RISK CONTROL

ICAAP for Asset Managers:
Risk Control Limited

March 2015

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Contents

RISK CONTROL

A Research-Led Risk Management Consulting and Software Company

Company Profile

Risk modelling expertise with proprietary algorithms, tools and quantitative models

- Risk Control is a risk management software and consulting company based in London
- Founded in 2000, Risk Control is led by William Perraudin, who is also an adjunct Professor and former Chair of Finance at Imperial College London, specialising in the field of risk
- Risk Control staff include highly qualified financial engineers and mathematicians
- They specialise in calculating and measuring multiple types of risk in the context of:
  - Credit VaR for retail, corporate and sovereign portfolios
  - Scenario analysis and stress testing of portfolios and financial statements
  - Operational risk for banks and asset managers

Brief History

Risk Control and Professor Perraudin have worked with major regulators, central banks and commercial institutions on risk and funding issues. Examples include:

- Analysis of Basel III liquidity and capital rules for banks and regulators
- Development and implementation of stress testing applications for global banks
- Credit VaR modelling with bespoke factor structures for multiple banks and insurance companies
- Prior to forming Risk Control, Professor Perraudin was involved in devising the financial engineering that underlies Basel II

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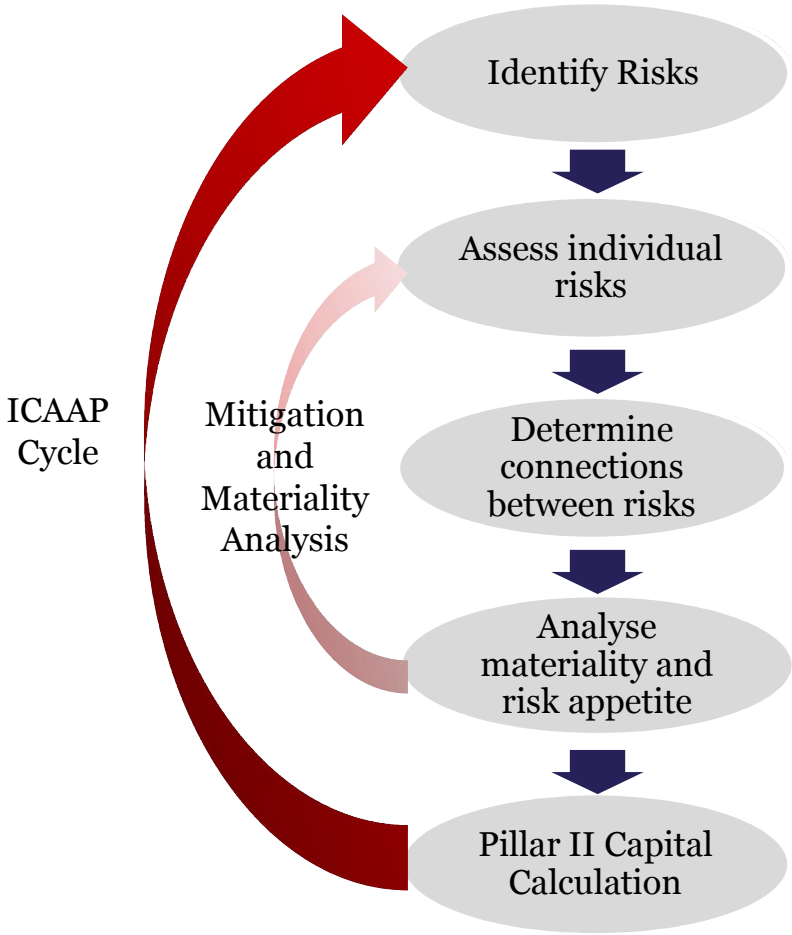
Contents

- Pillar II ICAAP: Overview and Step by Step

ICAAP: Overview



Identify individual risk events and categorise them.

Working cooperatively, risk owners are assigned to each event and parameters of each risks are determined.

Risk events can be connected in different ways. Group of connected risk events should be analysed and appropriate correlations should be determined.

Classify risk events into material and immaterial according to the firm's risk appetite and compare the potential losses with projected earning and capital.

Potential losses arising from material risks need to be covered by Pillar II capital.

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ICAAP: Identify Risks

Risk Category

Credit Risk	• Failure of bank counterparty • Credit events affecting linked entities such as parents	• Failure of customers
Market Risk	• Market disruption leading to withdrawal of funds • Sudden market movements combined with clearing problems	
Operational Risk	• IT failures • Personnel issues	• Frauds internal and external
Business Risk	• Loss of clients • Regulatory problems	• Reputational damage • Key person problems
Strategy Risk	• Hidden costs in takeovers • Parent entity withdrawal from UK	• Capital shortage
Other Risks	• Liquidity risk • Model risk	• Concentration risk

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ICAAP: Assess Individual Risks

Risk Owners

Key actors in risk assessment:
(1) Risk specialists
(2) Business specialists
(3) Senior management

Risk specialists and business specialist may be given specific roles as "risk owners" who determine likelihood, severity of events, and suggest mitigating actions.

Determining Parameters

Typical sources for informed decisions on parameters include:
(1) Expert judgement
(2) Experience from other firms
(3) Academic evidence
(4) Industry standards

ICAAP risk parameters can be informed by external data but are specific to the business and require extensive use of expert judgement within an orderly framework.

Cooperative Working

Stakeholders in ICAAP:
(1) Risk specialists
(2) Business specialists
(3) Senior management

Risk events and parameters should be evaluated through cooperative efforts of senior management, business and risk specialists. Reviews should occur regularly, and should feed into board decisions. It is important to have well organised routines with efficient exchanges of information.

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ICAAP: Determine Connections between Risks

Correlation within groups

Events of the same type may be correlated with each other to the same degree. For example, various IT related risks, such as a virus attack, loss of confidential information stored in IT systems and IT infrastructure failure may be correlated to each other in one group.

Correlation between groups

Groups of events may be linked to each other. For example, regulatory problems and reputational damage may happen at the same time. A correlation may be given to these two groups of events.

Conditional probability

Probability of events occurring given another event occurring across different type. For example, default in a Euro zone country may lead to a financial institution in the country having to withdraw its supports to foreign subsidiaries. Risks like these are connected but hard to quantify by a single correlation measurement.

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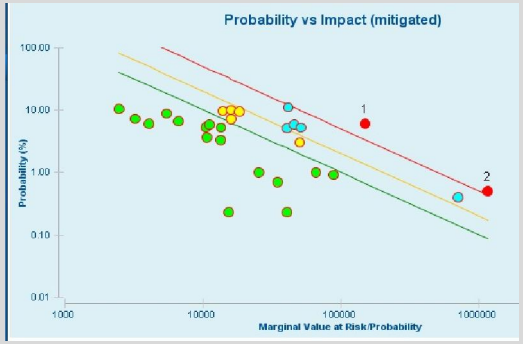
ICAAP: Determine Risk Appetite and Calculate Pillar II Capital

1. Risk Frontier



2. Material vs. Immaterial

According to the firm's risk appetite, one will assign risks to the north-east corner of the risk frontier in probability-impact graph as "material" or to the south-west corner as "immaterial".

The material and immaterial risks are covered by capital and projected earnings respectively.

3. Recalculate VaR

Value at Risk (VaR) measures the level of losses that will be exceeded with a given confidence level.

One may calculate VaR for each group (material and immaterial) and compare them with capital and projected earnings.

4. Review materiality, mitigating actions and capital requirement

If projected earnings or capital do not cover the potential losses measured by VaR, the firm needs to review the materiality of individual risks, take mitigating actions against some risks or boost capital.

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Example Risk Report: Capital Analysis

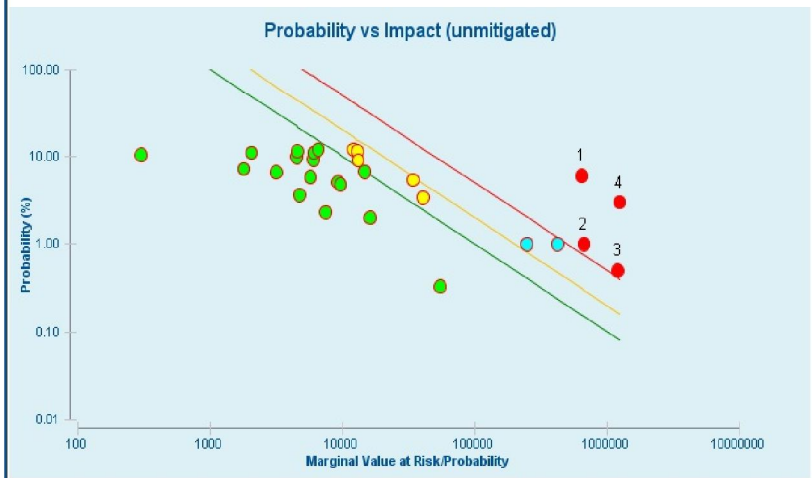
Showing page 1 of 4

Unmitigated Total Portfolio Results

Mean Total Loss	Volatility	Skewness	Kurtosis	Value at Risk
1,568,160	2,127,892	3.25	15.20	10,966,333

Mitigated Total Portfolio Results

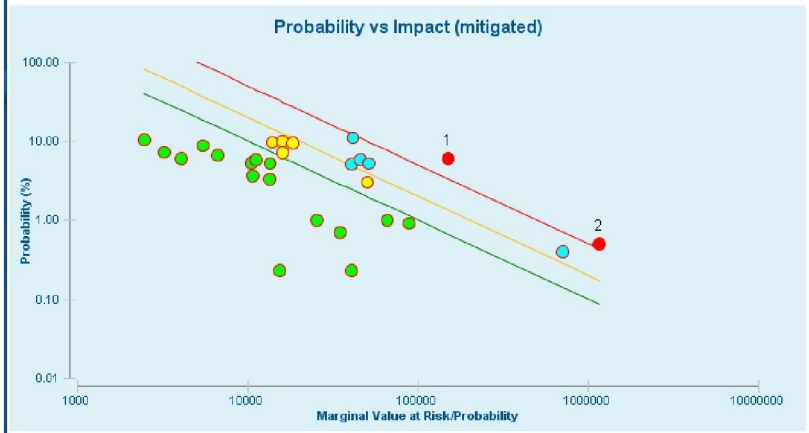
Mean Total Loss	Volatility	Skewness	Kurtosis	Value at Risk
931,651	1,025,980	2.06	8.33	4,346,448



Label	Name of Risk	Marginal VaR
1	Sovereign debt crisis	3,870,931
2	Lack of available capital	671,414
3	Failure of parent company	603,975
4	Failure of Euro	3,745,308

Risk Type	Total VaR	Capital/Earnings	Differences
Unmitigated			
Material	13,501,631	5,000,000	-8,501,631
Immaterial	7,200,870	10,000,000	2,799,130
Mitigated			
Material	4,806,386	5,000,000	193,614
Immaterial	7,200,870	10,000,000	2,799,130

Showing page 2 of 4



Label	Name of Risk	Marginal VaR
1	Sovereign debt crisis	902,963
2	Failure of parent company	580,494

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Example Risk Report: Top Five Risk Events

		Unmitigated Prameters			Mitigated Parameters		
Risk ID	Risk Name	Likelihood	Mean severity	Volatility	Likelihood	Mean severity	Volatility
6	Failure of Euro	0.03	4,000,000	2,262,742	0.03	1,100,000	466,690
5	Sovereign debt crisis	0.06	3,500,000	1,484,924	0.06	1,700,000	721,249
1	Failure of parent company	0.005	7,000,000	4,200,000	0.005	5,000,000	2,121,320
17	Fraud	0.034	2,400,000	1,319,782	0.0023	650,000	91,924
11	Third party legal action	0.054	1,800,000	1,018,234	0.053	500,000	212,132

		Unmitigated Results			Mitigated Results		
Risk ID	Risk Name	Mean Loss	MVaR	Volatility of Loss	Mean Loss	MVaR	Volatility of Loss
6	Failure of Euro	211,337	1,596,542	910,073	33,252	139,457	205,552
5	Sovereign debt crisis	121,041	1,131,781	793,527	102,649	769,359	442,036
1	Failure of parent company	35,629	437,284	580,171	25,519	292,664	386,151
17	Fraud	82,194	399,007	500,612	1,448	2,996	30,979
11	Third party legal action	97,387	381,866	471,171	26,585	64,169	122,404

Risk ID	Risk Name	Description of Mitigation
6	Failure of Euro	Diversify into other currencies
5	Sovereign debt crisis	Limit exposure to each country
1	Failure of parent company	Detailed contingency planning
17	Fraud	Insurance
11	Third party legal action	Improve internal procedures

RISK CONTROL

Contents

- What we can offer

Our offer

Identify Risks	Assess Individual Risks	Determine Connections Between Risks	Determine Risk Appetite	Pillar II Capital Calculation
We can help you implement a structured process of questionnaires, interviews and workshops, with risk and business specialists and board members to identify key risks.	Using data and proprietary methodologies, we can supply "first-pass" parameters sets for your risks. Working with your business risk specialists, we can link risks to your firm's growth strategy, reflecting precisely the risk outlook your firm faces.	Understanding connections between events is essential for assessing firm wide risks, risk appetite, and appropriate capital. Again our proprietary data and expertise can suggest benchmarks for correlations.	Firms wish to analyse risks as (1) material to be covered by capital and (2) "within their appetite" to be covered by projected earnings. *Risk Monitor™* allows users to analyse materiality and determine whether mitigating actions are required.	Having refined parameters and understood event connections (correlations), *Risk Monitor™* assesses appropriate capital and whether immaterial risks are indeed covered by earnings.

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