ACTUARIAL SOCIETY OF SOUTH AFRICA

Quantifying Risk, Enabling Opportunity.

Demystifying the Iterative Risk Margin

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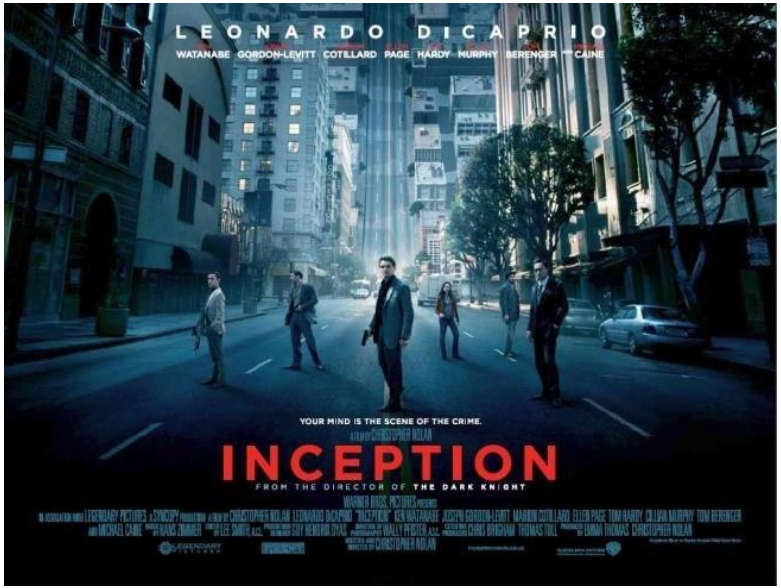
AGENDA

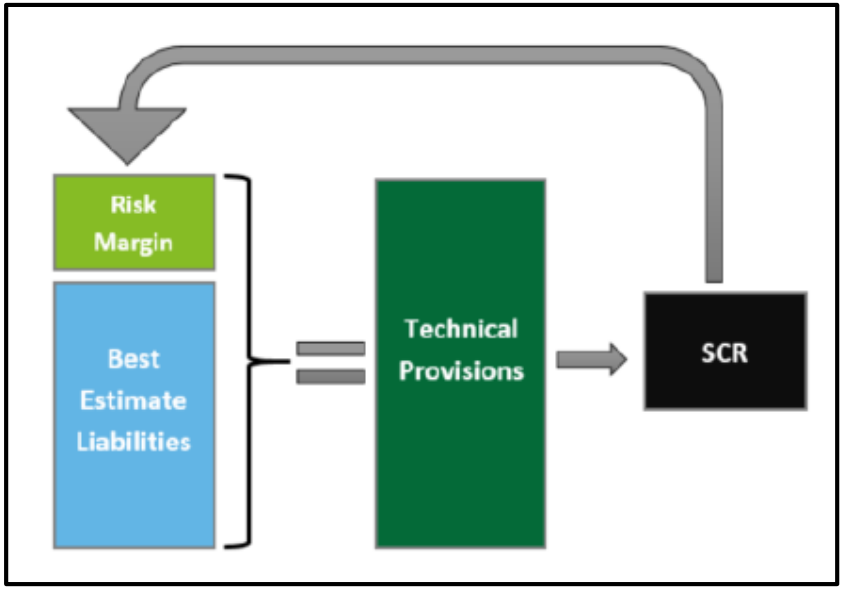
- INTRODUCTION
- MOVIE RECOMMENDATION
- SOME THEORY
- IRM MYTHBUSTERS
- IN CONCLUSION…
- QUESTIONS

INTRODUCTION

ITERATIVE RISK MARGIN???

What do these two pictures have in common?





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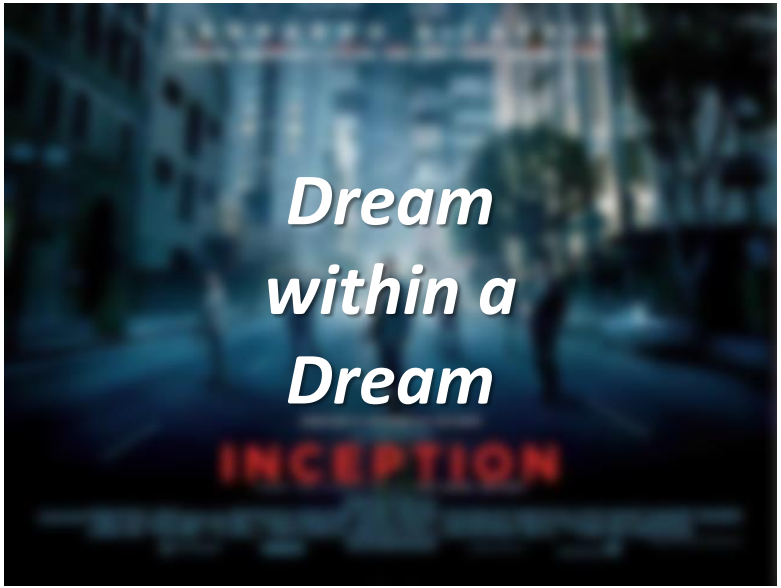
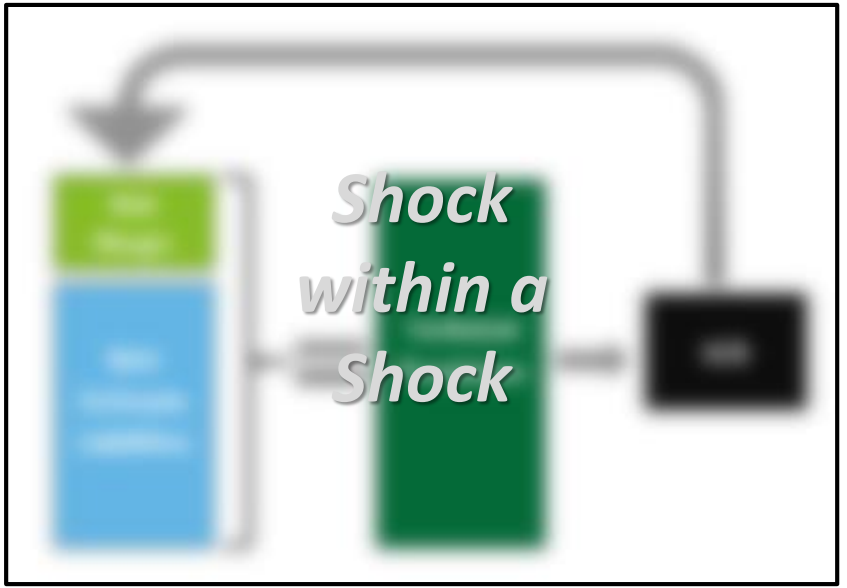
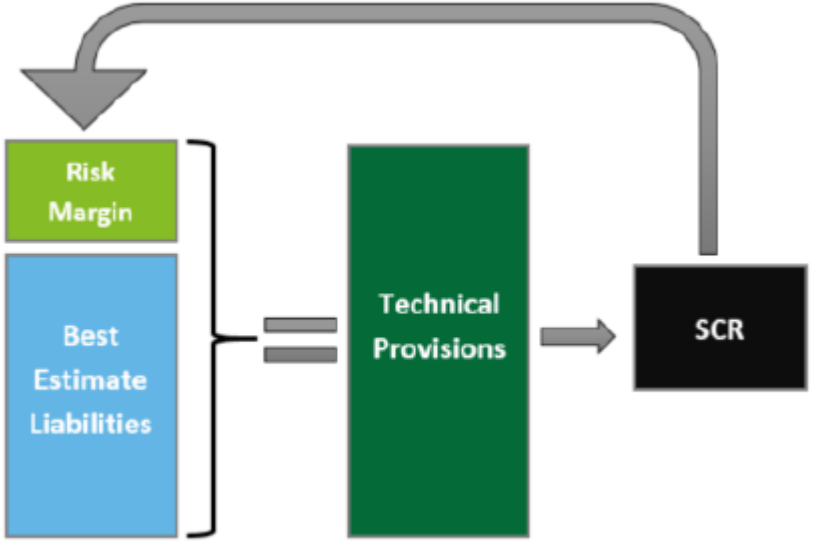




What is the (Iterative) Risk Margin?



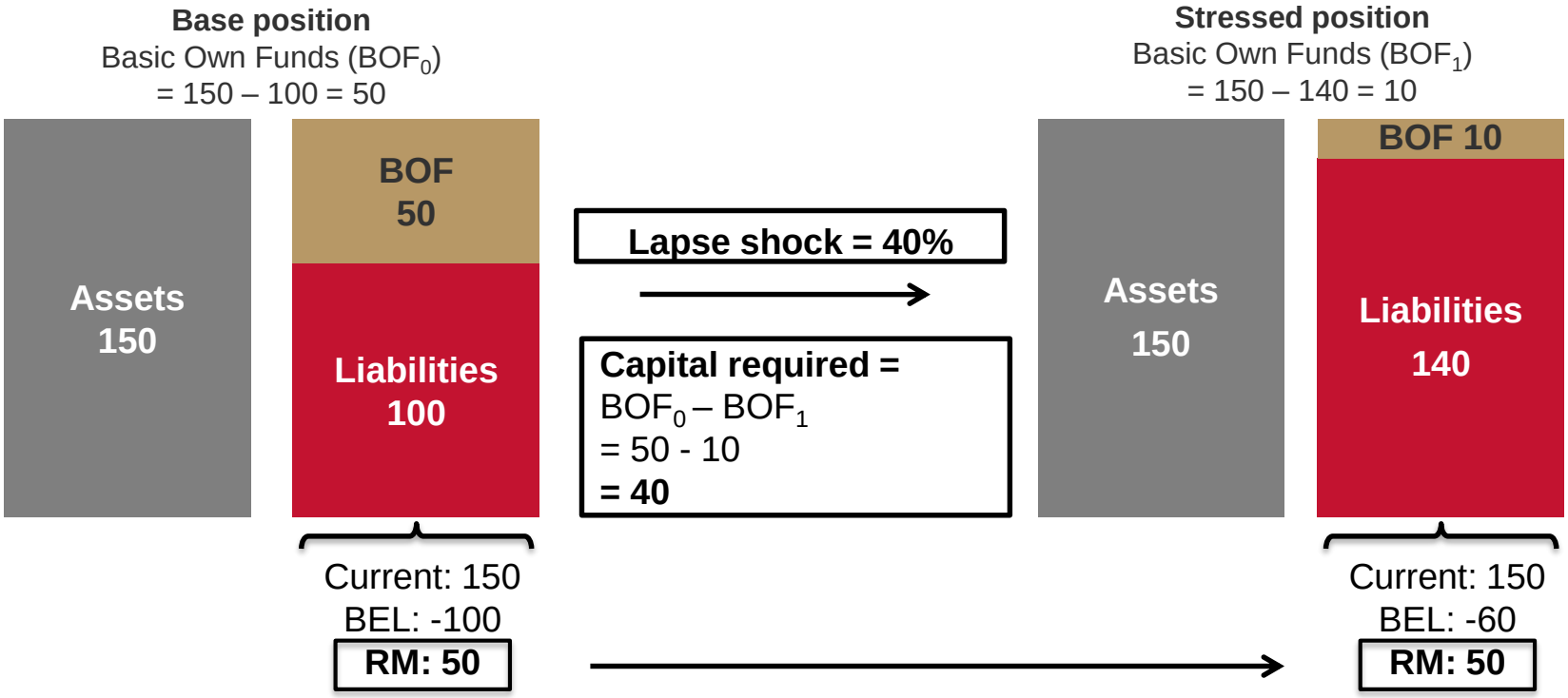
- SAM uses a simplification whereby change in RM is ignored

  SCR shock = ΔBEL – ΔAssets

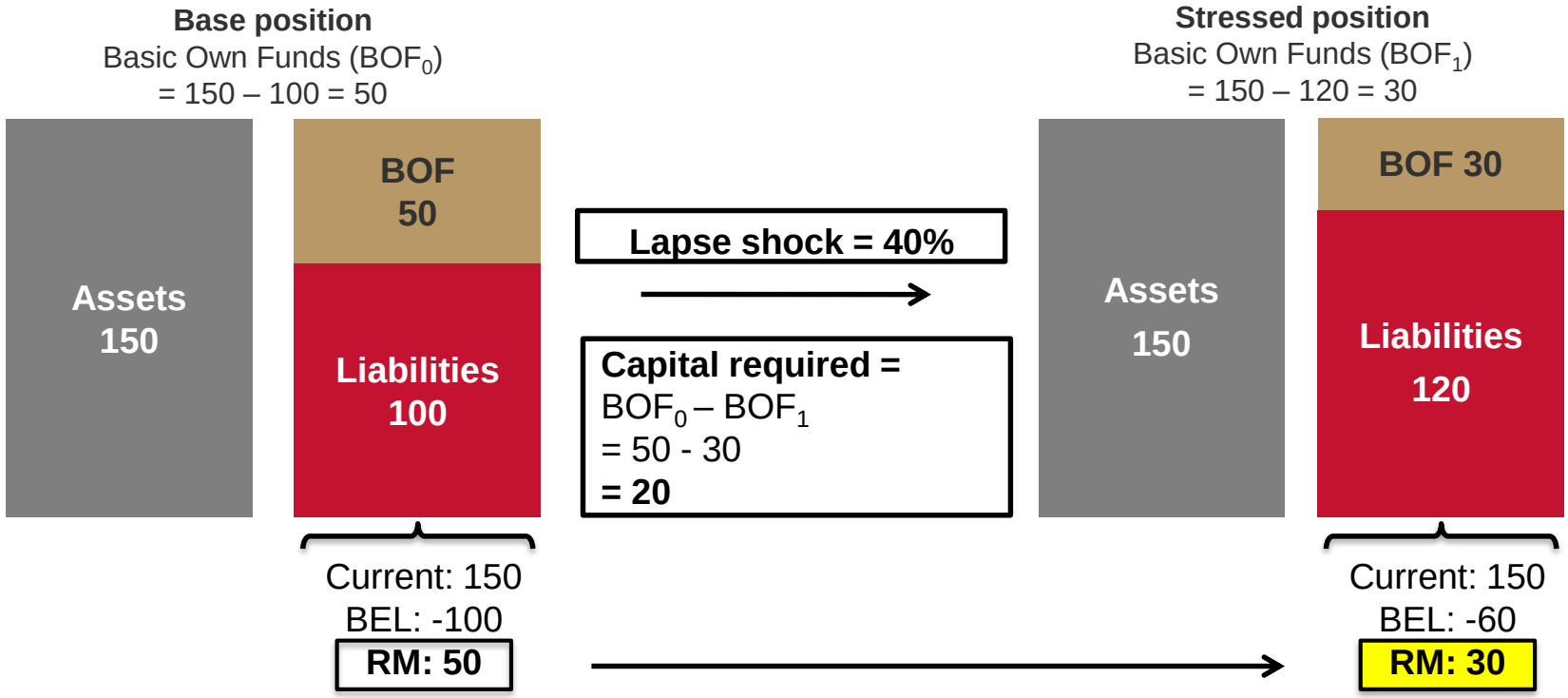
- Theoretically correct approach introduces circularity

  SCR shock = ΔBEL + ΔRM – ΔAssets

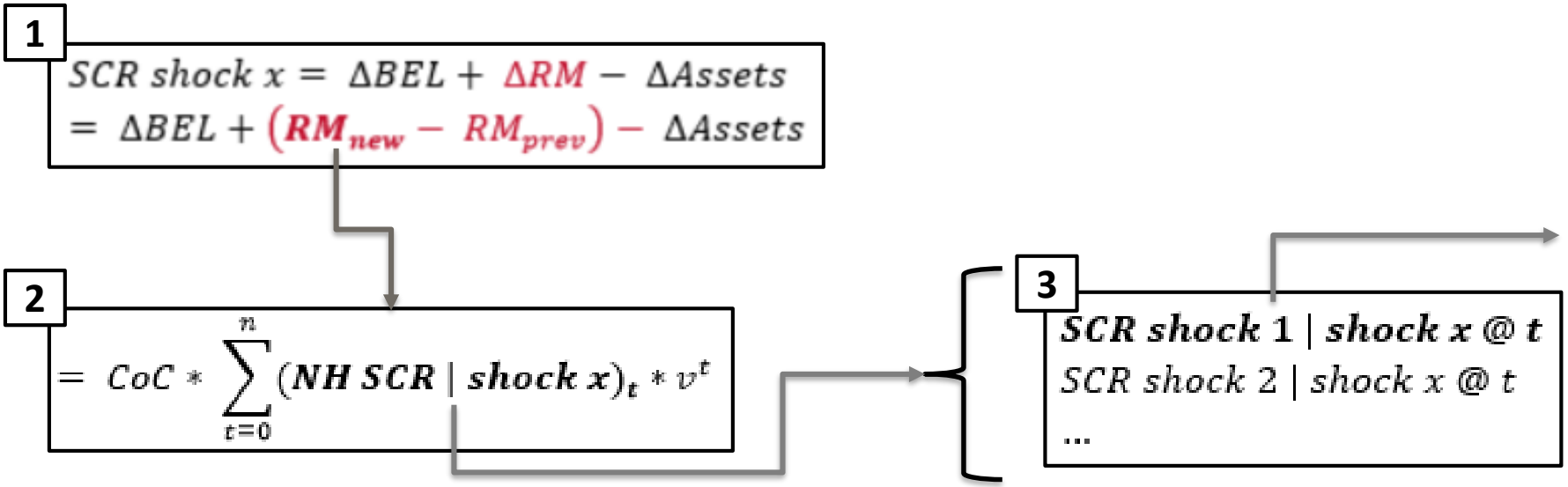
An example


Base position
Basic Own Funds (BOF_0)
= 150 – 100 = 50
Assets
150
BOF
50
Liabilities
100
Current: 150
BEL: -100
RM: 50
Lapse shock = 40%
Capital required =
$BOF_0 – BOF_1$
= 50 - 10
= 40
Stressed position
Basic Own Funds (BOF_1)
= 150 – 140 = 10
Assets
150
BOF 10
Liabilities
140
Current: 150
BEL: -60
RM: 50

An example…cont'd



How does the calculation work?



How does the calculation work? Cont'd

4

$$SCR\ shock\ 1 \mid shock\ x\ @t = [\Delta BEL \mid shock\ x + \Delta RM \mid shock\ x - \Delta Assets \mid shock\ x]\ @\ t$$
$$= [(\Delta BEL - \Delta Assets) \mid \boldsymbol{shock\ x}]\ @\ t + [\Delta RM \mid \boldsymbol{shock\ x}]\ @\ t$$

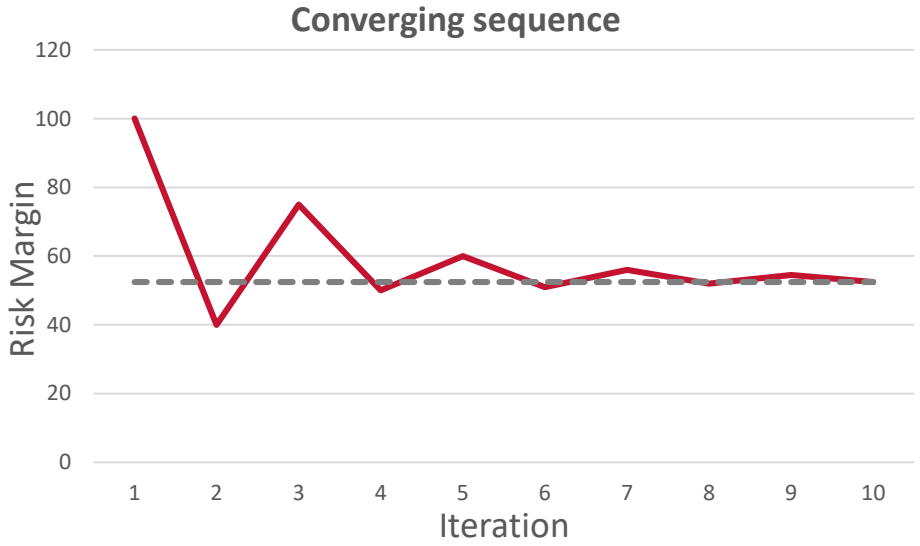
Shock within shock: estimated based on the "|shock x" proxies

Result from previous iteration; or zero for the initial iteration

To proxy or not to proxy?

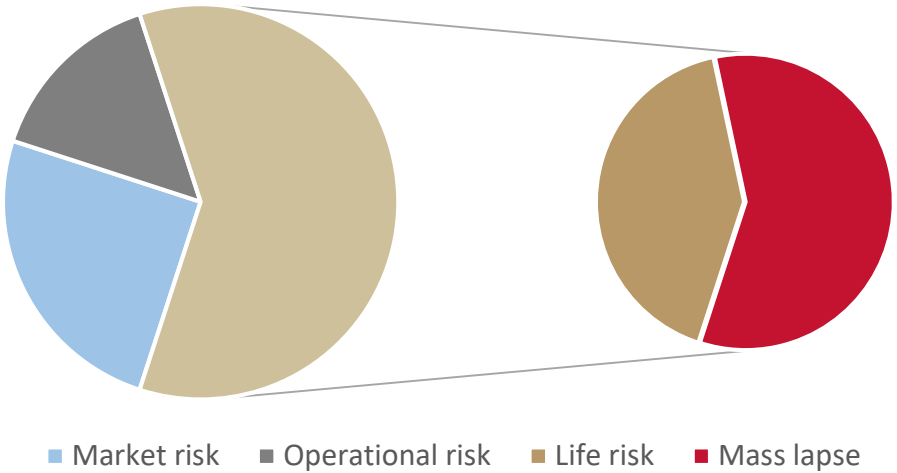
- **Total run time** would be significant for an exhaustive set of model runs.
- Full model run needed for **every "shock upon shock" combination**.
- **Hence, the need for proxies to estimate:**
  - **Projected SCRs** using **projected proxy**
  - **Re-calculated SCRs** in a "shock upon shock" using **shocked proxy**

When is convergence achieved?



- The **process is repeated** until the values of the **SCR** and **Risk Margin converge**
  - I.e. when the **successive difference** from one iteration to the next becomes **immaterial**
- Typically there may be about **10 to 20 iterations**

How significant is it?



- It **depends** on:
  - **Mass lapse** risk and its run-off
  - **Mix** of risks
  - **Relative run-off** of risks
- **Range** of impacts possible depending on the above factors
- Reductions in **both SCR** and **Risk Margin** are typically in the **10% - 30%** range.

IRM MYTH BUSTERS

Myth 1: You need big IT/systems to perform IRM

- Although you need to do a significant number of runs to **test your proxies**, these can be done in the valuation **'off-season'.**
- Iterative calculation process can be implemented in a **macro-based Excel model** to perform the Risk Margin and SCR recalculations for each iteration till convergence

Myth 2: Market risk stresses are unaffected by the IRM

- For a **total balance sheet approach**, stresses must be calculated based on the change in TPs, **including the Risk Margin**.
  - SCR shock = ΔTP – ΔAssets = (ΔBEL + **ΔRM**) – ΔAssets
- Under certain market risk stresses (and for certain products), a material change in RM may arise due to a change in:
  - **Non-hedgeable exposure** as a second-order effect
  - **Yield curve** for discounting

Myth 3: Using IRM always improves your SAM solvency

There are instances where using the IRM could have a **negative impact** on the solvency position. This is generally the case for products with **positive rand reserves**. Consider the following examples:

- **Non profit annuity** with its **longevity risk**
- A **risk policy** that is no longer in a profitable position (i.e. with a positive BEL). We need to consider both the **lapse (down) shock** and **mortality direction**

Myth 4: You can cherry-pick products for the IRM

- Given that the IRM does not always result in a benefit, it is **not advisable** for companies to cherry pick the products.
- Consider the possibility of having to perform the IRM for **all products** when ultimately seeking approval for the method
- **Simplified models** for other product lines so that the revised IRM reflects an accurate picture for the total business

Myth 5: The application process is quick and simple

- Application form requires applicants to demonstrate a **deep understanding** of:
  - Iterative methodology and approach
  - Use of proxies and any other simplifying assumptions
  - Controls and documentation
- Furthermore, the IRM methodology and calculation models must be **independently reviewed** by the HAF and the auditors.

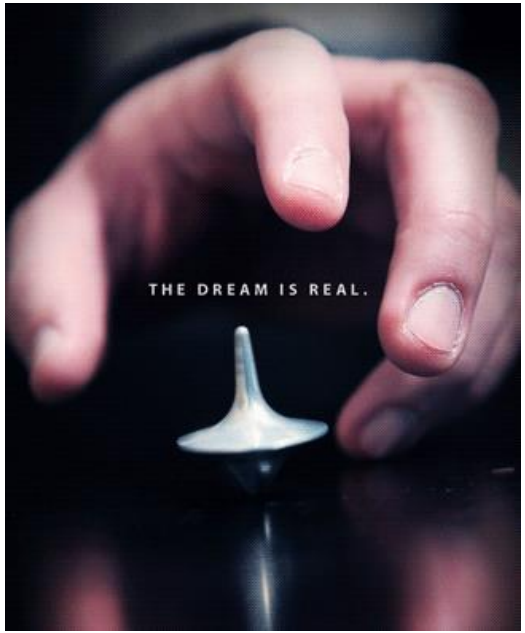
Myth 6: The IRM concept doesn't apply outside of SAM

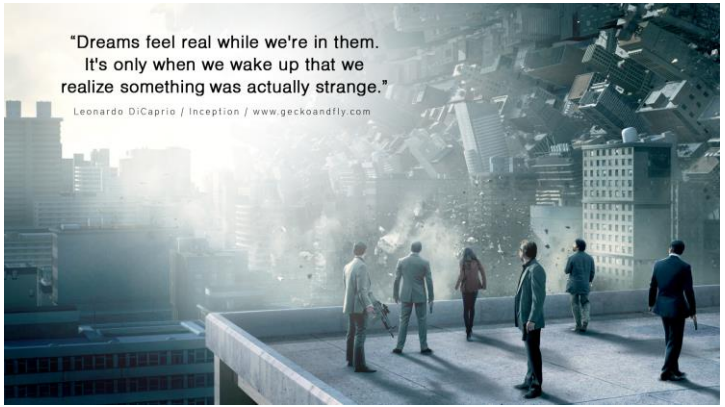
- **EV** via your **Required Capital** and **CoC** calculations (or **CNHR** for MCEV) depending on how these measures are defined for your business
- **IFRS 17 Risk Adjustment**, the magnitude of the Risk Adjustment could depend significantly on whether **IRM approach** is used
- **Internal Capital models**

IN CLOSING…

- IRM is **not that scary!**
- You don't need **NASA servers** to do it
- It's **not a silver bullet** for every insurer
- IRM is **usable** outside of SAM
- Yes, the **approval process** is not easy…

QUESTIONS?


THE DREAM IS REAL.


"Dreams feel real while we're in them.
It's only when we wake up that we
realize something was actually strange."
Leonardo DiCaprio / Inception / www.geckoandfly.com


IT'S ONLY WHEN WE WAKE UP,
WE REALISE SOMETHING WAS STRANGE

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