

Milliman Evening Briefing

31 MAY 2018

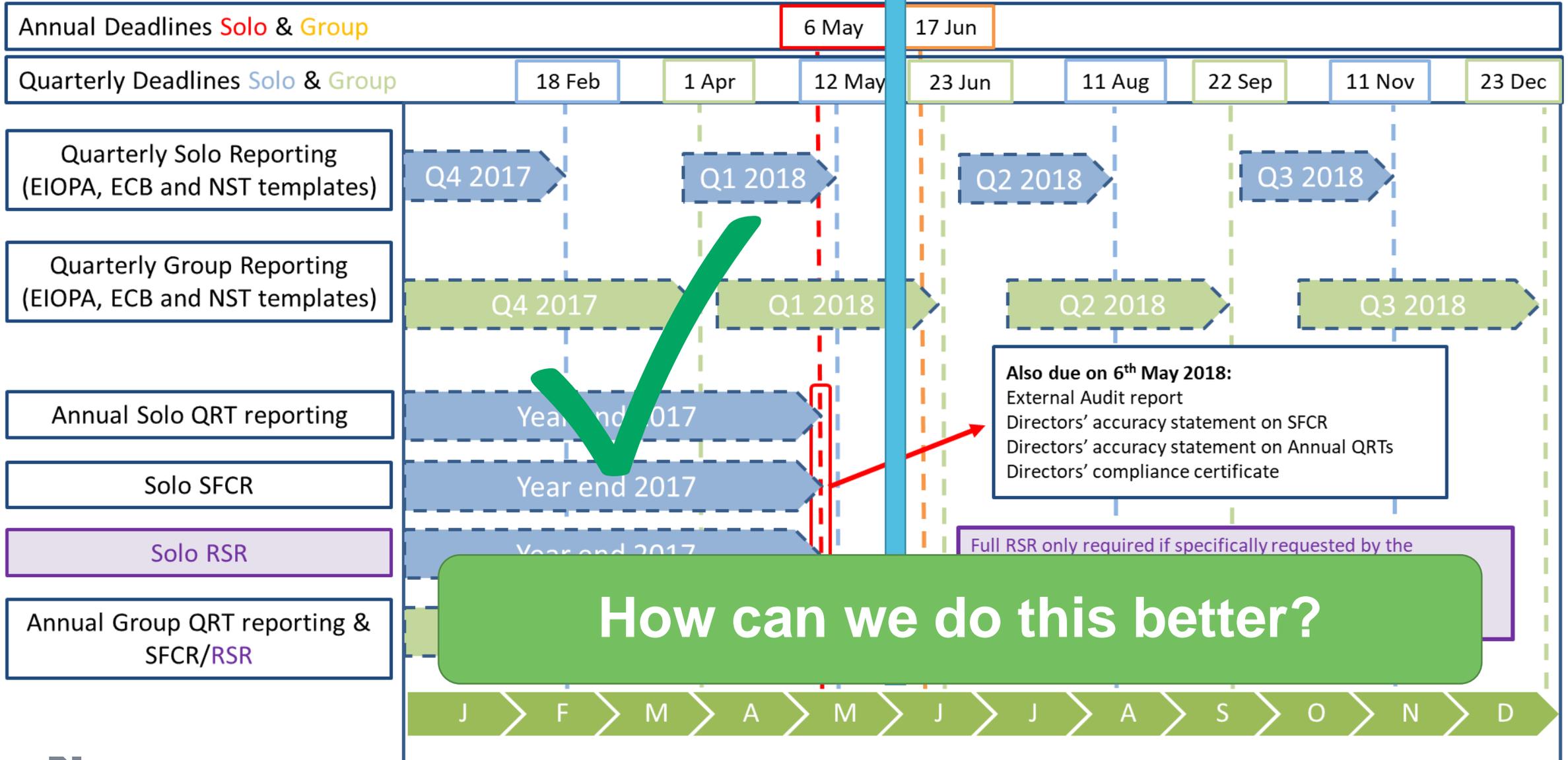


Regulatory Hot Topics 2018

Bridget MacDonnell
31 May 2018

Year End Done!

Today!
31 May



Hot Topics for the Actuarial Function

Process
Improvements

Directors'
Certifications

SCR
Calculation
Review

HoAF Opinion
& CBI Letters

Reducing
UFR

Variation
Analysis QRTs

Changes to
SF?

Shrinking
Timelines

IFRS 17

CBI agenda and priorities for 2018

Central Bank – 2018

Core supervisory activities

Including focus on business model sustainability

Outsourcing

Recent review and findings will lead to continued focus

Reporting and disclosure

Clear messages from the CBI that standards and quality need to improve

Brexit

Contingency planning and new authorisations

Cross-border supervision

Ensuring effective co-ordination with supervisors in other Member States

Non-Life pricing and reserving

Will continue to be a key focus in 2018

EIOPA agenda and priorities for 2018

EIOPA – 2018

Continued development of prudential framework

- SCR standard formula review (2018)
- Long-Term Guarantees measures review (2018-2019)
- Contribute to development of International Capital Standards

Recovery and resolution planning

Conduct risk and regulation

EU-wide Insurance Stress Test (2018)

Supervisory convergence

Bilateral visits, Colleges, Peer reviews

InsurTech

- Thematic review on industry's use of 'Big Data'
- Cyber risks: Supervisory approaches and new business opportunities

ORSA Hot Topics 2018

EIOPA
Feedback

ESAP 3

Brexit &
Cyber not
going away

UFR &
Solvency II
Review

Reverse
Stress Tests

Recovery &
Resolution

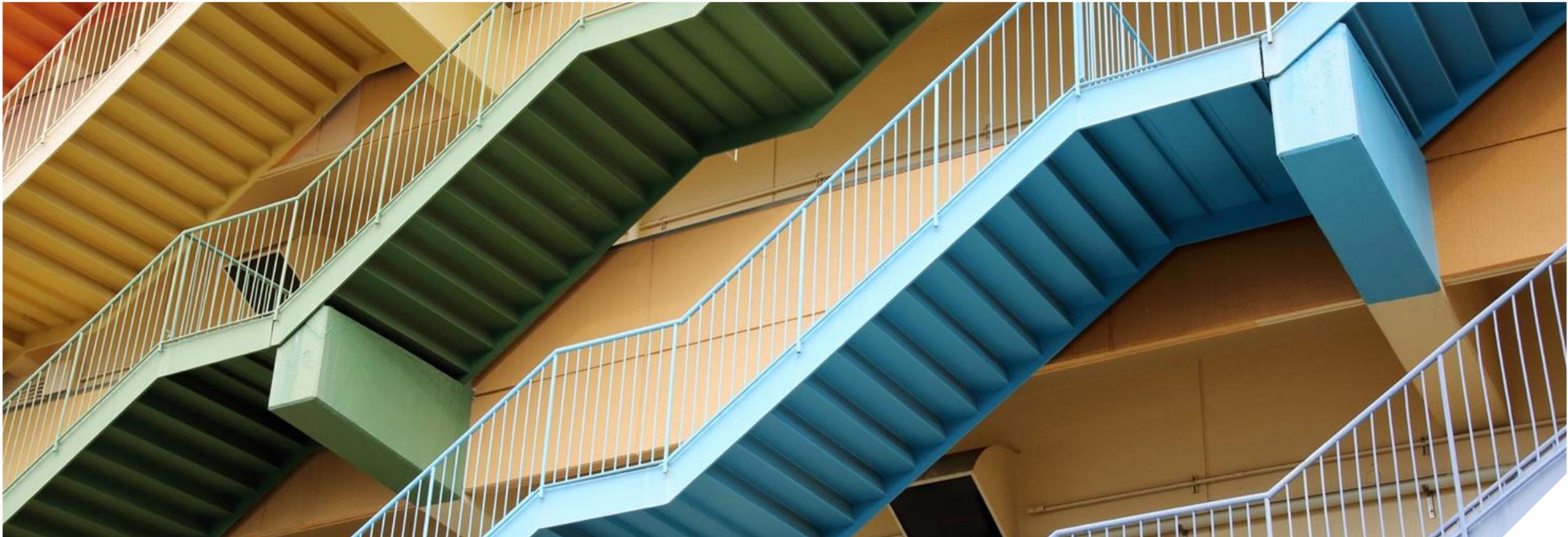


Thank you

Bridget MacDonnell

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Investment Strategies under Solvency II



Introduction

- Currently conducting research on investment strategies under Solvency II
- Expecting to publish findings in July
- Sneak preview of key issues emerging



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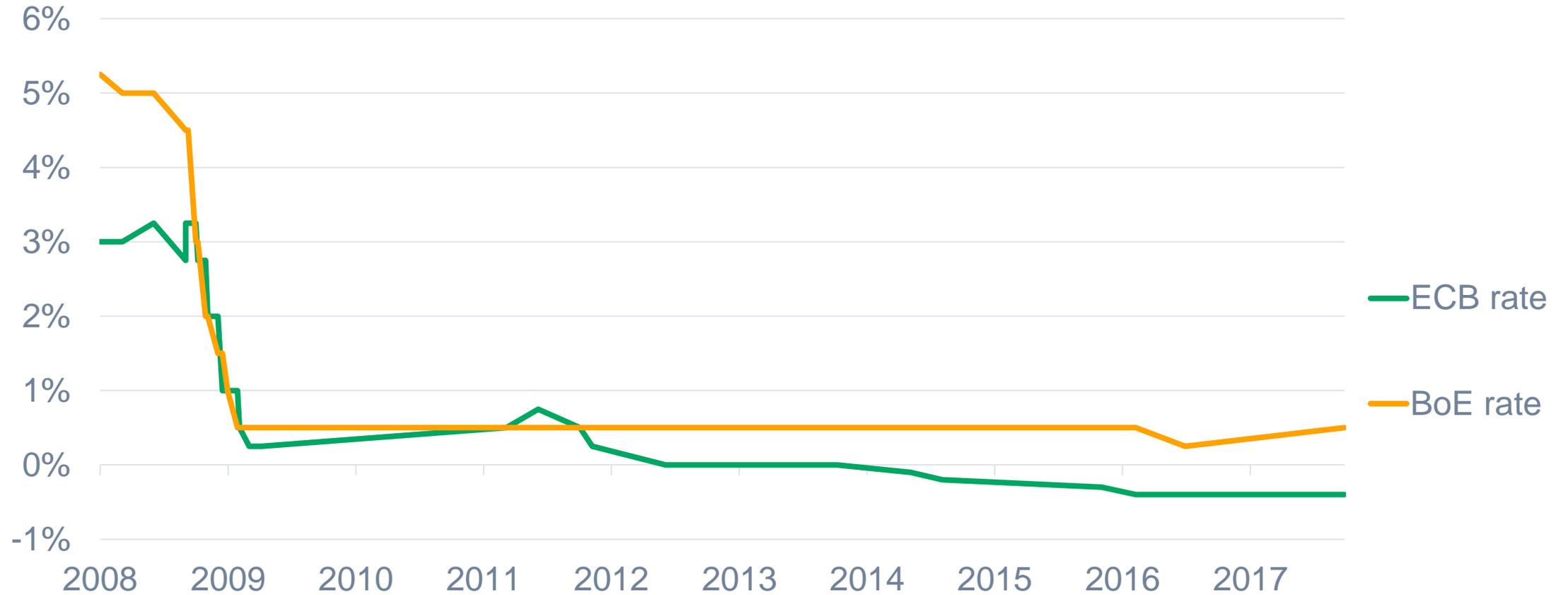


What drives changes in investment strategies?

Solvency I to Solvency II

- Liabilities
- Asset restrictions
- Capital requirements
- Other factors

Interest rates 2008-2018

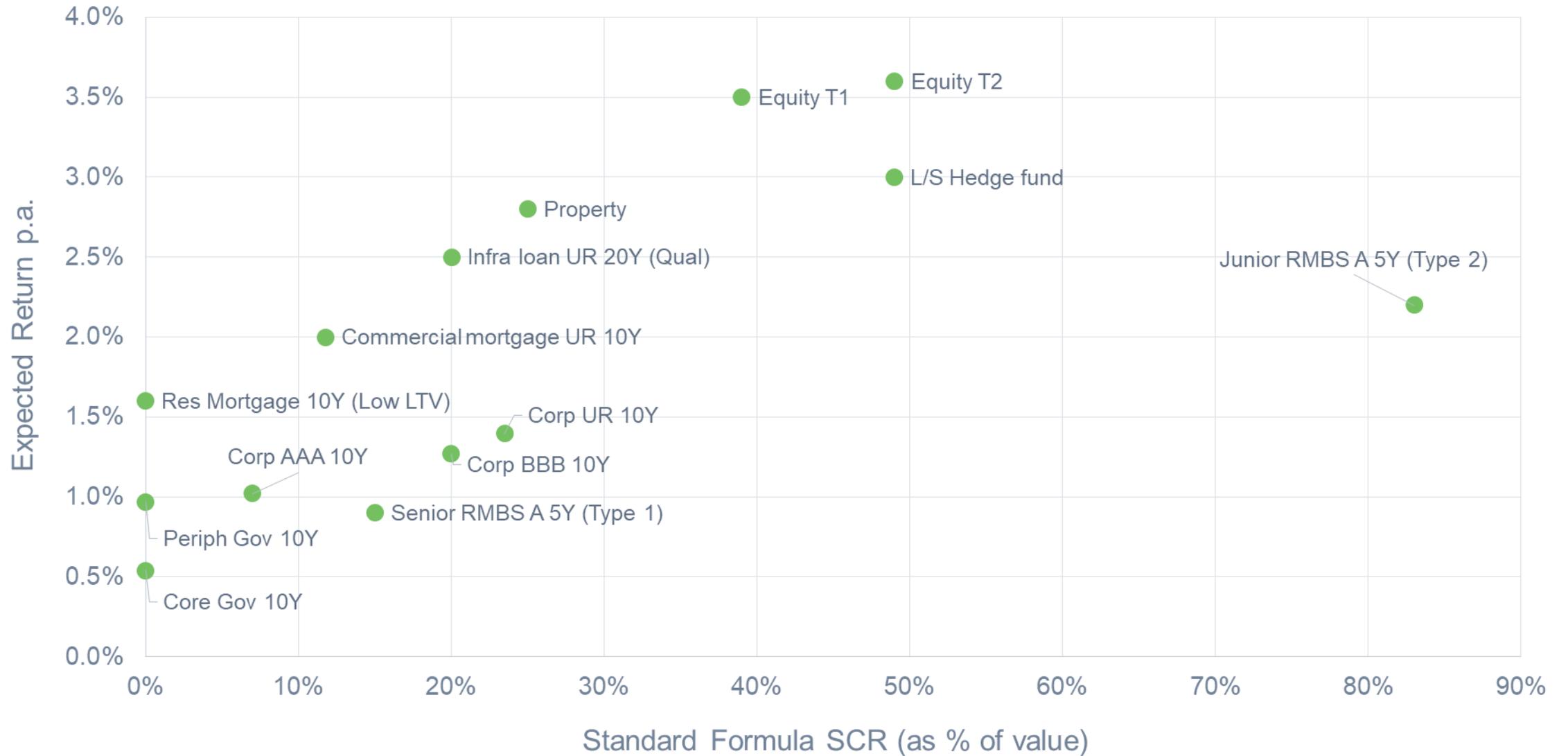


What will I do with all my money?

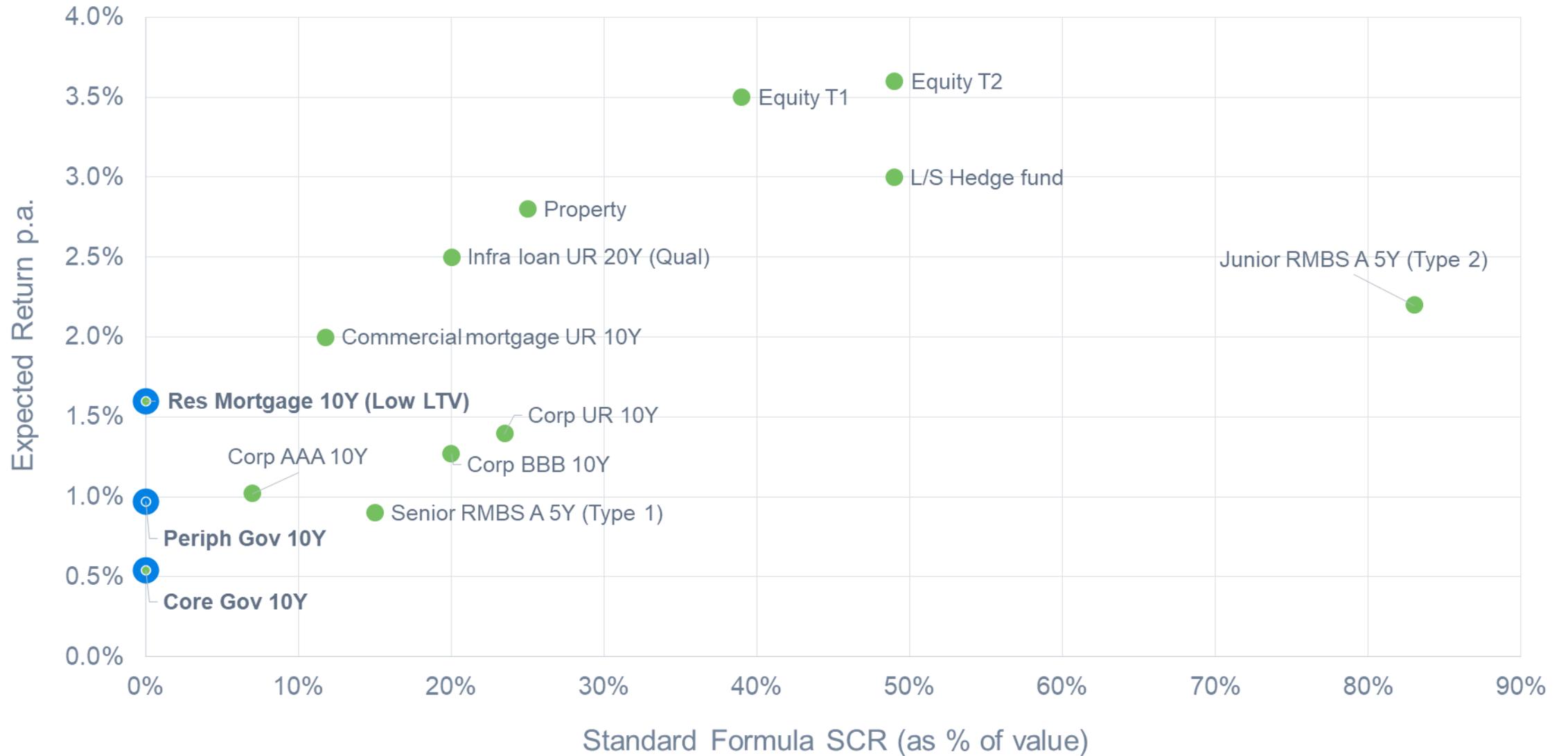


Return v Capital

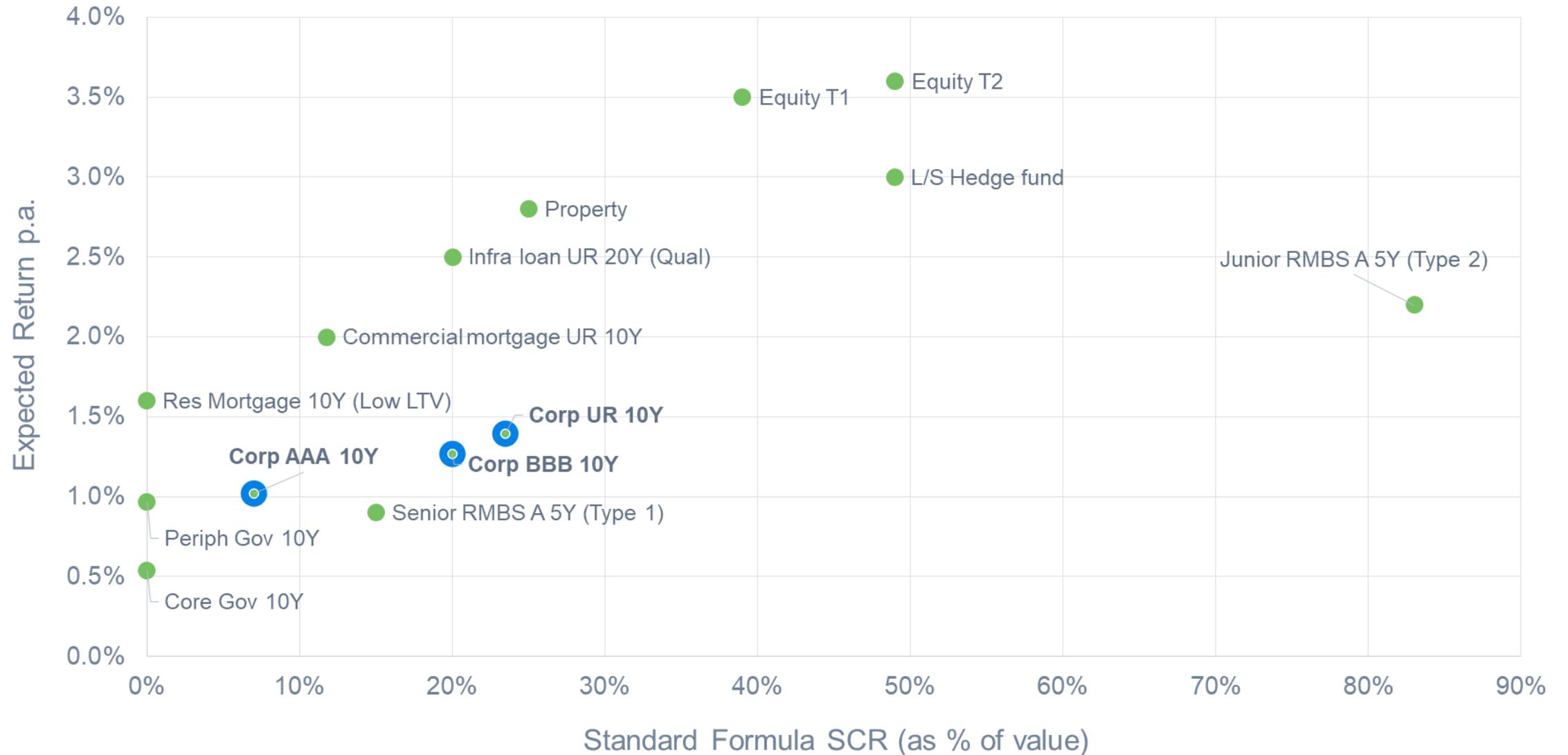
Return versus Capital



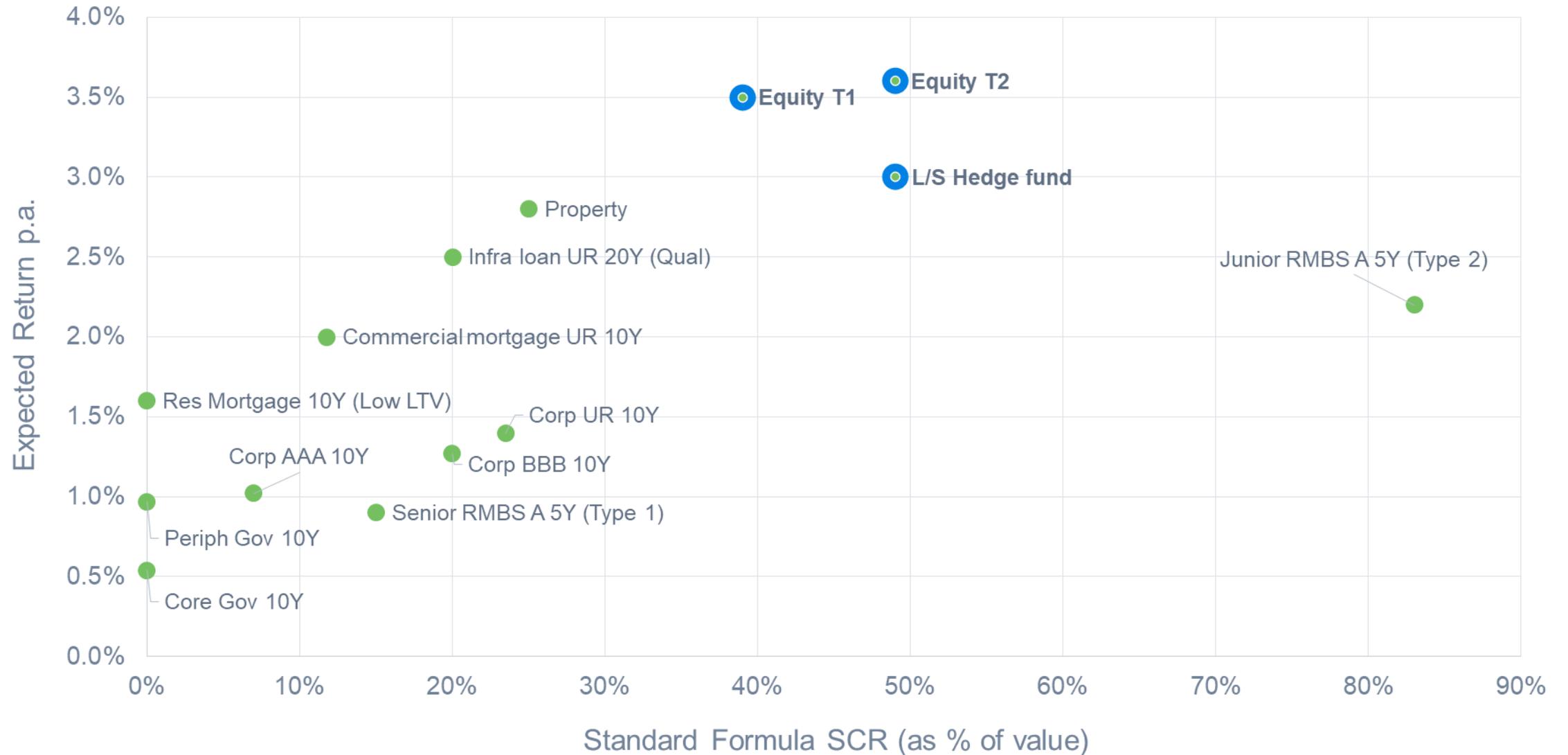
Return versus Capital



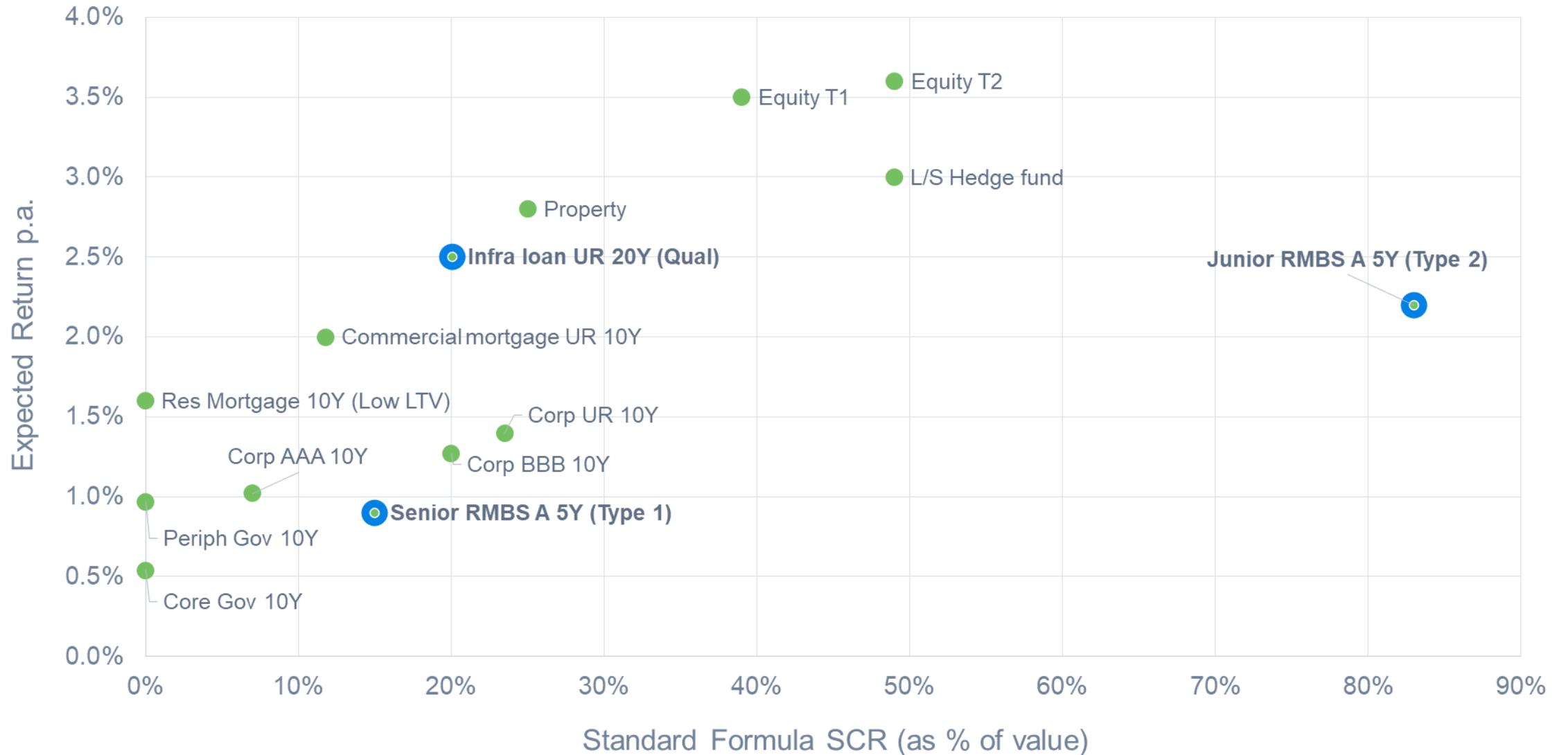
Return versus Capital



Return versus Capital

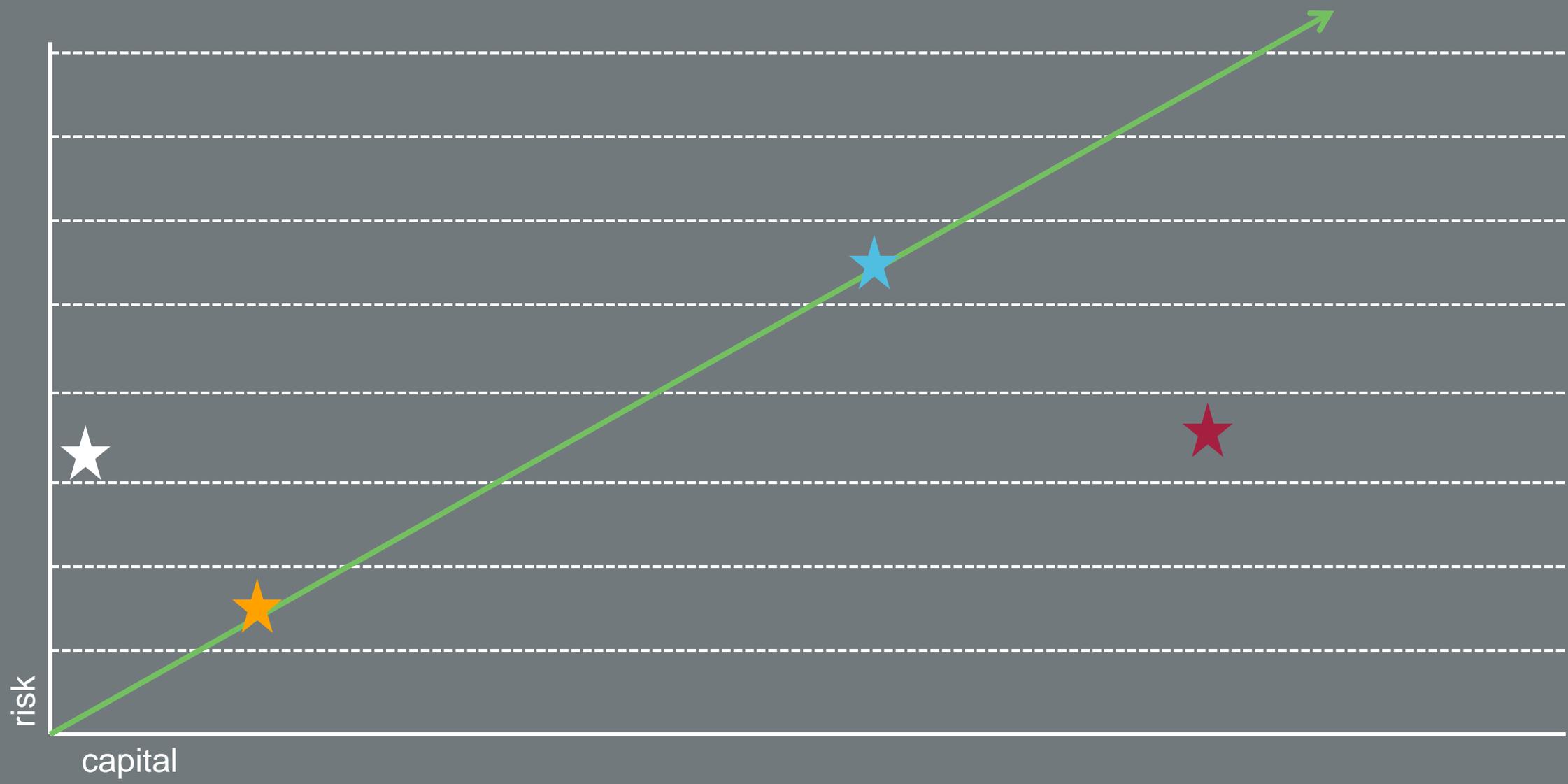


Return versus Capital



Capital v Risk

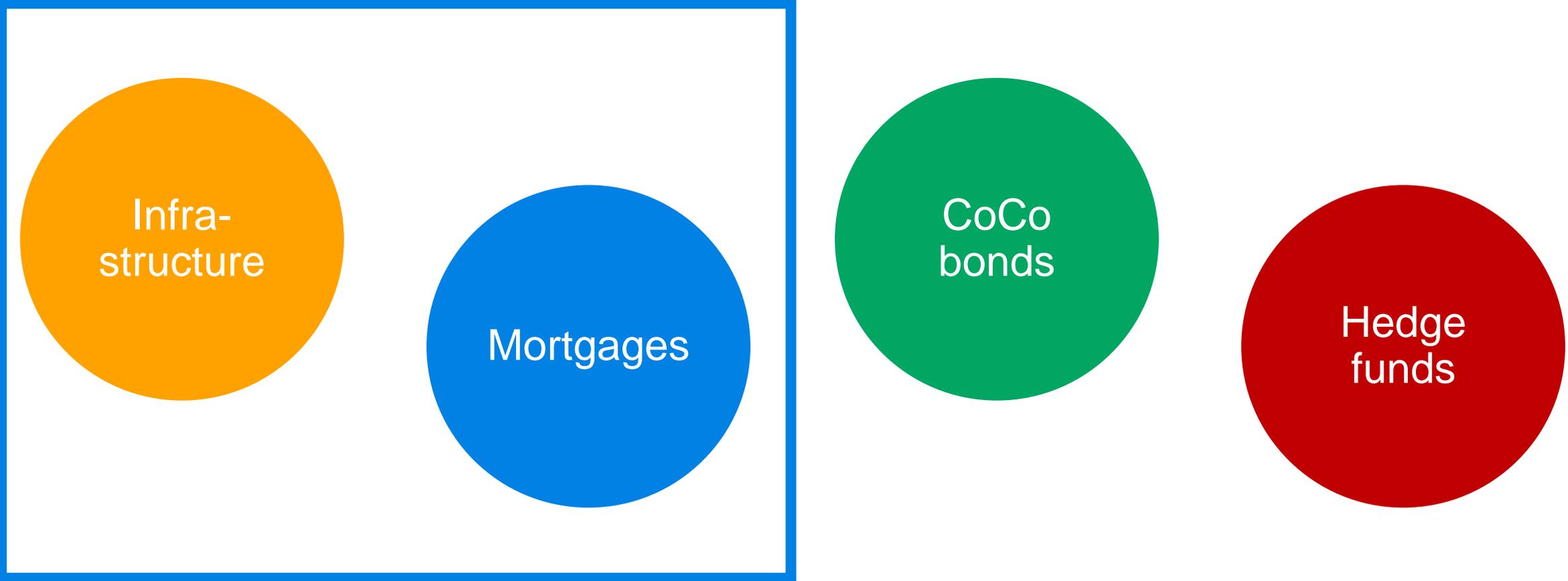
Capital versus risk



Alternative investments

Alternative Investments

Many options..



Infra-
structure

Mortgages

CoCo
bonds

Hedge
funds

Actuaries and AI

How relevant is AI?

Donal McGinley

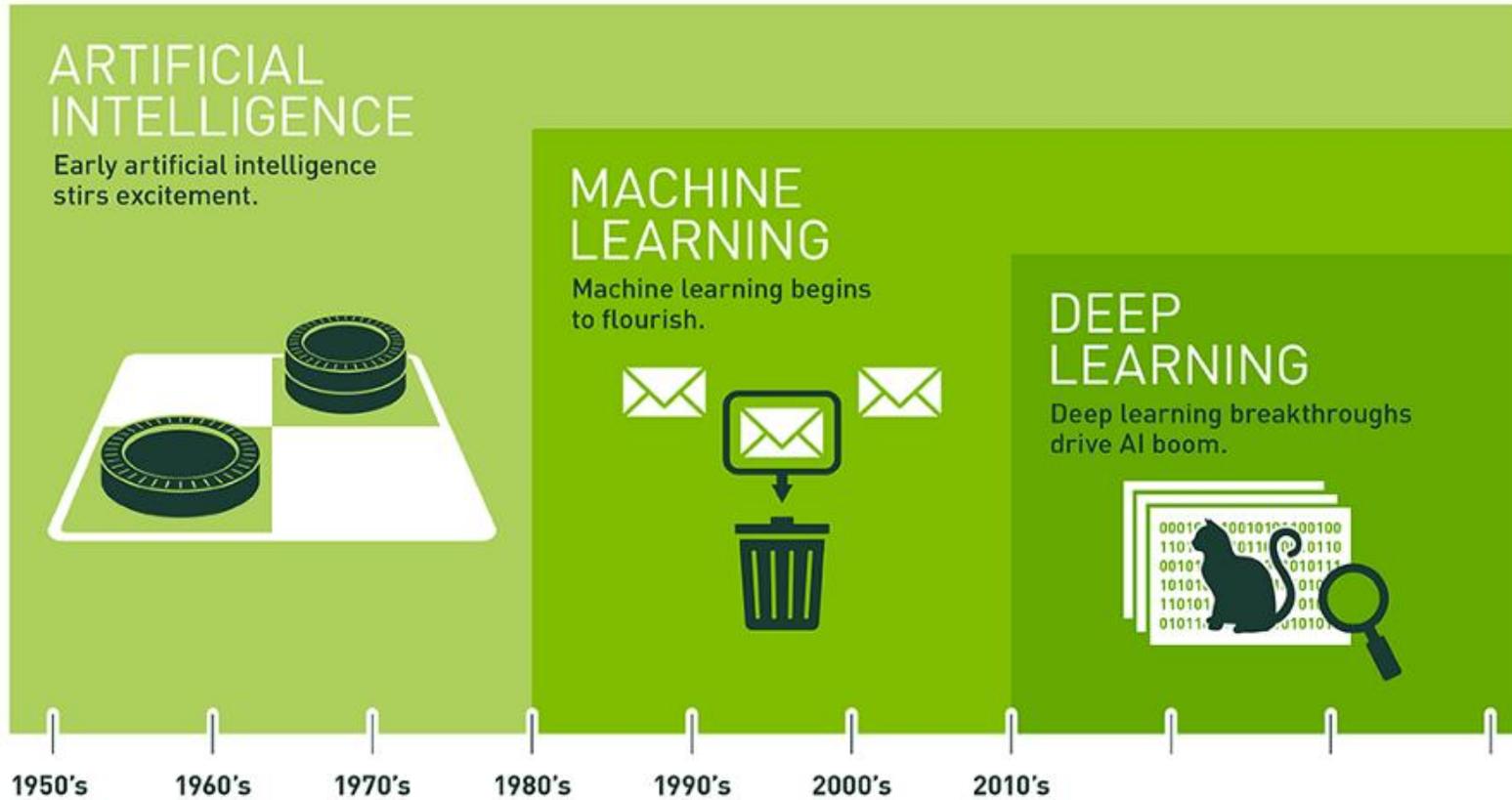
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Actuaries and AI

- Introduction
- What is AI and How Does it Work?
- Why is it Relevant to Actuaries?
- Examples

What is AI?

Introduction



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

General Examples

Self-Driving Cars

Speech-to-text

Fraud Detection

Sales
Forecasting

Game Playing

Machine
translation

Pricing

Anti-Money
Laundering

Reducing
Electricity Costs

Chatbots

Credit Risk

Call-Centre
Routing

Analysing
Satellite Photos

Recommender
Systems

Customer
Retention

Sentiment
Analysis

Reading X-rays

Text-to-Speech

Proxy Models

Geographic
Analysis

Key Points

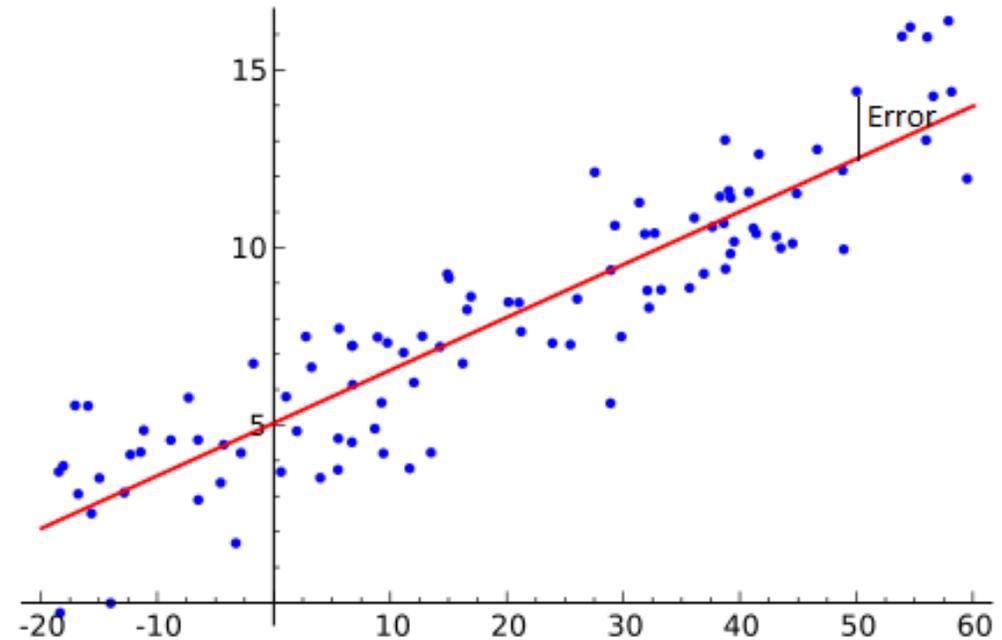
- Most AI hype caused by **deep learning models**
- Deep learning models are **data-driven mathematical models**
- They do complicated **non-linear regression**
- DLMS can achieve **human-level performance** on a wide variety of different tasks
- DLMS are **fast** – can run in real time
- A single DLM can be **scaled up** onto many different computers
- Can take actuarial skill-set out of actuarial department and into the **real world**

How Does It Work?

- Linear Regression Model:

$$\hat{Y} = b + aX$$

- Choose Loss Function
(e.g. Sum of Square Errors)
- Choose parameters a and b
which minimise the loss function



- Deep Learning Model: $\hat{Y} = f_1(b_1 + a_1 * f_2(b_2 + a_2 * f_3(\dots\dots\dots f_n(b_n + a_n X))))$

Why Should Actuaries Be Interested?

Why Should Actuaries Be Interested?

- Powerful new tool to solve real-world problems
- Wide range of use cases
- Already familiar with handling data and regression modelling
- Fast open-source software
- Low hanging fruit?
- Superstar salaries for top researchers
- Competition vs data scientists?

Challenges



- Black box nature
- Lots of data required
- Data, model and parameter risk
- Expertise and judgment required
- May not converge?
- How do they work?

Next Steps



Learn basic Python 3

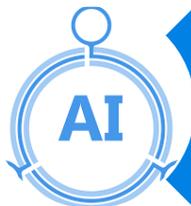
<https://www.reddit.com/r/learnpython/wiki/index>



Online courses on deep learning
(e.g. Coursera / Udacity / FastAI)



SAI Data Analytics Subcommittee



Meetup groups

Coursera Deep Learning Course

Jazz improvisation

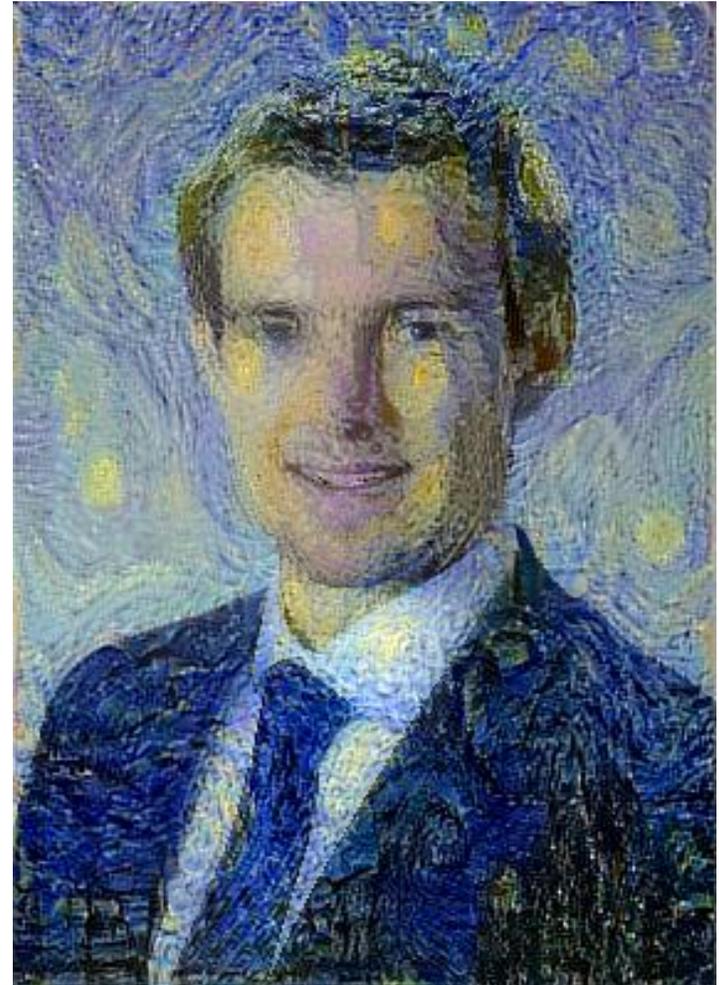
Face Recognition

Text Generation

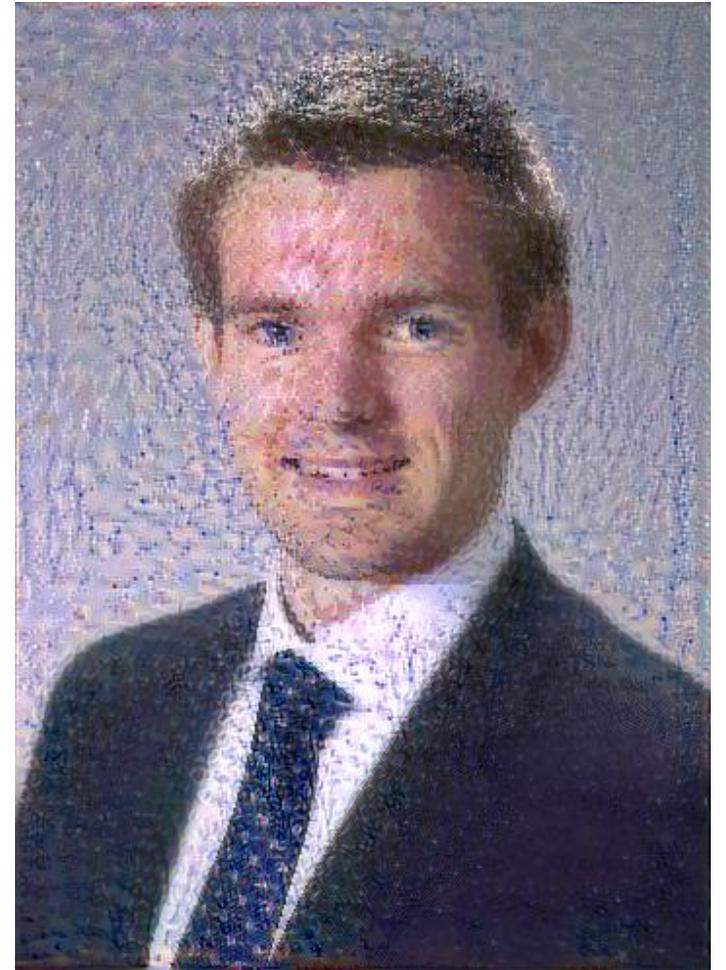
Coursera Deep Learning Course



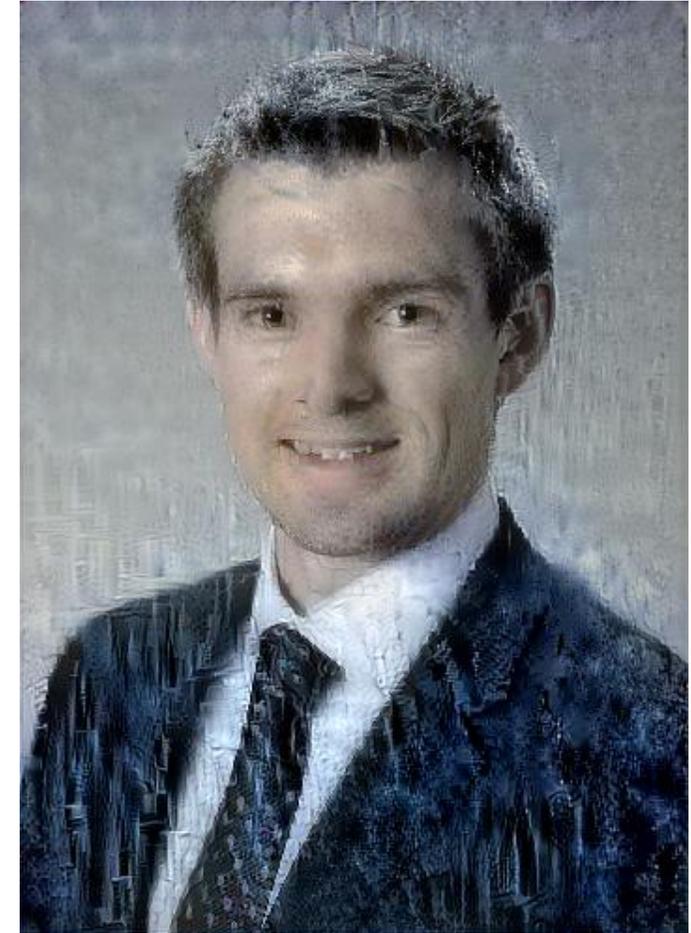
Starry Night



Monet



Gothic

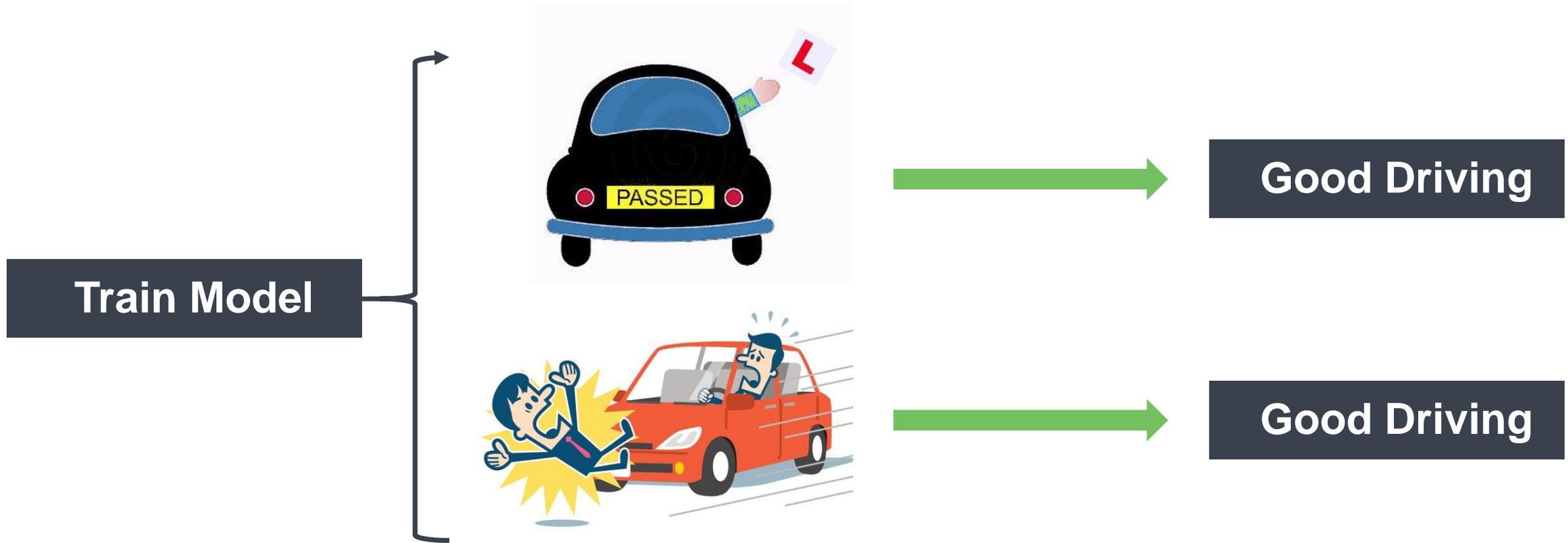


Mona Lisa



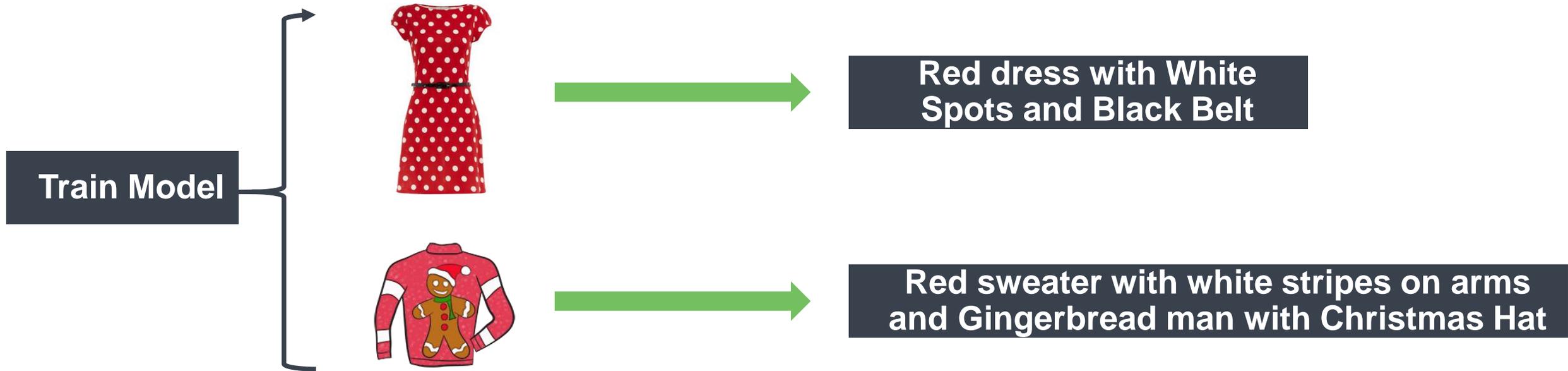
Examples

Example: Self-Driving Cars



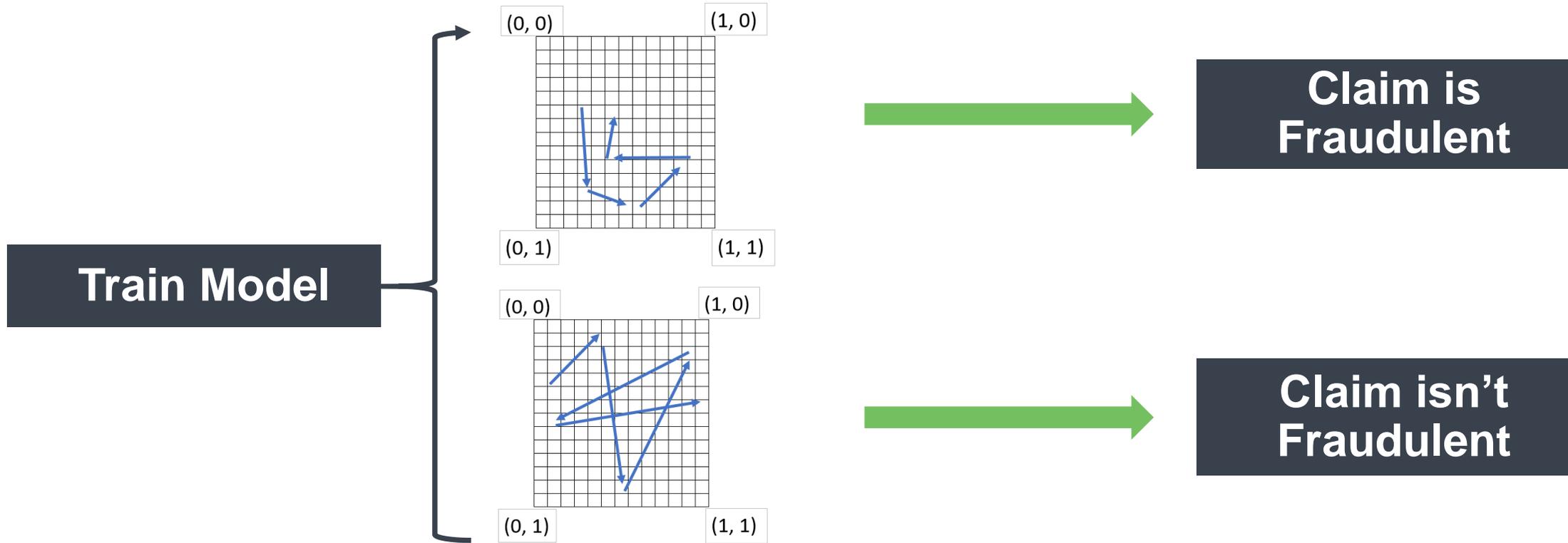
In future: Use trained model which copies the good driving style

Example: Captioning



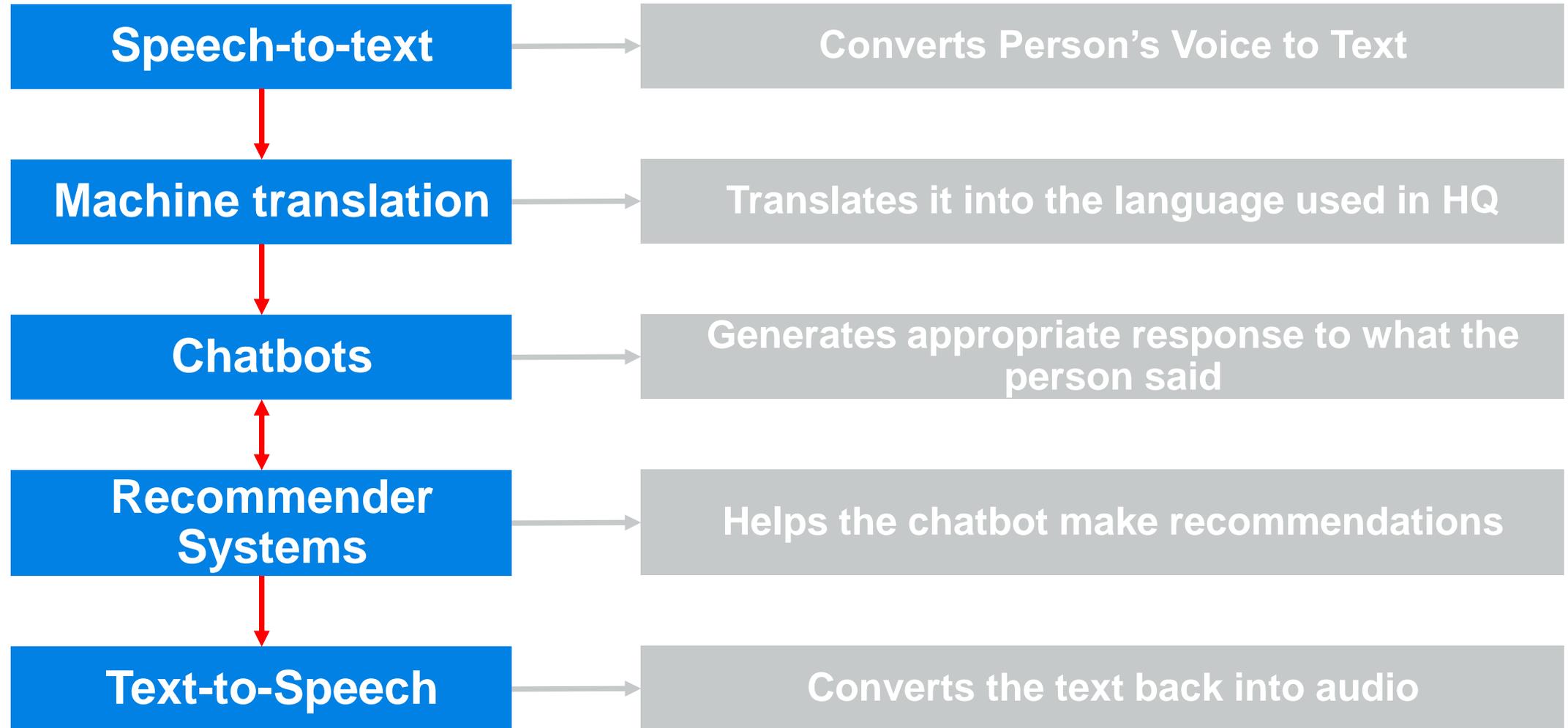
- In future:
 - Run thousands of pictures through the model every week
 - The model will output a caption for each picture
 - Use model output in recommender system and stock system

Example: Fraud Detection



- In future:
 - Record the mouse tracks for each claim
 - Run these through the model
 - The model will predict whether each incoming claim is fraudulent or non-fraudulent

Example: Automated Phone Answering System

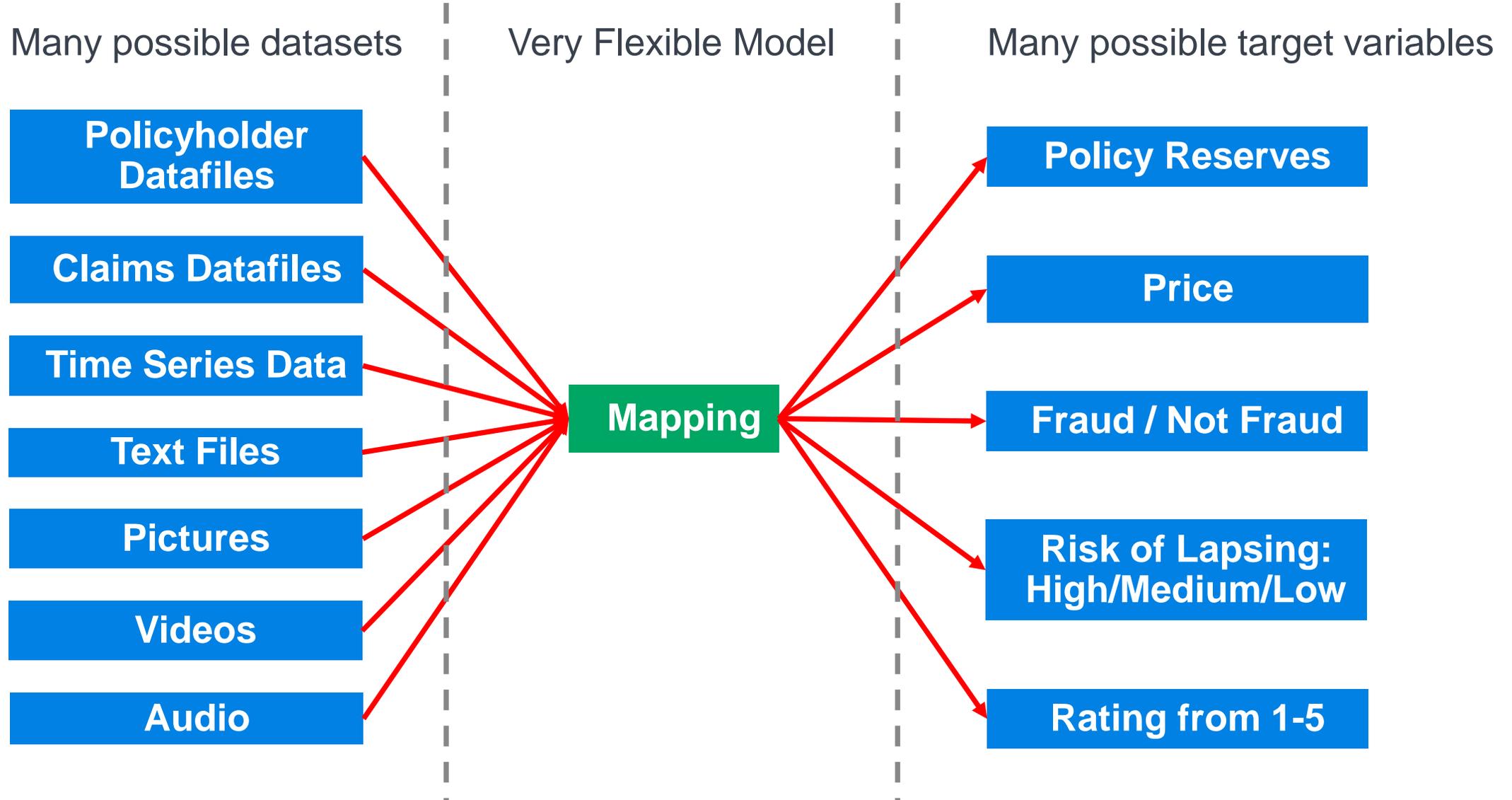


Brainstorming

Brainstorming



Brainstorming



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Thank you

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Questions?