

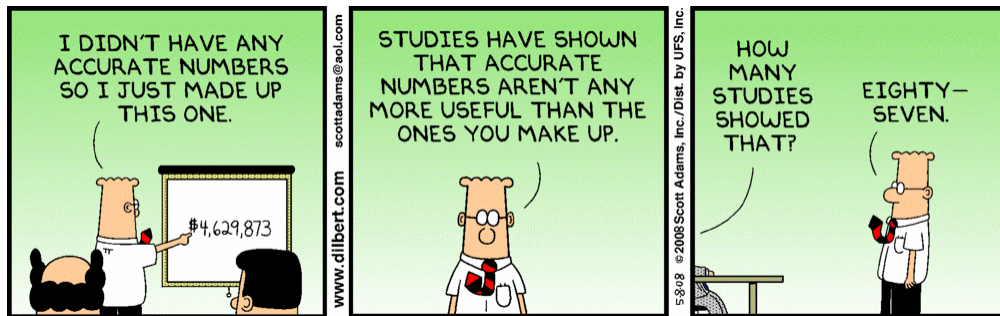
# A selective view on the future of modelling – a personal perspective

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## Overview

- Modelling Basics
- How to develop
- Are we doing the right thing?
- An alternative view

## Why model?



## Modelling

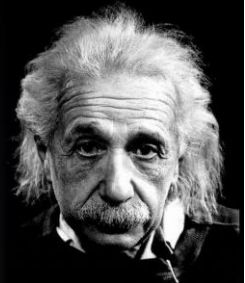
- What is a model
  - Representation of the collective understanding of the business
- How complicated should (the outputs of) a model be?
  - Depends on the question

For every complex problem there is an answer that is clear, simple, and wrong.

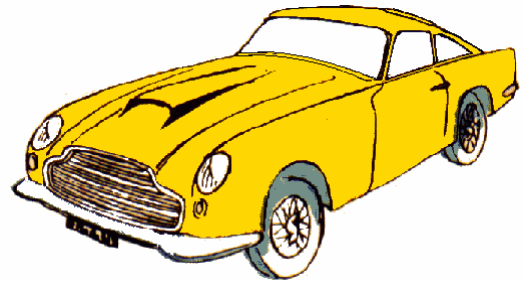
H.L. Mencken

“Everything should be made as simple as possible, but not simpler.”

Albert Einstein

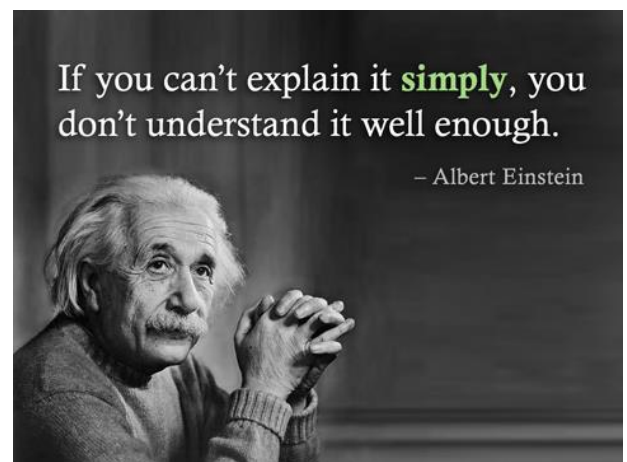


## Level of Complexity - Map analogy



## Level of Complexity - Explaining / communicating

- "If people do not believe that mathematics is simple, it is only because they do not realize how complicated life is."  
John von Neumann (1903-1957)



## Initial drivers

- Expected value not being sufficient
- Recognition that EV not the sole determiner of risk – although noted that higher “return” linked with higher “risk”
- Move to distributions
- Closed form solutions not tractable - simulation

## Early development

- Parallel development of
  - Notions of risk and how to measure it
  - Understanding of Dependency (in particular tail dependency)
- Notions of acceptability linked Risk and Capital
  - how much capital do you need to make a risk acceptable
- Flexible systems developed in order to allow different approaches to be tried.

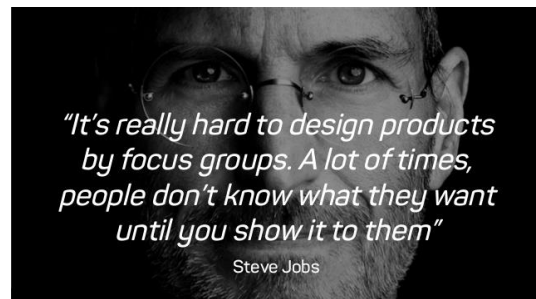
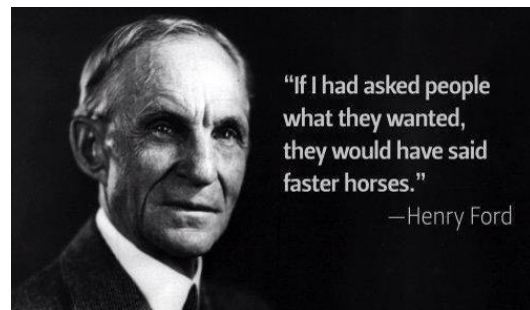
## More recently

- Models becoming “locked down”
- Flexibility to try new approaches reduced
- Approaches becoming “standardised”
- If approach correct then all is fine
- Otherwise....



## Innovation

- Look at what you have and make it faster - “Me too” development
- Do something different “rock the boat”



## Modelling reality

- If the model is not being “used” is it modelling the right thing?



## Four areas to consider (although the boundaries are blurred)

- Basic concepts of risk
- Economic capital and risk measures
- Value and risk
- Stakeholder management

## Basic notions

- Artzener et al. – Coherent measures of risk
  - “The basic objects of our study shall therefore be the random variables on the set of states of nature at a future date, interpreted as possible future values of positions or portfolios currently held”
- “Risk is a derivative on the states of nature” (AJC)
- Original Artzener et al. definition has element of method of measure – the time element
- The object of study of most modelling systems is consistent with this
- However...

## Lets Look at “Risk”

- Need to change to allow for “time” element
  - Crossing a road
  - “Underwriting” risk and “Reserving” risk
- The journey matters as well as the position at a fixed point
  - Look at distributions of curves rather than just points
  - Leads to notions such as Risk surfaces
- Ideas of risk measures can be extended
  - Current risk measures fit into this framework
- Better means of having a combined view of the lifetime of a risk
- Can have a broader definition that also links in to other results such as categorical data

## Economic Capital and risk measures

- Q: Which risk measure should I use? – A: What are you selling?
- Previously had a split between defining risk and measuring risk
- Need similar notion for economic capital
- EC is what is needed to satisfy the “economic contract”
- “Economic Contract” vs “Legal Contract”

## Is the risk measure appropriate?

- What is demanded from your target market?
- This influences what risk measure is used.
  - Only interested in being covered by a particular insurer for a year, with no guaranteed insurer later
  - Only interested in paid eventually
  - If your market does not fit into the above are you using the right measure?
- Commodity market equivalence to regulatory capital otherwise different
- Can obtain “capital equivalence” of reinsurance and capital – however this is only from one perspective.



## Value

- Much of the above is based on a “protection” viewpoint
  - Artzener et al. takes view from regulator / supervisor
- Profit profile of reinsurance vs capital is different
- Need to bring in concept of value
- “Naïve” Cost of capital approaches can yield strange results, particularly when looking at a marginal capital approach
  - Linked in to “justification” of 1 year view.
- Also there could be a issues with long term contracts.

## Measuring “Value”

- Mango GIRO 2012 capital tranching
  - Have different cost of capital for different layers of a contract
  - Return required commensurate to risk
- Can expand notion to have CoC be determined by the risk
- However this naturally leads to a “ $A=(A/C)*C$ ” type of argument – so maybe we can do away with the “C” element
- Leads to ideas of linking value directly with risk
- Has consequences
  - Duality between risk and value
  - Return linked with risk borne
  - Time element of risk appropriately considered
  - Only pay for risk that you are taking
  - Diversification has improved treatment
  - 1 year view has less justification

## “Economic” Cost of Capital

- Consequence – return commensurate with the risk that is being borne.
- Should shareholders receive returns in excess of that appropriate for risks (equivalent of “risk-free profit”?)
- Can start analysing “value” to different stakeholders

## Stakeholder Analysis

- When looking at results - Whose side are you taking?
- EC approaches mainly concerned with policyholder protection
- In fact Artzener et al. come from a viewpoint of what is needed for a regulator
- Many optimisation approaches look at maximising shareholder value
  - (In fact many of them maximise RoC which is not the same!)
- However on Shareholder Value
  - Jack Welch “dumbest idea ever” (F.T. interview 2009)
  - The Economist “Shareholder Value model has conceptual as well as practical problems” March 2105
- Point here is not which business model to follow but to recognise that different Stakeholders are interested in different things

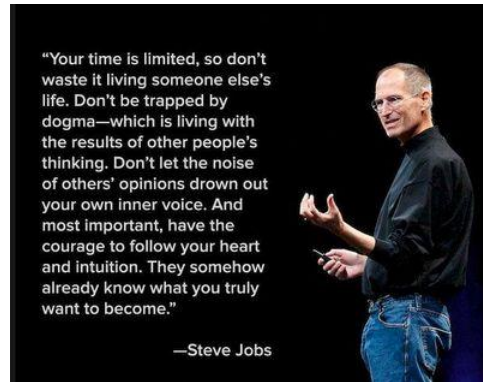
## Stakeholder Viewpoint

- Need different notion of value of company related to value for each of the different stakeholders
- By emphasising one of the stakeholders this could reduce overall value
- Returns should be linked to risks being borne
- Need to recognise that different stakeholders are interested in different things – its not just about capital
- Multiple views are required

## Summary

- The basic object of study needs to change
- Economic capital needs to reflect what is being sold
- Concept of what value is needs to be developed
- Viewpoints of all stakeholders need to be considered
- Its not just about capital!

But this is my view!



A word of warning!

