

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Risk Appetite Definition

Conclusion

No consensus on definition

- Every one has their own definition of risk appetite
- Coming up with one definition that everyone agrees on will take forever

Key for a risk manager

- You and stakeholders of your company should agree on and understand the definition …
- … and apply it uniformly across your organisation

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Why Risk Appetite matters

Sets the tone for how business should be done:

- Clear about outcomes that matter
- Clear about acceptable variation over different timescales
- Clear about which reasons for variation are acceptable

Provides the basis against which culture, performance, decisions are all judged

- Opportunities clearly assessed against core outcomes
- Ensures attitude to local tasks influenced by effect on global outcomes
- Culture guided by “reasons” for variation
- Use risk budgets to emphasize “good” risks

Agenda

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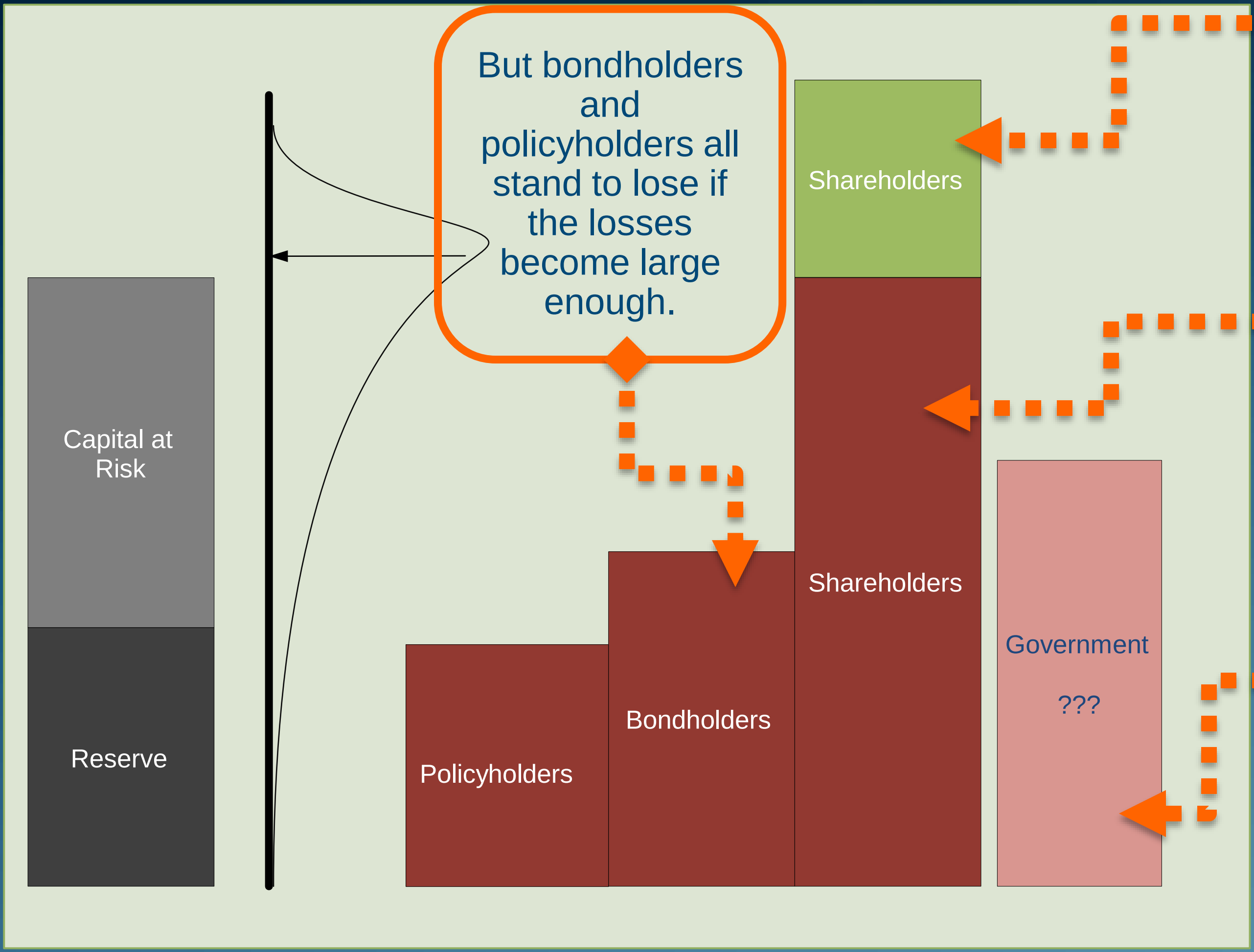
- **Risk Appetite Stakeholders**
- Risk Appetite Design
- Risk Appetite Execution

Risk Appetite Stakeholders

Risk Appetite Consumers



It may be tempting to believe that it is created for the shareholders – they gain on the upside and lose on the downside.

Not shown but *risk sharers* have a vested interest too. Risk sharers being… participating policyholders, reinsurers.

Government treasuries (i.e. taxpayers) are stakeholders too.
For example regulator failed in duty, political pressure, de-facto transfer to nationalised insurance sector.

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Risk Appetite Stakeholders

Risk Appetite Producers : Board involvement needed

SENIOR SUPERVISORS GROUP

Risk Management Lessons from
the Global Banking Crisis of 2008

2. Articulating Risk Appetite

- **Supervisors see insufficient evidence of board involvement in setting and monitoring adherence to firms' risk appetite.**
- **Risk appetite statements are generally not sufficiently robust; such statements rarely reflect a suitably wide range of measures and lack actionable elements that clearly articulate firms' intended responses to losses of capital and breaches in limits.**

EUROPEAN COMMISSION

B) Lack of ownership by Boards of risk strategy

In addition to the lack of effective challenge by Boards of management decisions, excessive risk-taking in credit institutions has been partly due to lack of adequate Board involvement in approving and overseeing the risk strategy (risk appetite) and risk management structure. Board members did not feel themselves sufficiently concerned by risk issues which resulted in lack of ownership of risk matters by Boards. Often, there were no clear lines of responsibility with regard to risk identification and management. The evidence gathered[94] shows that in several credit institutions, there was a lack of acknowledgement at the Board level of the risk certain transactions implied, while the risk appetite was either not properly defined or not defined at all. There was also no effective monitoring of whether the limits set by the risk strategy and the risk appetite were respected. This can be illustrated by the example of UBS, where there were no clear guidance on front desk on the limits of risk exposure and lack of coordination of risk strategy.

FSA

The failure of the Royal Bank of Scotland

risk appetite when the budget was reviewed. The 2006 report[655] said that directors felt there was insufficient input to and review of risk appetite at Board level, that the Board needed to articulate its risk appetite and that a third of them did not appear to be satisfied with the Board's role in defining and developing strategy.

RBS's risk functions were involved in the final stages of the strategy-setting process. Their involvement included assessing the impact of the strategy on RBS's expressed risk appetite and its existing risk limits as part of the Annual Divisional Budget Risk Assessment Process. However, the risk functions' role in the earlier stages of the strategy formulation was very limited. There was no comprehensive risk assessment of the impact of the growth strategy at that stage; for example how changes to the assumptions underlying the strategy might increase RBS's risk profile. This was because the strategy primarily

Risk Appetite Stakeholders

Getting the Risk Appetite Agreed

The Board needs to take ownership of the Risk Appetite and challenge proposed Risk Appetite from Executive.

There are three main areas of the business that we see as forming the strategic direction of the company.

We could include HR and IT but keep our focus on where Insurance Regulation is likely to focus more.

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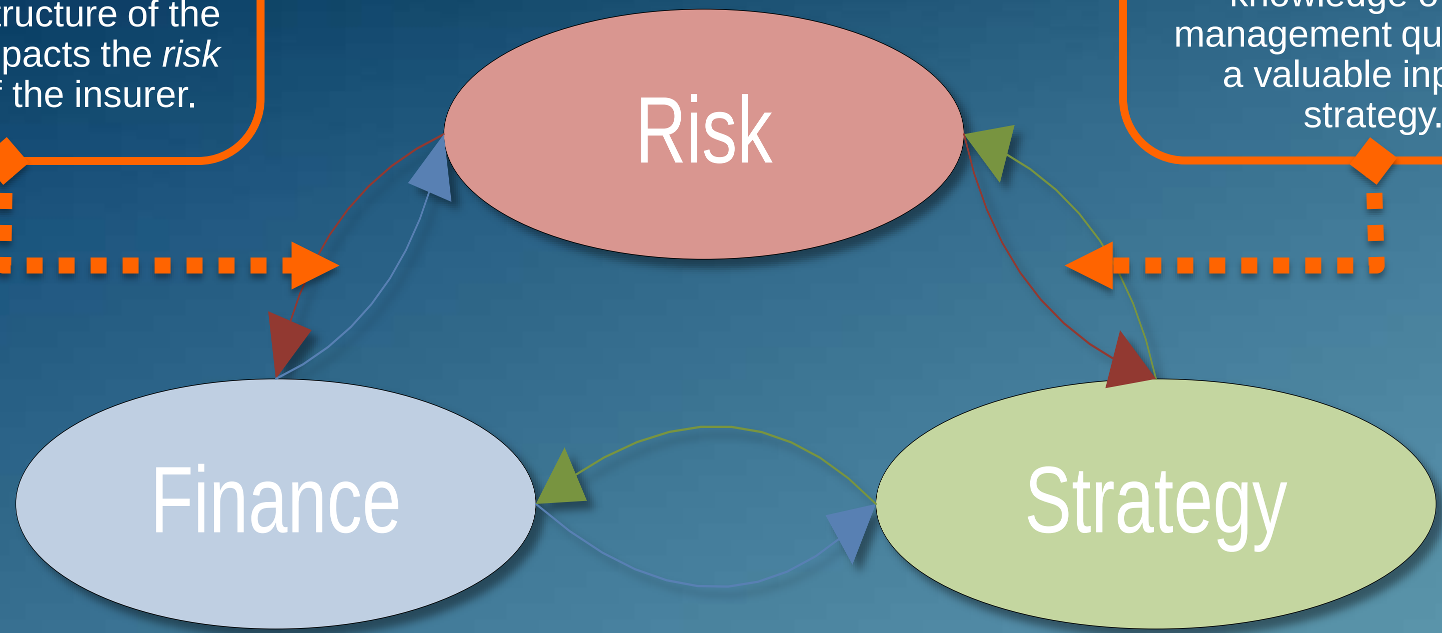
Risk Appetite Stakeholders

Executive Producers

We see three main players in the risk appetite design: Strategy, Risk and Finance.

The risk profile has consequences for the financial structure of the insurer.
Financing structure of the company impacts the *risk capacity* of the insurer.

The *strategy* is the main driver of the risk profile of the insurer.
The risk profile and knowledge of risk management quality are a valuable input to strategy.



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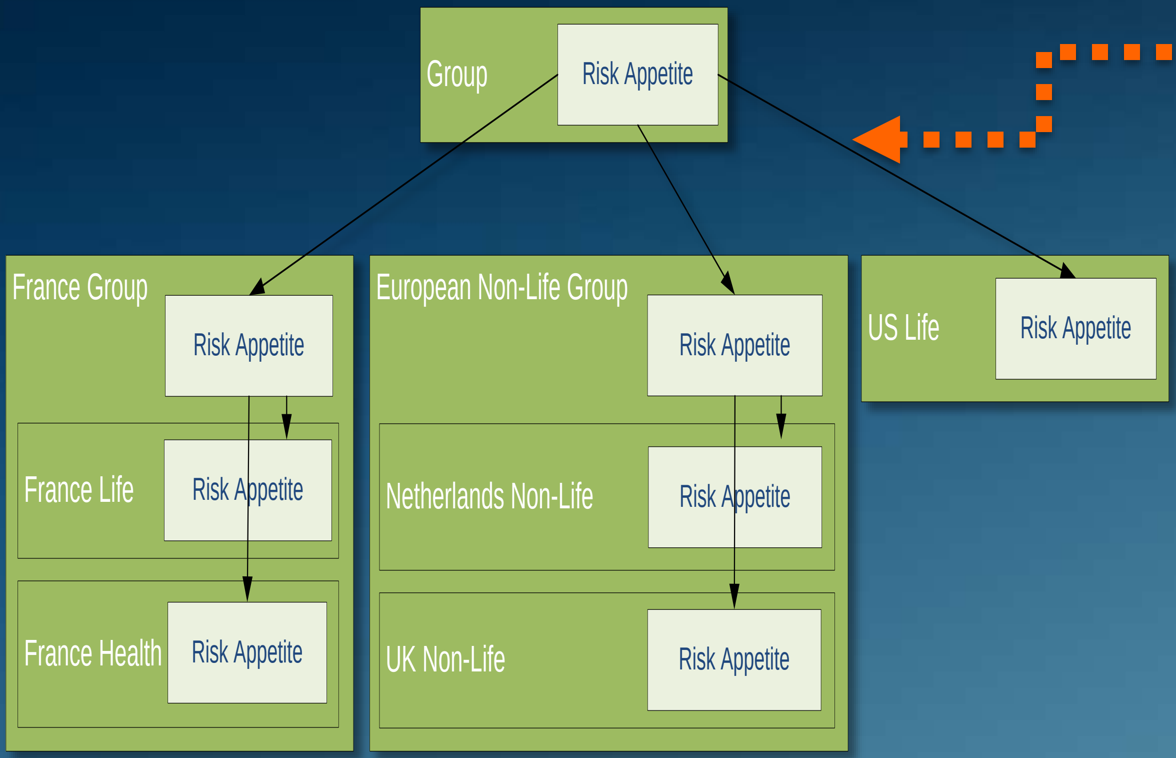
Risk Appetite Stakeholders

Engaging the business



Investors in the group would expect their investments to be subject to the strategy and risk appetite of the *group.*

However all entities need to comply with the group's regulations and all will have a Board. Therefore each business unit will have a risk appetite the local board is comfortable with.

Furthermore there are *real people* in those entities who will have to deliver to the risk appetite.

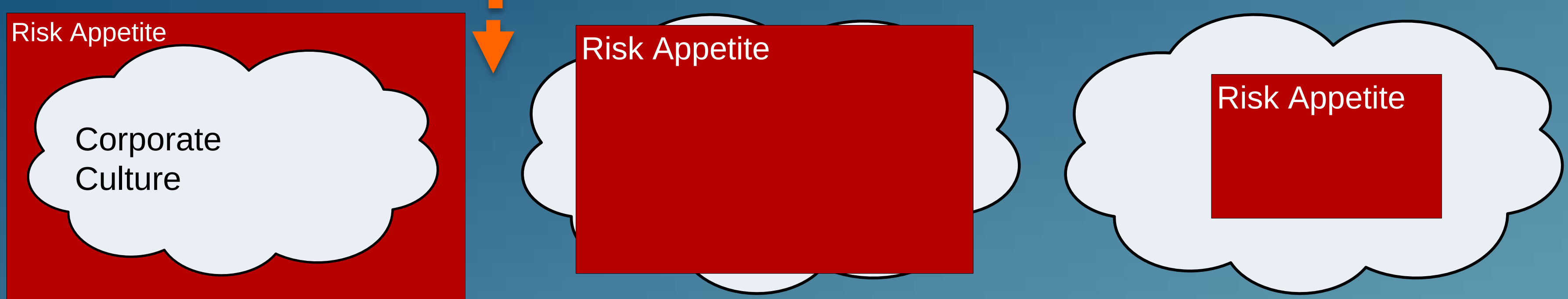
Risk Appetite Stakeholders

Risk Appetite - Risk Culture (Old) → Risk Appetite → Risk Culture (New)

Many firms find that their *risk appetite* is intimately linked to their *risk culture*.

They find that to change the *risk appetite they* need to change the (risk) culture.

How difficult this is depends on how different the target risk **appetite** is compared to the risk culture. The more different it is the more the people need to adapt (or the more the people need to change). Effective governance crucial to making this work



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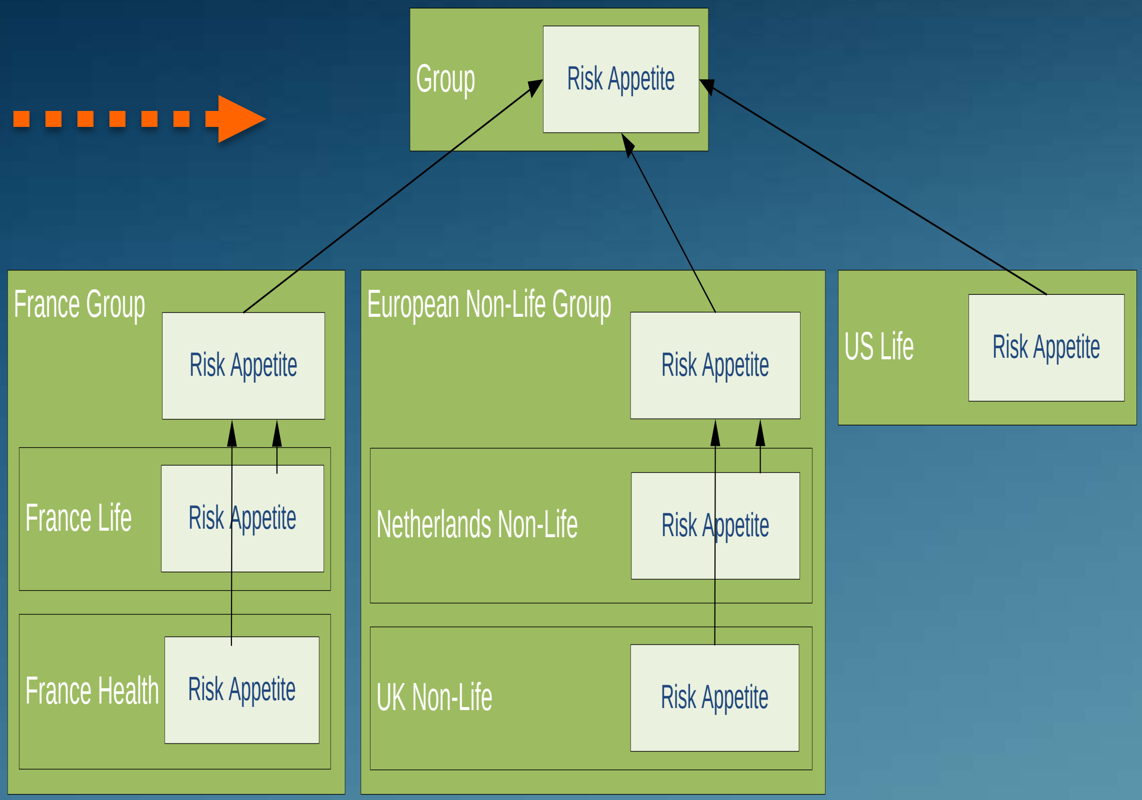
Risk Appetite Stakeholders

Corporate Culture → (de Facto) Risk Appetite

Accepting the culture of the business units can mean accepting the *de-facto* risk appetite at first of the business units. This is turn can mean that the group risk appetite is constrained by the business units it owns.

Changing risk appetite from the top *can* change / influence the risk appetite below but its success will depend on the nature of the relationship between the group and the entities. Compromises between Group and entities are almost inevitable.



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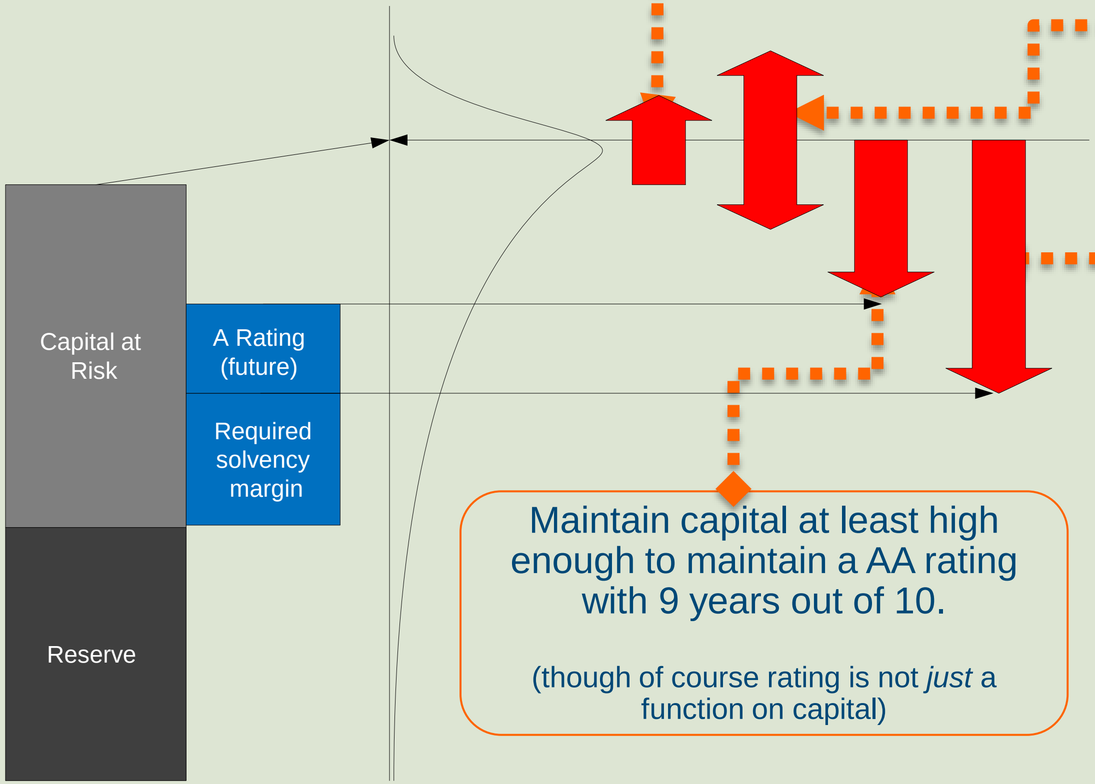
Risk Appetite Design

Quantitative Criteria Examples

Deliver an (economic) profit 7 years out of 10.

Some statements can be mapped to the probability of future capital-at-risk (own funds).



Ensure that economic profit and loss volatility is within a range of +/10%

(In practice P&L measures may well differ in how "economic" they are – IFRS Earnings, EEV Earnings are often referred to.)

Avoid regulatory intervention due to a capital requirements breach.

(typically *any* regulatory intervention is considered undesirable)

Maintain capital at least high enough to maintain a AA rating with 9 years out of 10.

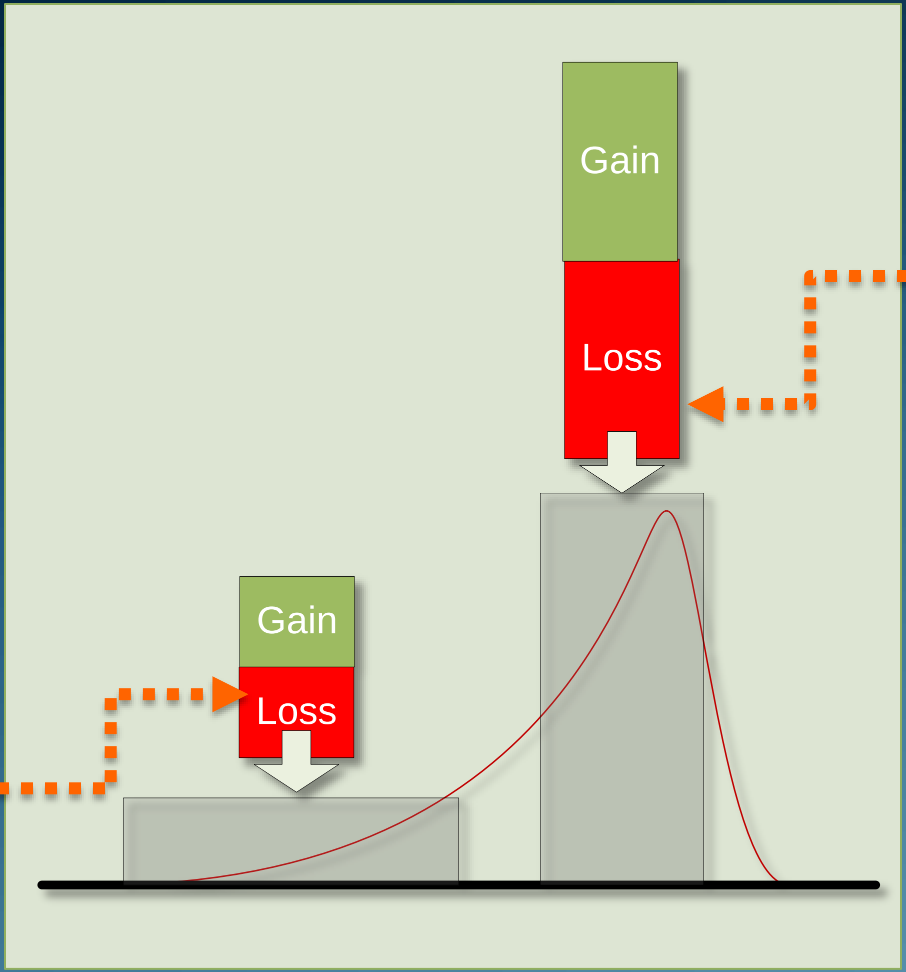
(though of course rating is not *just* a function on capital)

These statements may well impose some tough constraints on the distribution of Capital at Risk. There may need to be push-back from finance / risk on what is achievable.

Risk Appetite Design

Quantitative Criteria in Changing Circumstances

In “stressed” circumstances we might see a reined in risk appetite – boards bruised from recent losses – less prepared to take a risk – looking to consolidate and dig in until times are better.



In “normal” circumstances we might see a healthy risk appetite – boards prepared to risk the downside to get the upside.

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Risk Appetite Design

Qualitative Criteria Suggested by FSA

Box 1 – Risk appetite

Some firms have considered their risk appetite in the context of the extent of 'damage' that they are prepared to accept in all areas that underpin their strategic objectives. A discussion of what factors are important to a firm, in addition to quantum of capital may therefore be a useful starting point for considering risk appetite statements. Such factors may include (in no particular order):

- *ease of capital raising;*
- *returns to shareholders, debt-holders and customers;*
- *cost of new capital (or Ratings Agencies' ratings);*
- *fair treatment of customers;*
- *delivery of customer propositions;*
- *reputation;*
- *relationships with third parties, including regulators and governments;*
- *tolerance of a particular level of adverse press publicity; and*
- *achievement of market and other strategic objectives.*

Risk Appetite Design

Typical Statements

CAPITAL

Maintain sufficient capital to achieve at least a AA rating (19 in 20 years).

REPUTATION

Zero tolerance for any kind of reputational risk.

LIQUIDITY

Always have enough cash to meet financial obligations.

P&L

Ensure earnings volatility is in line with shareholder expectations.

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2013 Insurer Risk Appetites

PRUDENTIAL

Group Risk has responsibility for establishing and embedding a capital management and risk oversight framework and culture consistent with our risk appetite that protects and enhances the Group's embedded and franchise value. Group Compliance provides verification of compliance with regulatory standards and informs the Board, as well as the Group's management, on key regulatory issues affecting the Group. Group Security is responsible for developing and delivering appropriate security measures with a view to protecting the Group's staff, physical assets and intellectual property.

Risk appetite and limits
(Audited)
The extent to which we are willing to take risk in the pursuit of our objective to create shareholder value is defined by a number of risk appetite statements, operationalised through measures such as limits, triggers and indicators. These appetite statements and measures are approved by the Board on recommendation of the Group Risk Committee and are subject to annual review.

We define and monitor aggregate risk limits based on financial and non-financial stresses for our earnings volatility, liquidity and capital requirements as follows:

Earnings volatility: the objectives of the limits are to ensure that:

a The volatility of earnings is consistent with the expectations of stakeholders;
b The Group has adequate earnings (and cash flows) to service debt, expected dividends and to withstand unexpected shocks; and
c Earnings (and cash flows) are managed properly across geographies and are consistent with funding strategies.

The two measures used to monitor the volatility of earnings are EEV operating profit and IFRS operating profit, although EEV and IFRS total profits are also considered.

Liquidity: the objective is to ensure that the Group is able to generate sufficient cash resources to meet financial obligations as they fall due in business as usual and stressed scenarios.

Capital requirements: the limits aim to ensure that:

a The Group meets its internal economic capital requirements;
b The Group achieves its desired target rating to meet its business objectives; and
c Supervisory intervention is avoided.

The two measures used are the EU Insurance Groups Directive (IGD) capital requirements and internal economic capital requirements. In addition, capital requirements are monitored on both local statutory and future Solvency II regulatory bases.

We also define risk appetite statements and measures (ie limits, triggers, indicators) for the major constituents of each risk type as categorised and defined in the Group Risk Framework, where appropriate. These appetite statements and measures cover the most significant exposures to the Group, particularly those that could impact our aggregate risk limits. The Group Risk Framework risk categorisation is shown in the table below.

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2013 Insurer Risk Appetites

	Market risk	Credit risk
Definition	The risk that arises from the Group's exposure to market movements which could result in the value of income, or the value of financial assets and liabilities, or the cash flows relating to these, fluctuating by differing amounts.	The risk of exposure to loss if a counterparty fails to perform its financial obligations, including failure to perform those obligations in a timely manner. It also includes the risk of a reduction in the value of assets due to a widening of mortgage, bond and swap spreads.
Appetite	The Group has appetite for market risk exposures that arise as a consequence of core strategic activity. Business units are expected to limit market risk exposures by matching the features of liabilities to features of assets. Exposures may be incurred where there is an overriding business need and specific appetites will be established as necessary. Exposures may also be incurred with surplus assets subject to limits on the quantum and term of exposures.	The Group has an appetite for credit risk to the extent that acceptance of this risk optimises the Group risk-adjusted return. However, the Group has limited appetite for significant losses arising from counterparty failures and maintains robust risk limits which business units must adhere to.

Demographic and expense risk	Liquidity risk	Operational and strategic risk
The risk that arises from the inherent uncertainties as to the occurrence, amount and timing of future cash flows due to demographic and expense experience differing from that expected. This includes risks relating to insurance and investment contracts.	The risk that the Group is unable to realise investments and other assets in order to settle its financial obligations when they fall due, or can do so only at excessive cost.	Operational risk is the risk of adverse consequences for the Group's business, resulting from inadequate or failed internal processes, people or systems, or external events. Strategic risk is the risk associated with the robustness of the planning process and threats to achieving our strategy.
The Group has an appetite for demographic risks since we expect acceptance of such risks to be value additive and limits are established to reflect planned business activities. The Group recognises expense risk may arise from core strategic activity but has limited appetite for significant expense over-runs.	The Group always aims to meet its liabilities as they fall due.	The Group recognises that core strategic activity brings with it exposure to operational risk. However, the Group has limited appetite for large operational losses due to the related reputational damage and opportunity costs. The Group seeks to manage existing operational risk exposures and proactively control new exposures.

Silo approach, very generic statements about risk

2013 Insurer Risk Appetites

Risk appetite metrics

Measure	Severity	Explanation
Earnings at Risk (EaR)	1 in 10	The reduction in pre-tax IFRS adjusted operating profit (AOP) over a one-year forward-looking time horizon that should only be exceeded once in 10 years (90% confidence level). EaR is an indicator of potential earnings volatility (shareholder measure).
Economic Capital at Risk (ECaR)	7 in 10,000 (1 in 200 from 2014 onwards)	The reduction in post-tax economic value (broadly defined as a market value balance sheet basis for insurance entities and IFRS equity for other companies) over a one-year forward-looking time horizon that should only be exceeded seven times in 10,000 years (99.93% confidence level that the event will not occur). During 2013, the confidence level for our internal measure was reviewed, and from 2014 onwards we will calculate our ECaR using a 1 in 200 year severity, which is more closely aligned to the emerging regulatory capital standard. ECaR helps us to optimise risk-based decisions. The stress tests underlying ECaR allow us to monitor our exposures and deepen our understanding of where the business could further improve its capital allocation. ECaR is similar to the 'solvency capital requirement' measure in Solvency II and has been calculated and used within the Group for more than five years. It provides an internal view of required capital and risk profile (ie. relative risk exposures and directional interactions) to support strategy. The methodology allows for diversification both between different risks within entities and across sectors and territories.
Cash Flow at Risk (CFaR)	1 in 10	The reduction in the cash portion of earnings over a one-year forward-looking time horizon that should only be exceeded once in 10 years (90% confidence level).
Operational risk (OpRisk)	1 in 10	The reduction in pre-tax economic value due to once in 10 years unexpected operational loss events (90% confidence level).

* During 2014 a risk culture metric will be included

2013 Insurer Risk Appetites

Risk appetite

Risk appetite is an expression of the level of risk we are willing and able to accept in pursuit of our strategic objectives and thus provides the context for our risk and capital management.

The following appetite statements, which are reviewed and approved by the Board, demonstrate a key focus on balance sheet strength and protection of the franchise value. They supplement risk appetite statements relating to the regulatory solvency position.

- Economic capital: the Aviva Board requires that the Group has sufficient capital to remain able to meet its liabilities in extreme adverse scenarios, on an ongoing basis, calibrated consistently with the Group's strategic target of maintaining a credit rating in the AA range.
- Liquidity: the Board requires that the Group maintains significant liquid resources to meet both planned cash outflows and cover unexpected cash requirements under stress conditions. In addition, the Group maintains substantial unutilised committed credit facilities to cover extreme adverse scenarios.
- Franchise value: we recognise that our long-term sustainability depends upon the protection of our franchise and our relationship with customers. As such, we will not accept risks that materially impair the reputation of the Group and we will require that customers are always treated with integrity.

2013 Insurer Risk Appetites

BNP PARIBAS

Risk appetite is defined as the risk level by type of risk BNP Paribas is willing to accept in support of its business strategy.

At Group level, risk appetite is expressed through:

- risk appetite principles and related metrics, specified in four categories:

-> risk adjusted profitability and growth

-> capital adequacy

-> funding and liquidity

-> concentration

- key qualitative principles, especially on risks that are hardly quantifiable by nature such as reputation risk or operational risk, as well as qualitative guidelines stemming from the decisions of the various executive risk forums.

The risk appetite thus defines BNP Paribas' overall medium to long term appetite for risk taking. This statement allows to:

- define an explicit and forward-looking view of the Group's desired risk profile;
- guide risk taking activities within the boundaries of the stated risk appetite, and enhance the consistency of risk practices throughout the Group;
- monitor risk profile, thus contributing to proactively manage risks, capital and liquidity in a controlled and optimized way;
- facilitate the dialogue with the Board and with the supervisors.

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2013 Insurer Risk Appetites

PHOENIX GROUP

RISK APPETITE

The Group's risk appetite framework consists of a set of statements and targets that articulate the level of risk the Group is willing to accept, in pursuit of shareholder value and achievement of the Group's strategic objectives. The statements encapsulate policyholder security, earnings volatility, liquidity and the internal control environment as follows:

- **Capital** – The Group and each life company will hold sufficient capital to meet regulatory requirements in a number of asset and liability stress scenarios.
- **Cash flow** – The Group will seek to ensure that it has sufficient cash flow to meet its financial obligations and will continue to do this in a volatile business environment.
- **Embedded value** – The Group will take action to protect embedded value.
- **Regulation** – The Group and each life company will, at all times, operate a strong control environment to ensure compliance with all internal policies and applicable laws and regulations, in a commercially effective manner.

The risk appetite and control framework supports the Group in operating within the boundaries of these statements by seeking to limit the volatility of key parameters, under a range of adverse scenarios agreed with the Board. Risk appetite limits are chosen which specify the maximum acceptable likelihood for breaching the agreed limits. Assessment against the appetite targets is undertaken through scenario testing. Breaches of appetite are corrected through management actions where appropriate.

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- Risk Appetite Execution

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Risk Appetite Execution

But what does it all mean for me ?

- The risk appetite statements presented are very general!
- But never fear, underlying these broad statements is something much more concrete (thankfully!!)
- So how do we go about defining a risk appetite statement for a company ?

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Risk Appetite Execution

Defining a risk appetite statement

- Step 1 : Engagement management!!!
  - The buy in of management is critical to the success of the implementation of any risk appetite statement
- How?
  - Talk in their language!
  - What is important to senior management ?

Risk Appetite Execution

Definition of the key global risk indicators

- Although the appetite statement presented before are very general, we notice that it's the stuff management cares about that comes through :

Measure	Prudential	Standard Life	Old Mutual	Aviva	BNP	Phoenix
Capital	x	x	x	x	x	x
Profitability	x	x	x		x	
Value / EV				x		x
Regulation						x
Liquidity	x	x		x	x	x
Concentration		x			x	

Risk Appetite Execution

Definition of the key global risk indicators

- **Management often cares about :**

Capital	• if they don't have enough, the regulator comes knocking on their door.
Profitability / EV	• if they don't deliver, the shareholders come knocking on their door
Liquidity	• if they can't pay their debts, policyholders (and then everyone else) comes knocking on their door

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Risk Appetite Execution

Definition of the key global risk indicators

- For each of these measure, we need to define the KRI the management wishes follow. Some typical examples are :

Capital	• Regulatory capital • Internal model capital • Rating agency capital
Profitability / EV	• IFRS profits • Return on equity • Embedded value
Liquidity	• Total cash position

Risk Appetite Execution

Definition of the targets

- Step 2 : For each of the key global risk indicators define the reasonable minimum level at which the company wants to operate
  - Management (or even the board) generally has a good idea of what is the minimum they wish to maintain

- Typical examples
  - Regulatory Solvency Ratio should be no less than 150% => for listed companies this is often linked with some rating objective
  - Projected profits no less than 90% of budgeted profits

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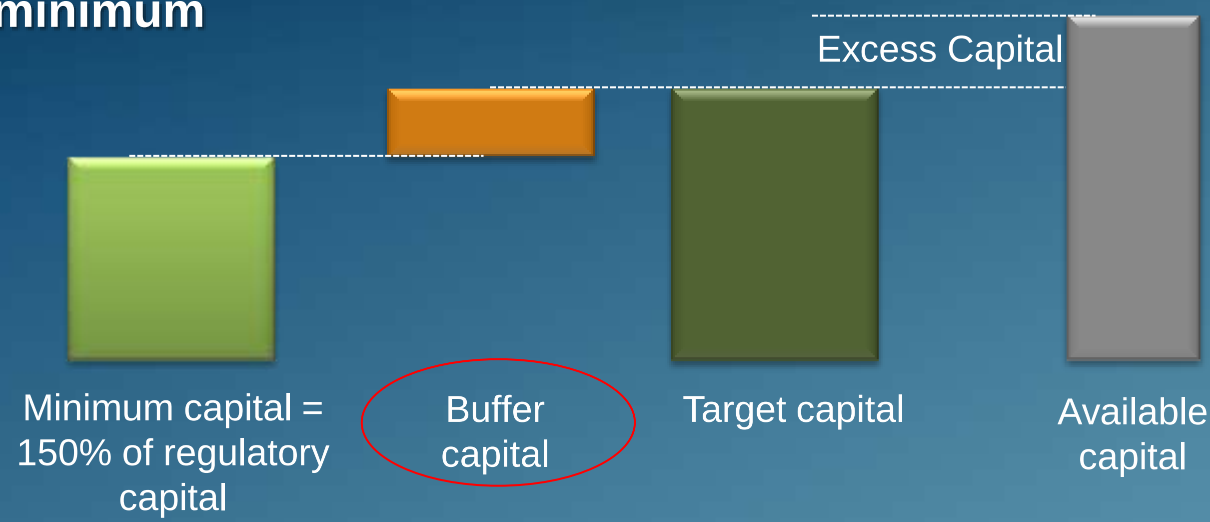
Risk Appetite Execution

Minimum capital levels

- For capital, a company can not simply maintain the minimum level of capital as any small adverse shock will force the company to have less capital than the minimum.
- As a result, the company needs to maintain some buffer capital over and above the minimum



- But how to define the buffer capital ?

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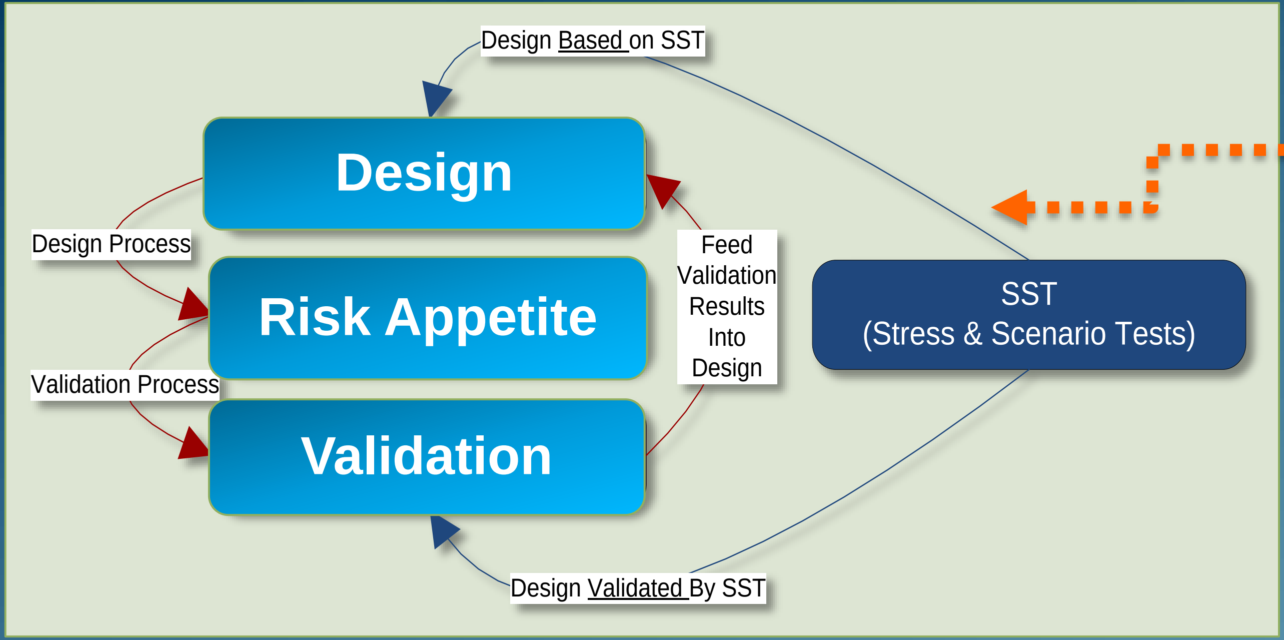
Risk Appetite Execution

Definition of the stresses

- **Step 3 : Define the level of stress that the company must sustain to hit the minimum level**
  - **This is where it gets more complicated!**



Various opinions exist on to what extent stress and scenario tests play a role – some prefer to use in the design – some prefer to use them to validate.

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Risk Appetite Execution

Definition of the stresses

- Often start with a position but expect to refine
  - Following a 1:20 year event the Board expects to have sufficient capital to maintain a solvency ratio of 150%.

- The management often has no idea what a 1:10, 1:20 or 1:50 year stress looks like
  - It is the role of the risk team to guide the management and make it come to life!

Risk Appetite Execution

Definition of the stresses

- What does a 1:20 (95th percentile) scenario mean ?

- We need to define :
  - Which risks are included in the risk appetite ?
  - How to calibrate the a 95% percentile stress ?

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Risk Appetite Execution

What Risks to be Covered?

- Insurance risks
  - Mortality / Longevity
  - Persistency
  - Catastrophe risks
  - Product design risks
- Market risks
- Credit risks
- Liquidity risks
- Operational risks
- Others

Risk Appetite Execution

Quantitative VS Qualitative Risks

Quantitative

- Insurance risks
- Market risks
- Credit risks
- Liquidity risks

Qualitative

- Operational risks
- Others

- Any risk factors can be included in a risk appetite statement, but often we aim to reduce it to the key quantitative risk factors
- Setting up of risk appetite will be an iterative process

Risk Appetite Execution

Calculation of the stresses

- **The definition of the stress levels uses standard calibration techniques and depends on the risk**
  - Market risk :
    - Equities : lognormal, SVJD, AR-GARCH
    - Interest Rates : PCA (principal component analysis), AR-GARCH
  - Lapse risk : t-student, bootstrap
  - Mortality / longevity : t-student, stochastic mortality modelling (Lee-Carter, Brouhns-Denuit, ..)

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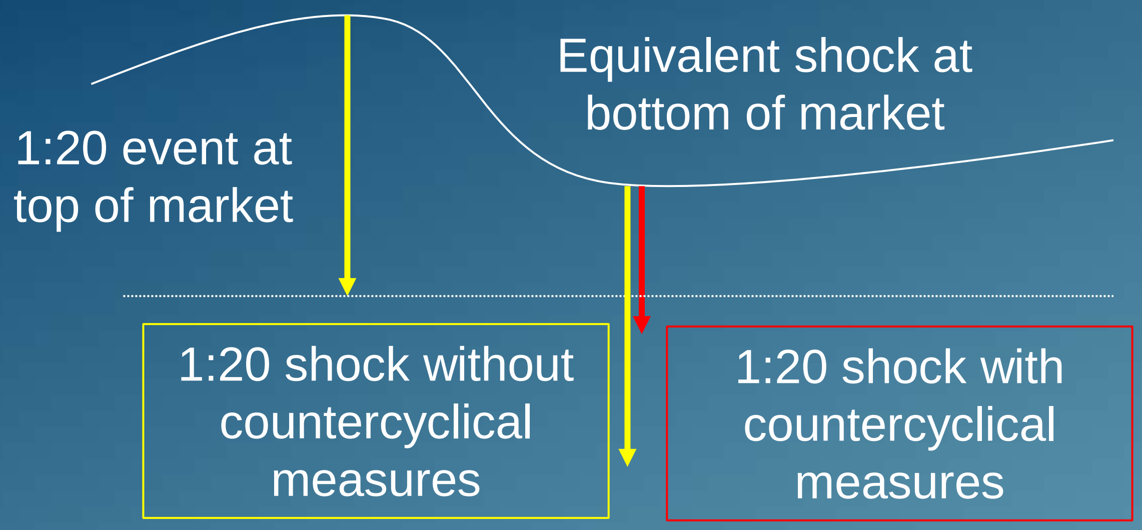
Risk Appetite Execution

Countercyclical scenarios

- **The problem with calibration based on historic data is that it gives the same level of shock irrespective of the point in the business cycle**
- **Can introduce some countercyclical elements**



Risk Appetite Execution

Countercyclical scenarios – example : equity shock

- **The calibration of the equity can be based on a « central » shock plus a cyclical adjustment factor :**
  - **Step 1 : – Calculation of the "central" shock**
    - **The retained index for the calibration of the shock should be based on the most index most appropriate for the insurers portfolios**
    - **Similarly, the insurer should choose the level of shock based on the relevant percentile as per the risk tolerance of the company.**
    - **The following table gives the example of the distribution of the MSCI Europe, assuming a normal distribution of the log returns based on a historic between 1973 and 2009 :**

Percentile	99.5%	99.0%	95%	90%
Level of shock	-43%	-38%	-25%	-18%

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Risk Appetite Execution

Countercyclical scenarios – example : equity shock

- **Step 2 – calculation of the adjustment factor**

The symmetric adjustment factor (SAF) is :

$$SAF = ((CI - AI)/AI - \text{Average}) / \text{StandardDeviation}$$

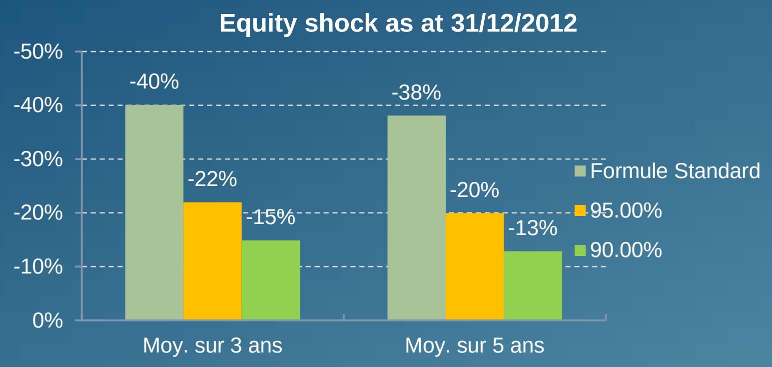
Where

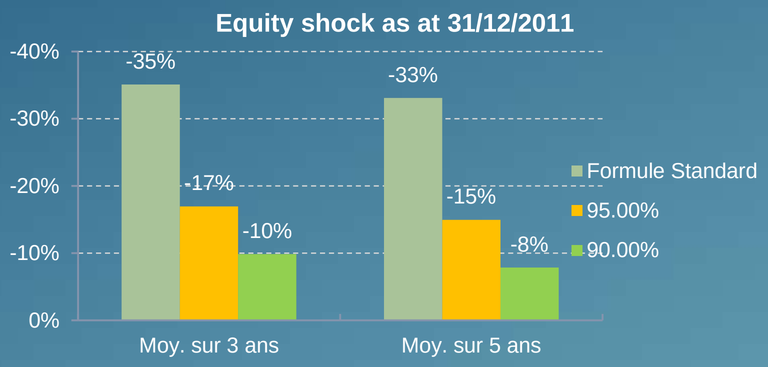
CI (current index) = current level of the index at the evaluation date

AI (average index) = average level of the index over the previous 3 or 5 years

Average and StandardDeviation = average and standard deviation of the $(CI - AI)/AI$ over the full data history

Example in the case of the MSCI Europe :





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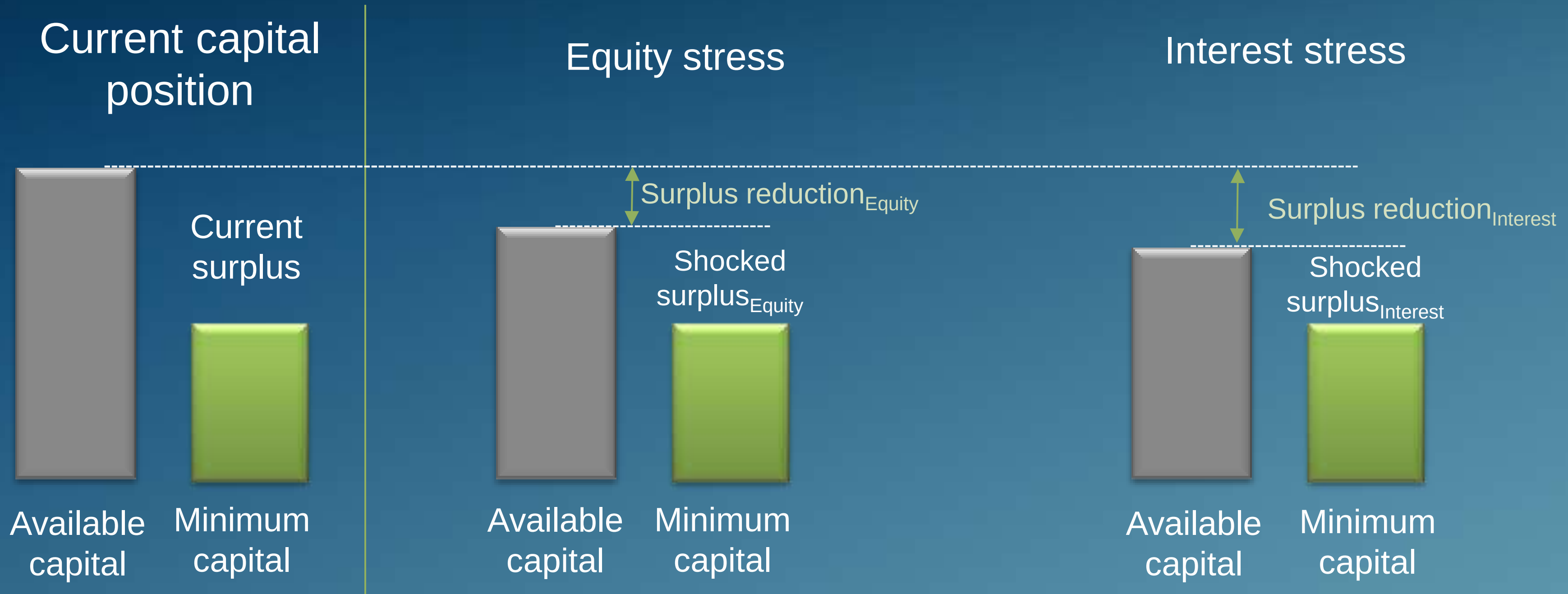
Risk Appetite Execution

Definition of the key global risk indicators

- **In order to calculate the buffer capital, we will apply the shocks individually as a first step**



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Risk Appetite Execution

Combined stresses

- Companies often include one or several combined stresses
  - Generally we will pick the major sources or risk or ones that are known to be correlated (eg. Interest rates and lapses)

- It is important to reduce the base shocks when creating a combined shock to get the same intensity of event
  - A 95th percentile equity shock combined with a 95th percentile interest shock will result in a much higher than 95th percentile
  - The shock levels need to be reduced

Risk Appetite Execution

Combined stresses

- **A very simplified approach : Percentile of a normal distribution**
  - **Assumption :**
    - **The intensity of the shock follows approximately a normal distribution**
    - **The shocks are correlated amongst themselves.**
  - **The intensity of the combination of several shocks also follows a normal distribution but with different parameters ;**
  - **A reduced percentile can be deduced based on the initial percentile for each of the individual shocks**

Number of risk factors included in the shocks	Reduced percentile shocks Assumption : 0% correlation between the risk factors	Reduced percentile shocks Assumption : 50% correlation between the risk factors
1 risk factors shocked	95%	95%
2 risk factors shocked	88%	92%
3 risk factors shocked	83%	91%
4 risk factors shocked	79%	90%
…	…	…

!! Method is based on two heavy assumptions :
- *No account taken for the volatility of each individual risk ;*
- *Impact of individual risk on capital not accounted for.*

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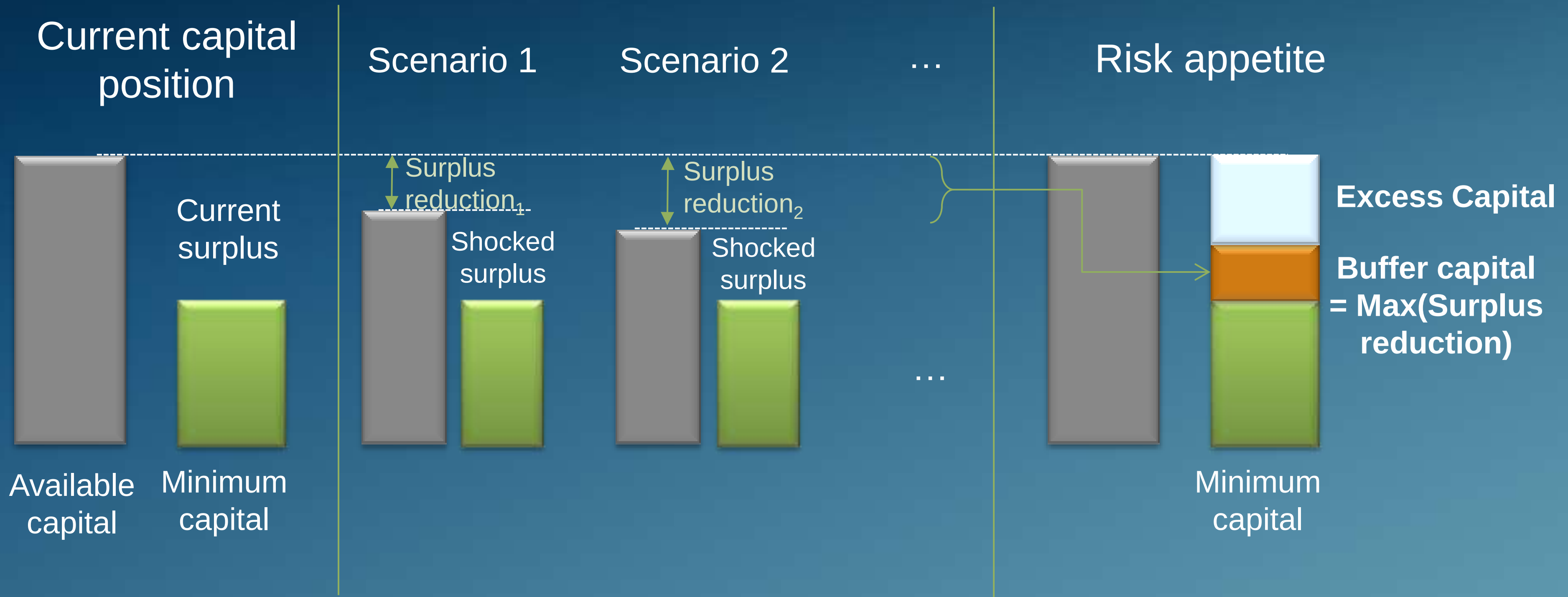
Risk Appetite Execution

Final risk appetite

- **The final capital buffer is the scenario that generates the greatest reduction in surplus capital**



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Risk Appetite Execution

Final risk appetite

- **The validation of the risk appetite by the management means that it must be translated into something more tangible**
- **Generally rather than talking about a 95th percentile, we present the stresses as either a stress level or, even as an absolute level.**
- **An example of the risk appetite statement for one company is :**

Available Capital
> X% internal model capital

Where X =

	Limit
Base case	140%
Stresses *	130%

And stresses defined as :

Equity drop:	Market values of all equity investments drop by 25%.
Interest rates up:	Parallel shift in yield curves by 250 bps up.
Interest rates down:	Parallel shift in yield curves by 200 bps down.
Combined scenario:	Drop in market values of all equity investments by 10% and parallel shift in yield curves by 80 bps up.

Risk Appetite Execution

Final risk appetite

- **The risk appetite should be in a reasonable range**
  - **If the available capital does not even cover the minimum capital + buffer capital, then potentially stress levels too high (or simply company too risky!)**
  - **If excess capital is very high, potentially the stresses are too low (or could be that company is in high growth phase)**

Risk Appetite Execution

Final risk appetite

- The risk appetite should be an integral part of the decision making of the firm
  - Any decision that is made should be judged through the impact it has on the excess capital within the risk appetite of the firm
  - The risk appetite including the buffer capital is the capital measure that should be used to judge the capital consumption when pricing products (not just the regulatory capital)

- Although we have focused on capital, a similar approach will be used for other measures (profits, embedded value, return on equity, …)

Why Risk Appetite matters

Sets the tone for how business should be done:

- Clear about outcomes that matter
- Clear about acceptable variation over different timescales
- Clear about which reasons for variation are acceptable

Provides the basis against which culture, performance, decisions are all judged

- Opportunities clearly assessed against core outcomes
- Ensures attitude to local tasks influenced by effect on global outcomes
- Culture guided by “reasons” for variation
- Use risk budgets to emphasize “good” risks

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