



# How do firms incorporate the COVID-19 impact into their ICAAP?

Dr Mustafa Çavuş

June 2020

© Monte Carlo Plus

[www.montecarloplus.com](http://www.montecarloplus.com)

# About us

- We license **Monte Carlo simulation software** (Monte Carlo Plus) for calculating capital requirements from operational risks scenarios
- We carry out **model validation and risk audit** for financial firms
- List of references and clients >

 <p><i>Asset Management:</i></p>	 <p><i>Broker:</i></p>	 <p><i>Asset Management:</i></p>	 <p><i>International Banking:</i></p>	 <p><i>Broker:</i></p>	 <p><i>Asset Management:</i></p>
 <p><i>HF Trader:</i></p>	 <p><i>Asset Management:</i></p>	 <p><i>Bank:</i></p>	 <p><i>Insurance:</i></p>	 <p><i>Bank:</i></p>	 <p><i>Bank:</i></p>
 <p><i>Asset Management:</i></p>	 <p><i>Asset Management:</i></p>	 <p><i>Bank:</i></p>	 <p><i>Asset Management:</i></p>	 <p><i>Asset Management:</i></p>	

# Our SW> Simple to Use, no Previous Experience Required

The screenshot displays the 'Monte Carlo Plus' software interface. The main window is titled 'RUN MC' and features a navigation menu at the top with options: Overview, Economic/Regulatory Capital, RAROC, and Insurance Pricing. Below this, there are tabs for 'Basic Inputs', 'Correlations Input', 'Run Simulation' (which is active), 'General Report', 'Detailed Report', and 'Visualise Risk Profile'.

The 'RUN MC' section includes the following controls:

- Confidence Level: 99.50% BBB+ (dropdown menu)
- No. of Trials: 10,000 (dropdown menu)
- Seed Value: 1 (text input)
- T-Copula (checkbox)

A central flow diagram illustrates the simulation process:

- Inputs: Likelihood (%) and Typical/Worst Case Impact (£/£££).
- Parameters: C. L. (%), Iterations #, Seed #, and Copula.
- Action: A large play button labeled 'RUN SIMULATION'.
- Output: Random #s (represented by a scatter plot).
- Analysis: Loss Distributions (represented by a bell curve).
- Final Results: A histogram and a table icon.

MONTE CARLO SIMULATION:

- > MC SIMULATION IS RUN IN THIS TAB, IF IN PREVIOUS TABS LIKELIHOOD AND IMPACT VALUES HAVE BEEN SAVED.
- > NO CORRELATION INPUT IS NEEDED IF THE USER ASSUMES THAT ALL RISKS ARE INDEPENDENT OF EACH OTHER.
- > MC SIMULATION WILL RUN WITH DEFAULT ASSUMPTIONS SET FOR CONFIDENCE LEVEL, NUMBER OF ITERATIONS, SEED NUMBER.
- > THE COPULA IS A METHOD FOR AGGREGATION OF RISKS DURING SIMULATION. IF THE CHECK BOX IS NOT TICKED, THE GAUSSIAN COPULA IS USED.

The Windows taskbar at the bottom shows the time as 12:37 and the language as EN.

# Our Senior Team

Here is our most senior personnel in order to ensure highest quality of delivery. Both have consulted with and advised financial firms in the UK and at European level

Mustafa Çavuş PhD  
Managing Director, **MC+**



Mustafa is an expert in quantitative finance and risk and is a leading authority on pricing derivatives and options. He holds a PhD in financial mathematics and also has degrees in economics and business from the UK and Germany.

Mustafa is one of the UK's most respected contributors to debates on operational risk. Clients include banks, brokerage firms and asset managers for whom he has advised on operational risk methods and practices and prepared ICAAP submissions. He has held senior roles in buy-side firms and has also advised regulators in the UK and Europe on regulatory and economic methods and requirements in relation to operational risk.

Mustafa is the founder of **MC+**, the easy-to-use Monte Carlo solution for operational risk analysis. He has also written several books on finance focused on enterprise risk and options valuation.

Peter Bonisch  
Director, **MC+**



Peter has worked in a wide range of sectors and is one of the UK's leading commentators and advisors on risk and governance. He is a frequent speaker on issues of governance, risk and control. He has completed governance and board reviews of some of the UK's leading firms and has advised on strategy, governance and risk and risk methods in leading financial firms. He is a former National Director in EY and is a former President of the Institute of Internal Auditors in NZ.

Peter has published studies on the financial crisis and systemic risk as well as the reaction to the financial crisis and organisational behaviour. He has worked actively with HM Treasury and PRA to improve their understanding of these areas. He is a co-opted member of the UK Chief of Defence Staff's Strategy Forum. By training, Peter is a microeconomist with a post-graduate degree in international relations.

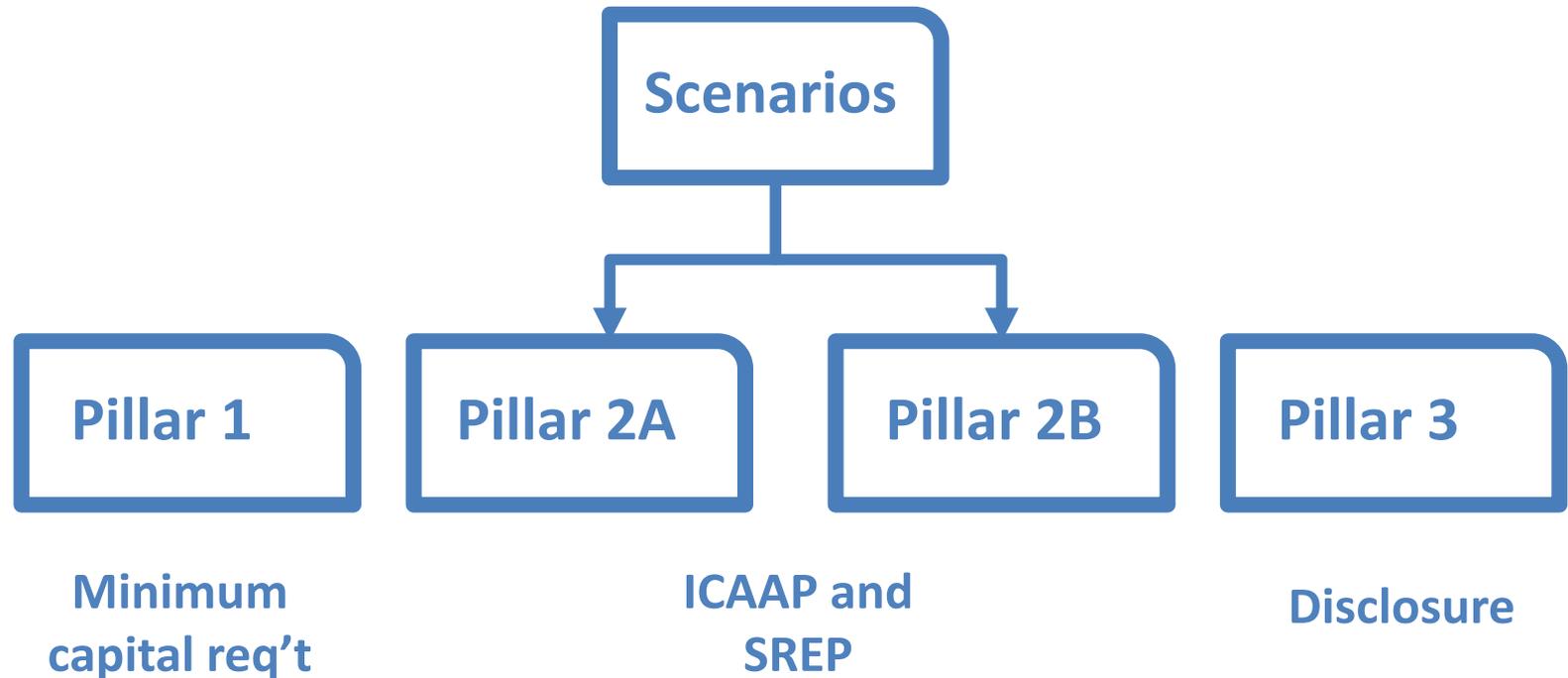
# Context and Background to this Review

- Conducted in April and May 2020
- Interviewed **17 financial firms** (semi structured interview)
  - Asset Managers/Wealth Managers
  - Brokers
  - 1 Exchange
- Also spoke to 2 consulting firms
- Q: How are you factoring in the recent **COVID-19 in your ICAAP?**
  - Capital requirement assessment through ICAAP
  - Over two different horizons
    - 1 year – **Pillar 2A** at 99.5% confidence level
    - 3-5 year – **Pillar 2B** – Stress Testing

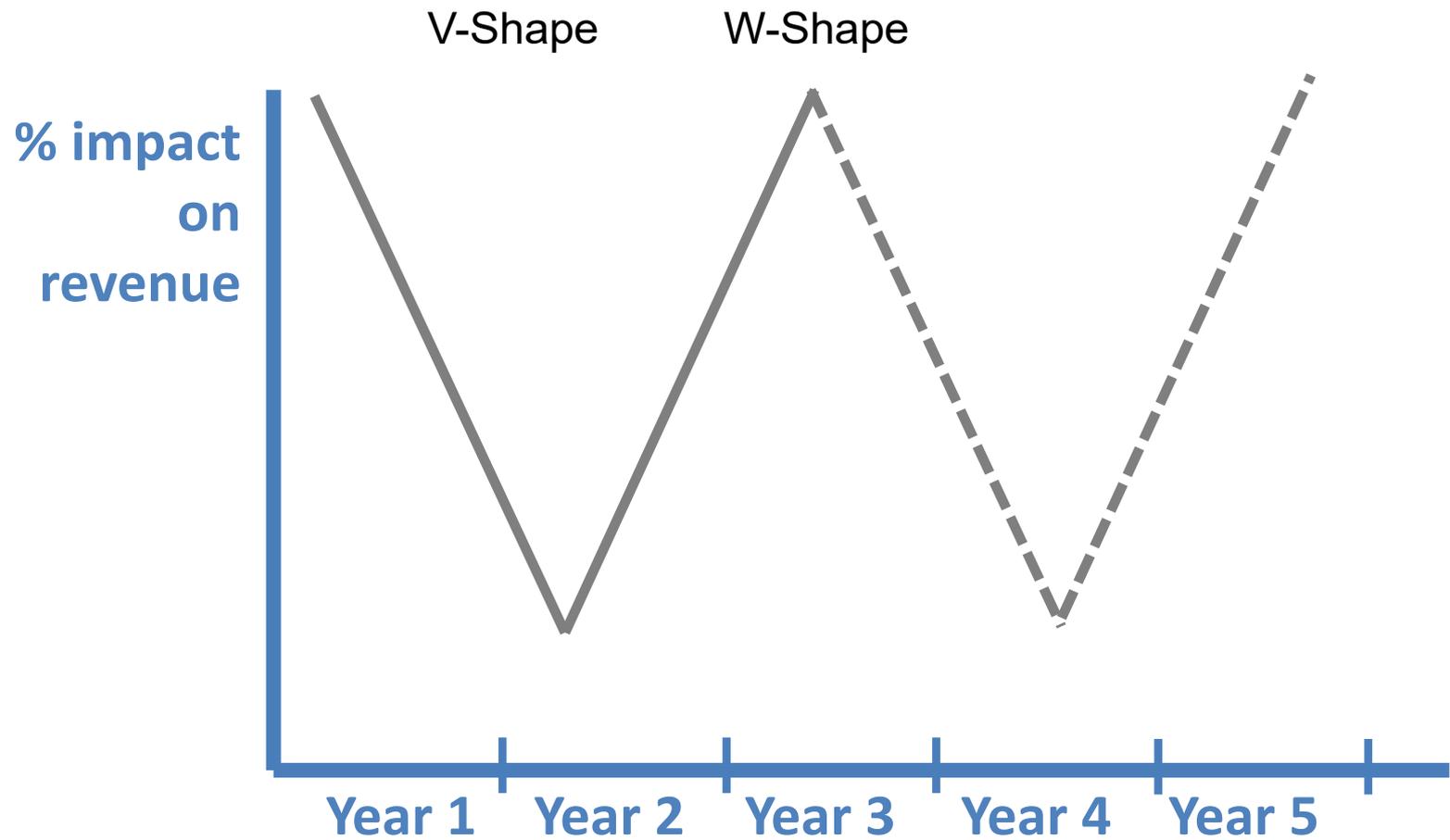
# Interview Questions

- We understand that market volatility drives market risk numbers
- Particular interest in **scenarios**
  - Forward looking assessment
  - Data issues
  - Subjective
- Find out firms' scenario **approaches for Pillar 2A and 2B**
- Q1: (How) are you incorporating the COVID-19 impact in your Pillar 2B?
- Q2: How are you incorporating the COVID-19 impact in your Pillar 2A?
  - **Option1:** Incorporate it as an **additional impact on** each of the **existing** operational risk scenarios but not as a scenario on its own right
  - **Option2:** Incorporate as an additional scenario **on its own right**

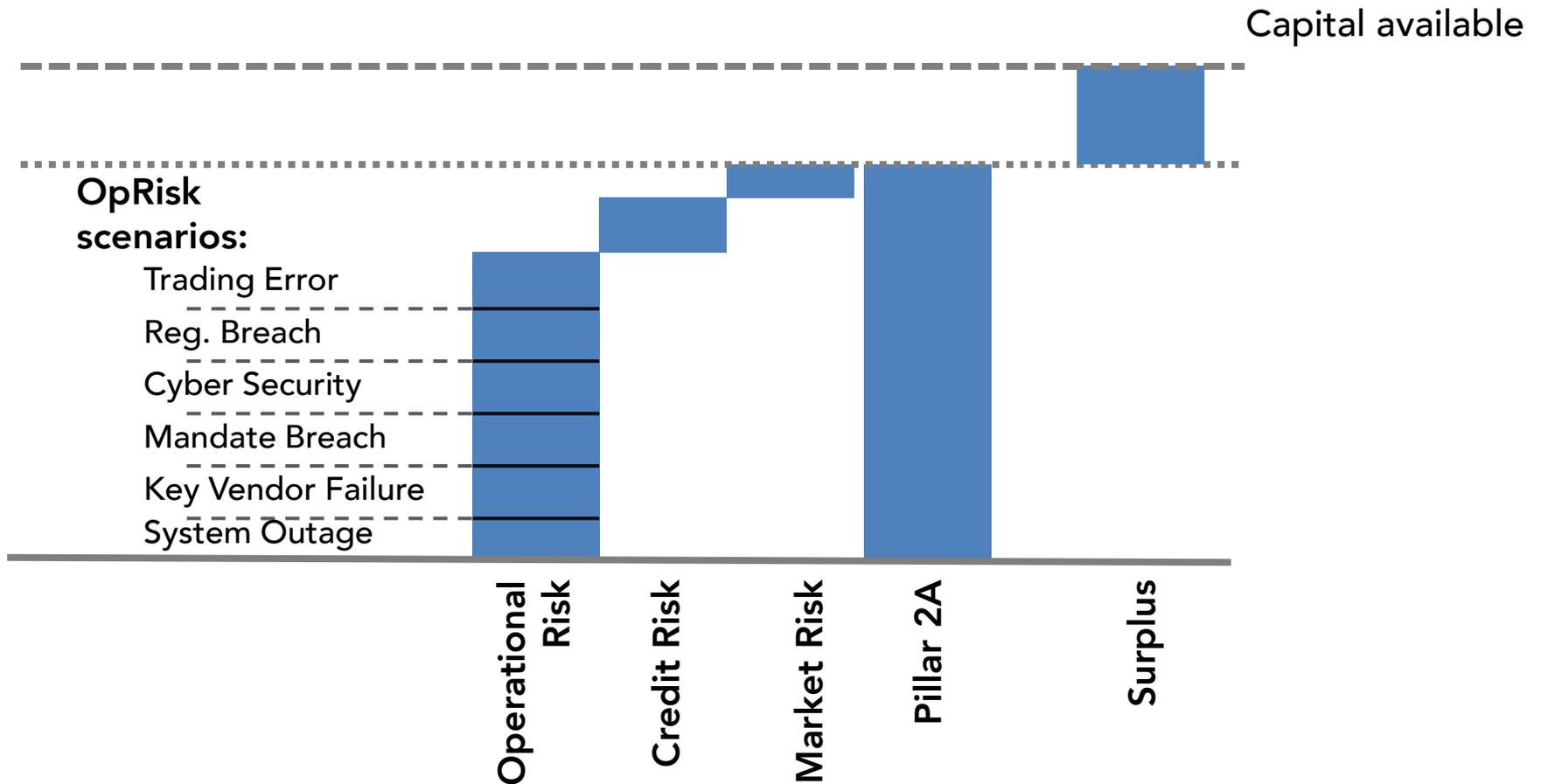
# Context> Simplified Prudential Framework



# Context> Simplified Pillar 2B Stress Test Example

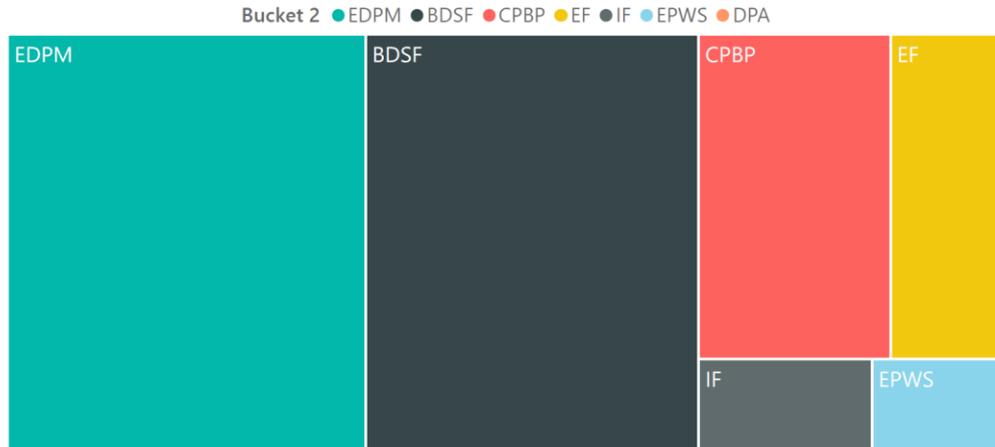


# Context> Simplified Pillar 2A Example



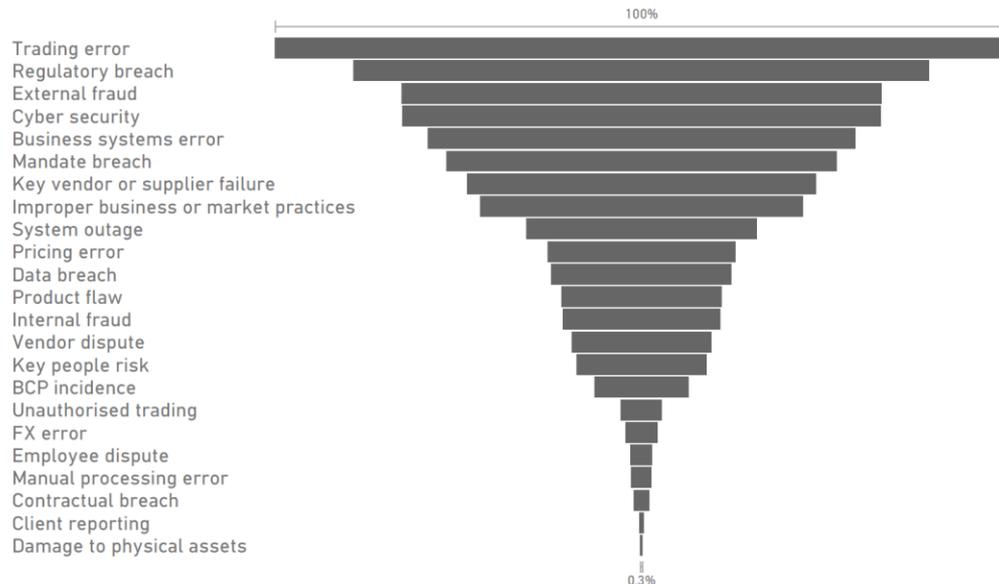
# From our 2019 Benchmarking Analysis [1]

Distribution of Operational Risks across Basel Loss Types



Most operational risks are in the category EDPM “Execution Delivery Process Management” and BDSF “Business Disruption System Failure”

Most Commonly Observed Operational Risk Scenarios



Top three operational risk scenarios:

1. Trading error
2. Regulatory breach
3. Cyber security

# From our 2019 Benchmarking Analysis [2]

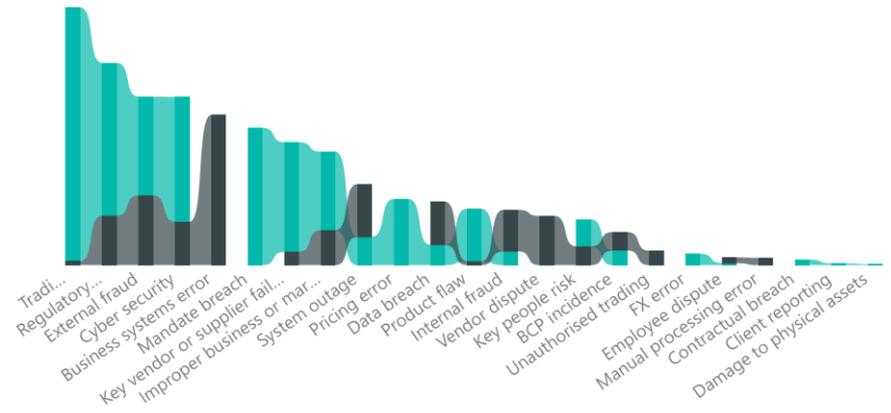
Likelihoods of operational risk scenarios across Loss Types

● AM ● Broker



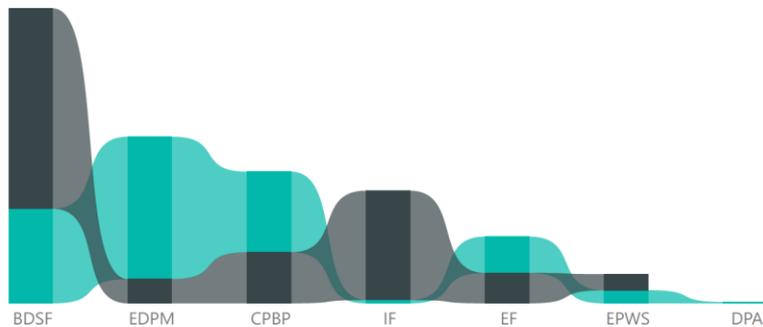
Worst Case Losses from Operational Risk Scenarios

● AM ● Broker



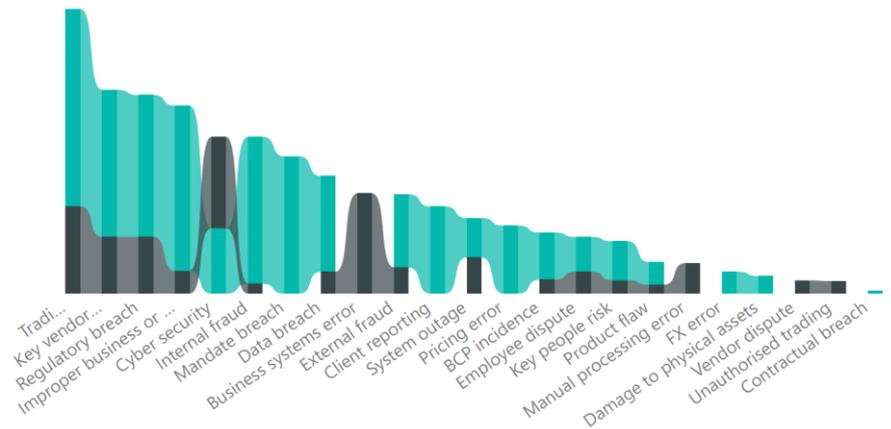
Worst Case Losses from Operational Risk Scenarios across Loss Types

● AM ● Broker



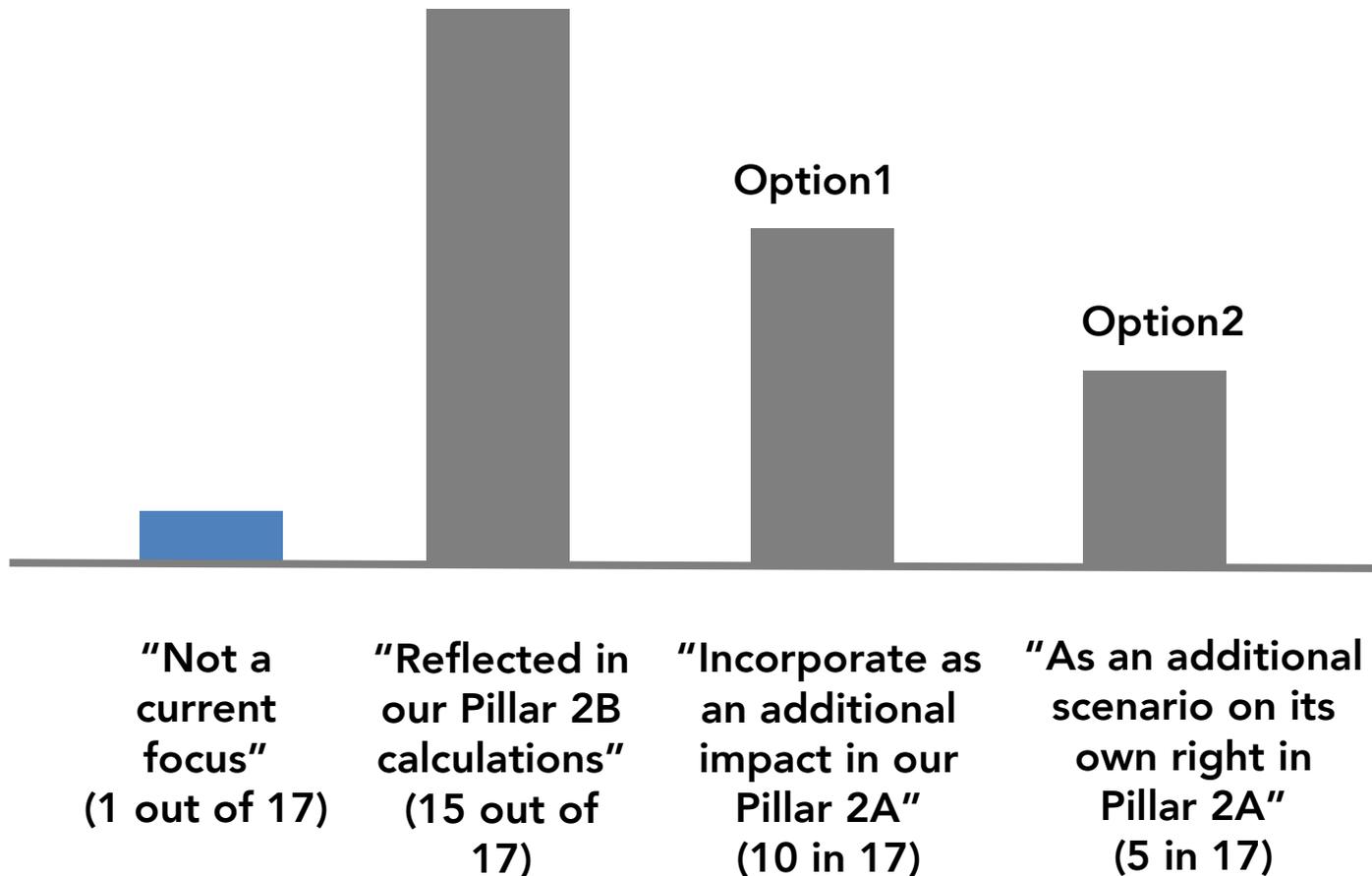
Likelihoods of Operational Risk Scenarios

● AM ● Broker

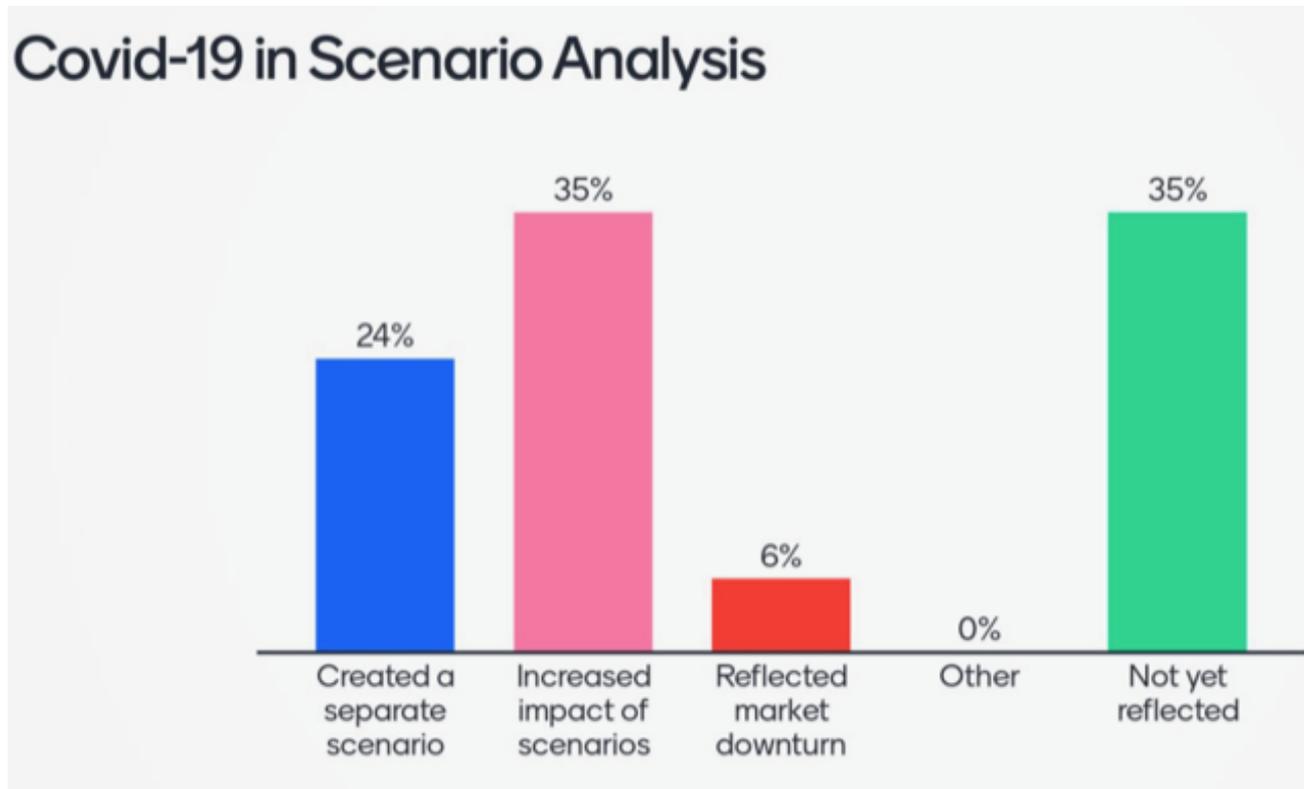


# Generic Results

- Q1: (How) are you incorporating the COVID-19 impact in your Pillar 2B?
- Q2: How are you incorporating the COVID-19 impact in your Pillar 2A?
  - Option1: Incorporate it as an additional impact on each of the existing operational risk scenarios but not as a scenario on its own right
  - Option2: Incorporate as an additional scenario on its own right



**Our results are somewhat similar to a quick poll in April 2020 carried out by an operational risk consulting firm on our behalf (amongst their forum members – mainly banking)**



# Our Observations for Pillar 2A [1]

- Firms' approach to ICAAP depends on their 'ICAAP-cycle'
  - If their cycle ends by March 2020 > "quick and dirty". However, in their ICAAP, they have at least added a chapter on COVID-19.
- COVID-19 implies an operational risk from the BAU/Business continuity perspective.
- The majority of the firms we spoke did **not** include a **separate** operational risk scenario for COVID-19. Instead, firms considered whether any **adjustments** were required to the impacts and likelihoods of any of the existing scenarios.
  - In terms of existing scenarios, both **impact dimension** and **likelihood dimensions** are considered. Firms especially look at business continuity scenarios' causal factors along with associated controls. For example, the causal factors leading to 'IT Outage' type of scenarios have been revised to include global pandemic or health emergency which leads to staff being unavailable or being unable to travel to office.
- Only a few firms consider the **pandemic** as an additional operational risk scenario on **top of changes made to existing scenarios** with increased likelihoods of occurrence and increased size of impact given occurrence.

## Our observations for Pillar 2A [2]

- Our review indicated that there is **no single methodology** for operational risk scenario analysis amongst financial services firms.
  - Some firms use Basel II **loss event types** as their starting point whereas some others map the scenarios to their **own risk classes**, such as "Process", "Cyber", "Technology", "Financial Crime", etc.
- The number of scenarios is somewhere between 8-12
- If an operational risk scenario for **business continuity event** type already exists, then it seems that the simplest thing for firms is to add COVID 19 as a further **factor** that can **trigger** a business continuity scenario
- A few firms have carried out correlation analysis.
  - Dependency between operational risk scenarios
  - Gaussian versus t-copula

# Our observations for Pillar 2A [3]

- Operational Risk is in a stark **contrast to market risk**.
  - Higher **volatility** and correlations of traded instruments > **VaR** (Value at Risk)
  - **Actual loss experience** has not been significantly different (in some cases lower)
    - Overall, firms find that there is no “**dramatic change**” to their operational risk profile. “It is a shift but not a massive change”.
    - “The vast majority of incidents point to very minor actual loss amounts related to COVID 19”.
    - Some firms have only carried out a **sensitivity analysis** whether the drivers change the overall impact on their assessment, flexing the quantification, not actually changing the capital number. “We have done sensitivity analysis which is higher but not held capital” because they argue that they have “not observed any crystallisation and the loss experience has been below the trend”.
- > **However**, this is only relates to the expected loss (**EL**) part for operational risk
- > Unexpected losses (**UL**) under Pillar 2A can only be captured through scenario analysis using expert judgement rather than historical loss experience.

# Our observations for Pillar 2B [1]

- Firms have modelled COVID-19 and its **revenue impact** as the base case assumption
- The firms assume either a **V-shape** or **W-shape** of recovery depending on whether the number of pandemic caused deaths stay low or go up again.
- Revenue impact depends on the business model. Overall, brokers and High Frequency Traders are expected to do better in volatile times as there are more trades and margins increase whereas asset managers are expected to loose revenue due to decline in AUM and/or outflows to cash.
- Two or three specific pandemic stresses are considered depending on the risk profile and business model of the firm.
- **Key man risk** is the most modelled stress. In some cases, a key person/team contributes disproportionate amount of revenues (which can be thought of as “internal concentration risk”).
- > One area of **weakness** we identified is the **correlation** between some of the Pillar 2B stress tests (market fall, business continuity, key man risk, cybersecurity etc.). Currently, none of the Pillar 2B stress tests include analysis as to how **increased correlations between the Pillar 2B stress tests** would impact the firms’ risk profile.

# Our observations for Pillar 2B [2]

- Asset managers' stress scenario is based on both **outflow** and **decline** in AUM (March & April data already contains information on outflows and decline)
  - Work with PMs through plausible scenario for the rest of the 2020 & 2021 and add further additional stresses using assumptions, such as
    - One of the **funds** is **suspended** which causes large outflows
    - Are there additional outflows and **additional costs**?
    - What does base scenario look like in terms of recovery? (Deeper V and a second wave?)
    - Are there any **key man risks**?
- Brokerage firms' core stress assumes a global recession where market volatility is increased, interest rates remain low overlaid with the impact of COVID-19.
  - Depending on the business model, in a **high volatility** environment they generate **more revenue** than in benign market environments.
  - Nevertheless, they allow for declining revenues and increasing costs, such as
    - **Staff unavailability**
    - Investing in new **IT** equipment and **backup** facilities to ensure systems and trading platforms are running without **outages**

# Relation to the most recent FCA's Final Guidance 20/1: "Assessing adequate financial resources"

- "Reduce risk of harm" to consumers and markets
- All firms should assess the risks inherent in their business model, the potential harm that can be caused
  - Firms should consider 'what if' scenarios and estimate the potential impact
  - Viability and sustainability of the business model and strategy
  - Consider a forward-looking approach to risks and how these evolve throughout the economic cycle
  - The amount of risk it poses
    - Are material risks identified?
- Risk management framework with a clear risk appetite?
- Has adequate use been of stress testing in the risk assessment?
- Does the risk assessment process meet the 'use test'?
- Also requirements regarding wind-down planning and liquidity

# FCA's Expectation re Adequate capital resources

- **Need for capital** - To assess how much capital is necessary requires a wider assessment of the risks to which firms are exposed.
- **Expected losses** (i.e. "our remark: **EL**") should already be recorded on a firm's financial statements, either through provisions or impairment of assets.
- **Quantifying potential changes** in value of assets or liabilities, to determine capital requirements, should be based on adverse circumstances and capture **unexpected losses** (i.e. "our remark: **UL**"), as well as other potential losses that haven't already be accounted for.
  - Compensation and redress schemes
  - Enforcement and fines
  - Direct and indirect litigation costs

# Assessing the likelihood and impact of harm

*"Firms should consider 'what-if' scenarios for the activities undertaken, the harms that can be caused and the events leading to those harms, taking into consideration the likelihood of events, that all events might not occur at the same time" > (i.e. our remark: not fully correlated)*

*Firms should estimate the potential impact on their financial resources based on their knowledge and experience, which, where a firm's control framework is sophisticated enough, may be further supported by statistical models. When using such models, we expect firms to understand how appropriate the inputs and outputs of the model are, which include the scenarios and assumptions.*

*"Firms should assess ...how much risk of harm remains ..."*

# Outlook: Inter-related Elements [1]

Understand your **risk profile** – risk registers, incidents, indicators, risk reviews, audits

> insights into **expected losses (EL)**

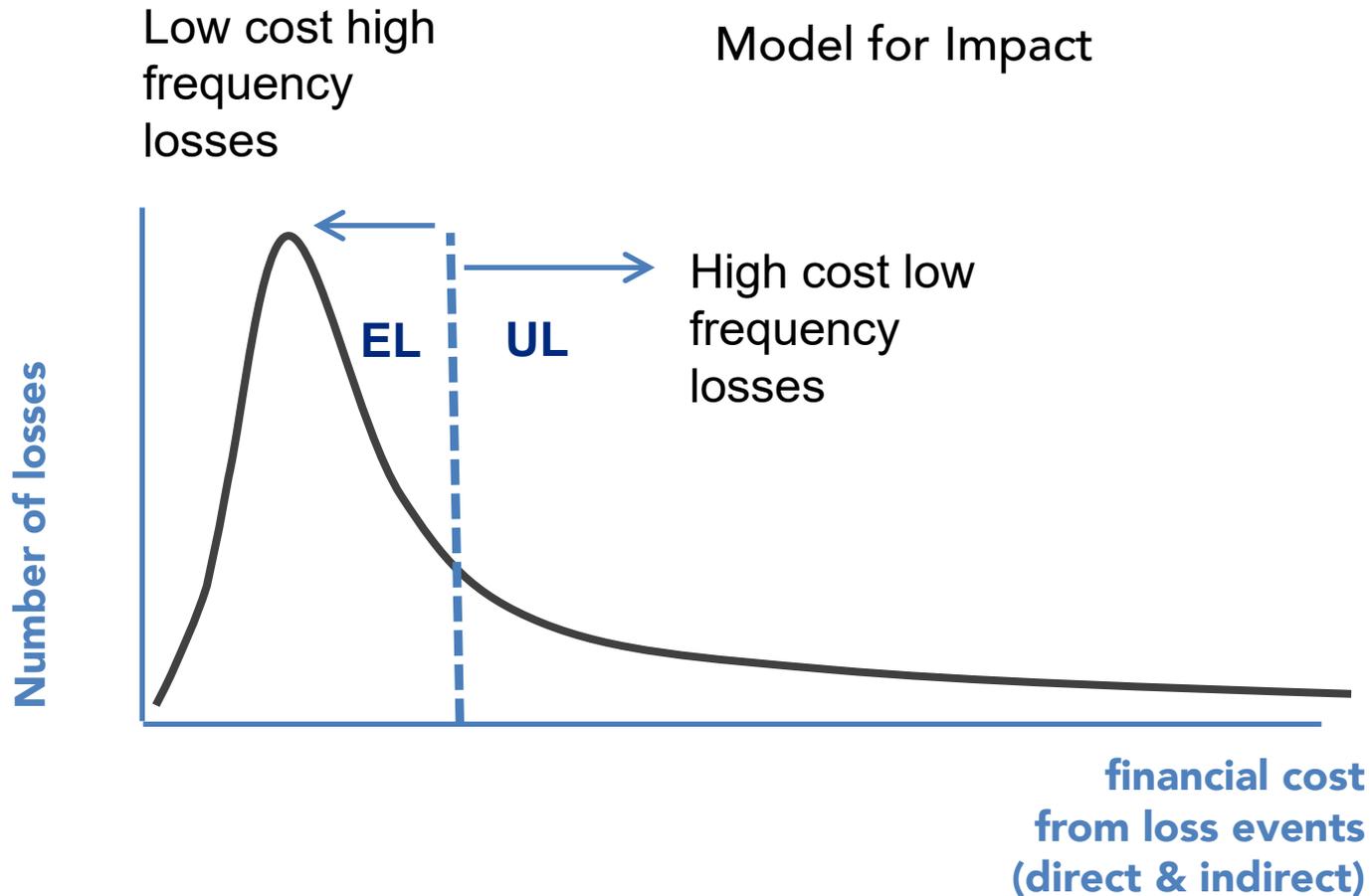
## Unexpected losses (UL)

- By definition these have not (yet) occurred
- Need to hold capital for these unexpected losses

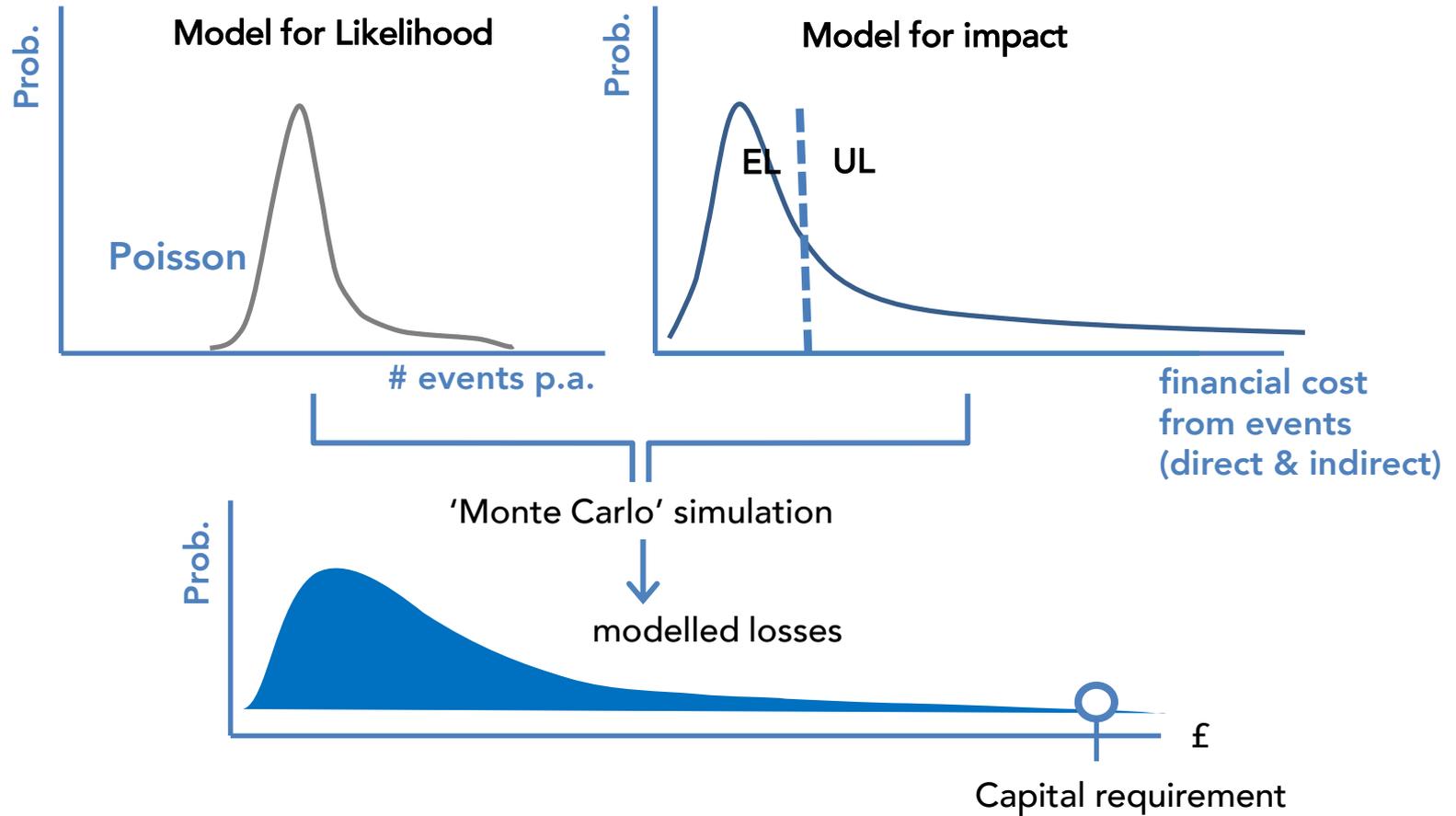
**Scenarios** form the inputs to a model which calculates our capital requirements

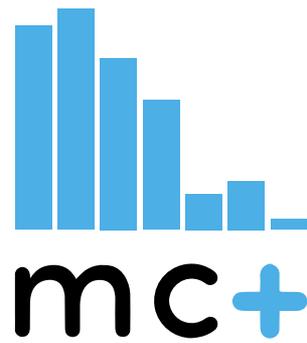
- To model the future we need data on losses that haven't yet happened
- The scenarios provide this data
- Using a model enables us to **hold capital at the regulator's prescribed confidence level**

# Outlook: Inter-related Elements [2]



# Outlook: Inter-related Elements [3]





[montecarloplus.com](http://montecarloplus.com)