

# Practical aspects of fair value accounting

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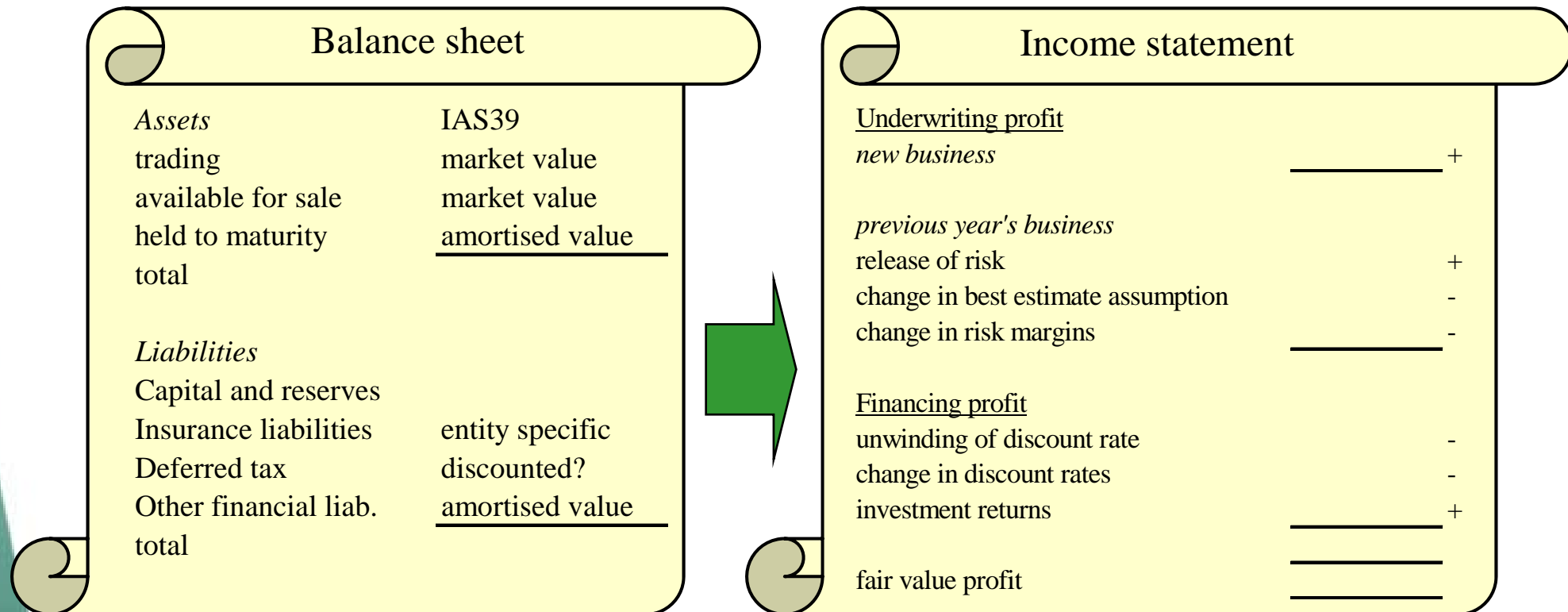
# Agenda

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- General methodology & principles
- What you need to know?
  - non-profit products
  - general insurance products
  - unit-linked products
  - with-profit products
- Asset model

# Methodology & principles

## ● Asset/liability approach

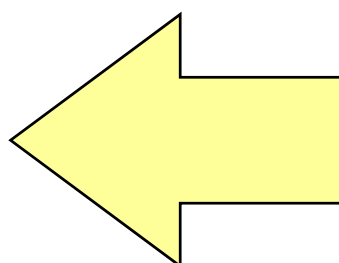




# Methodology & principles

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- Prospective discounted cash flow approach
- Best estimate market consistent assumptions
- Non-market assumptions in line with budgets



Cash flows included:  
existing contracts only  
claims and claims expenses  
premium receipts  
transaction-based taxes  
policy & admin. expenses  
policy loans and recoveries

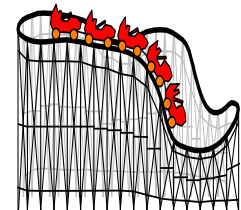
Risk-free discount rate: pre-tax yield on least risky assets in economy (adjusted for credit risk and liquidity premium)



# Methodology & principles

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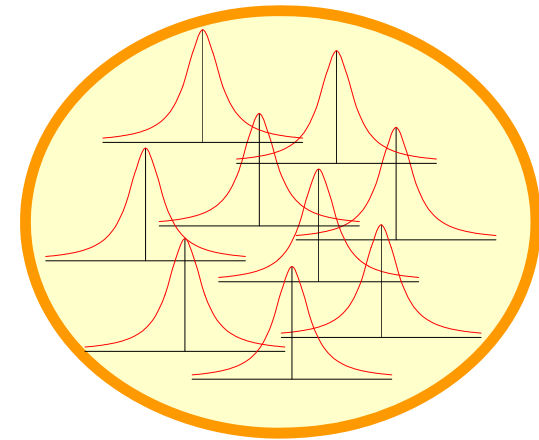
- Allowance for non-market risk:
  - market value margins in assumptions to allow for risk
  - risk margins should allow for volatility of both past and future experience
  - currently difficult to assess
  - if margins cannot be determined reliably they need to be set such that at inception no profit arises (unless clear market evidence of profitability)



# Methodology & principles

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- Stochastic vs deterministic
- Starting point is the "expected present value" of future cash flows:
  - in principle stochastic
  - to capture cost of guarantees
  - and correlation between cash flows
- "In many cases, relatively simple modelling may give reasonably reliable answer" (DSOP)





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## What do you need to know?

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- How to do the calculations
- Are stochastic projections required?
- What are the outstanding issues?
- How do results compare with existing methods?





## How to do the calculations

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- Project benefit payments and expenses
- Longevity: best estimate + margin
- Persistency: best estimate + margin
- Expense levels: best estimate + margin
- Expense inflation relative to RPI: best estimate + margin
- Discount rate: risk free zero coupon yields (FI/IL)



# Are stochastic projections required?

- No



# What are the outstanding issues?

- Market value margins:
  - explicit approach
  - cost of capital approach
- Risk free discount rate (what is risk free rate?)



## How do results compare with existing methods?

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- Varies from product to product
- Likely to be more volatile



# Agenda

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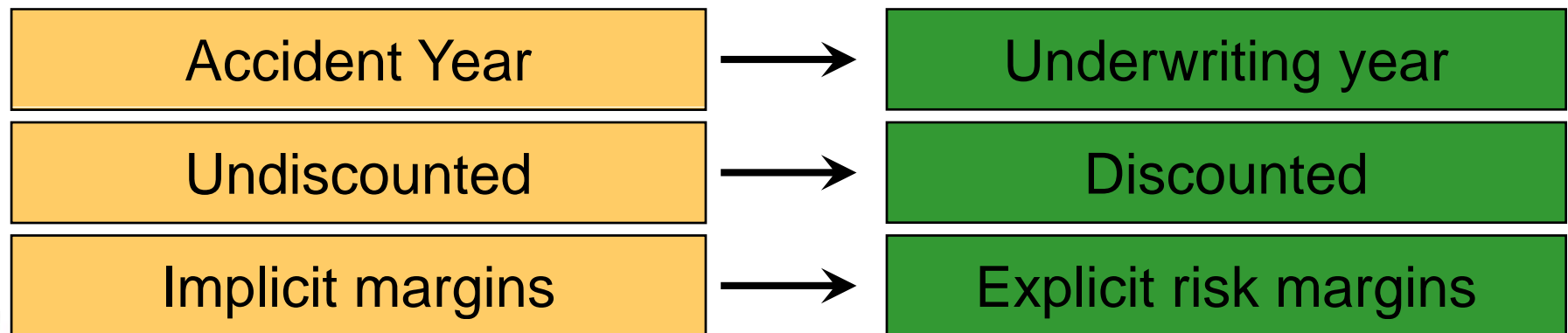
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## How to do the calculations

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- Movement away from traditional deferral & matching
- Prospective NPV valuations for liabilities





# How to do the calculations

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Outstanding claim



Fair Value liability valuation:

- best estimate future cash flows
- discounted
- risk adjusted

Unearned premium

DAC

Unexpired risk



In respect of contracts written prior to the b/s date

Equalisation

Catastrophe



Replaced with either segregated capital or notes to the accounts



## What are the outstanding issues?

- Market value margins
- Definition of insurance (e.g. earthquake risk)





## How do results compare with existing methods?

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Impact will depend on relative size of the following changes:

- discounting which will depend on length of business
- explicit market risk margins replacing any implicit prudence in assumptions
- unearned premium reserves replaced with prospective NPV capitalising future losses and profits



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## How to do the calculations

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- Market consistent principles
- $X$  of unit fund has a total fair value of  $X$ , independent of assumed unit growth rate
- Fair value calculation involves apportionment of  $X$  between the stakeholders (policyholders, shareholders, agents/expenses, tax)



## How to do the calculations

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- Project cash flows
- Unit growth = risk free rate
- Discount rate: risk free rate (FI/IL)
- Expense levels: best estimate + margin
- Expense infl. relative to RPI: best estimate + margin
- Persistency: best estimate + margin



# Are stochastic projections required?

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- Does value depend on unit growth rate?
- In theory yes, if:
  - guarantees
  - performance related charges



## What are the outstanding issues?

- Definition of insurance contracts
- Allowance for future renewals

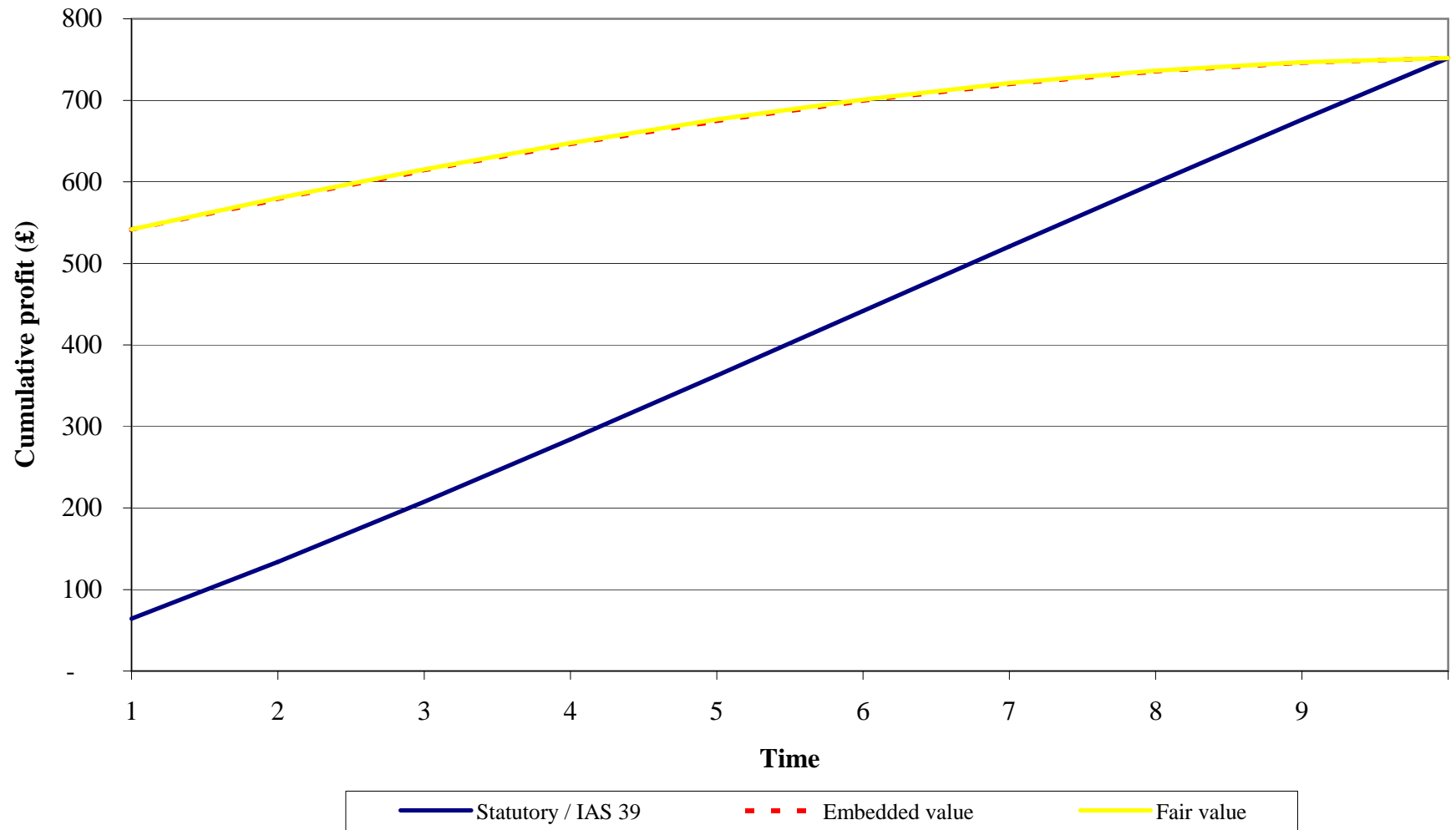


## How do results compare with existing methods?

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- Probably not too different from embedded values unless IAS39 applies
- Will be more volatile if "smoothing" currently applied in embedded value calculations

## Unit Linked : Analysis of emergence of profit







# Agenda

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## How to do the calculations

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- Generalised case of unit-linked
- Need to define bonus and MVA policy
- Need to model management discretion
- Global step-by-step projections required



## Are stochastic projections required?

- Stochastic projections likely to be needed unless a "shortcut" can be found:
  - guarantees prevalent
  - performance related charges implicit within a 90/10 gate
  - smoothing



## Outstanding issues

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- Modelling complexity (are stochastic projections required?)
- Allowance for cross subsidies?
- Extent to which you can model management discretion
- Requirement for asset model
- Availability of market data
- Allowance for new business



## How do results compare with existing methods?

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- Results can be very different but very product specific
- Likely to be more volatile especially if embedded value uses smoothed asset process
- Matching will be more of an issue



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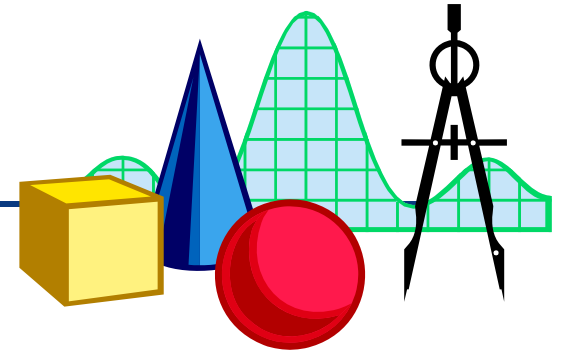


# Asset models - What do you need to know?

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- Types of asset models
- Risk neutral vs deflator methods
- The way forward (2005 project)

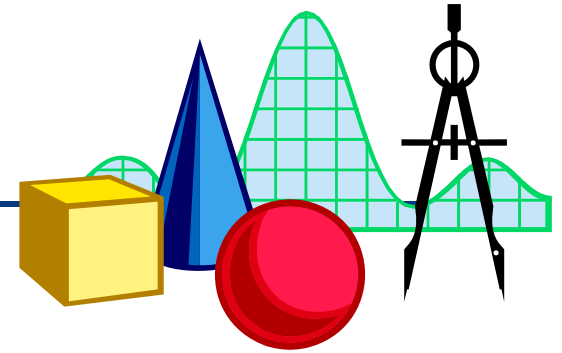
# Types of asset models



- Econometric asset pricing models:
  - aim is to price each asset by reference to its exposure to fundamental sources of macro economic risk
  - input to risk management and strategy by helping to assess risk, profitability, capital requirements
  - relies on historic data to fit the model



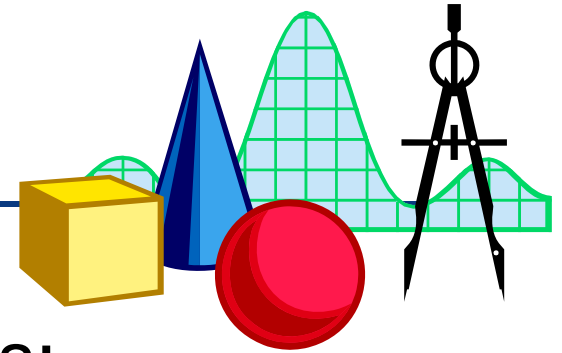
# Types of asset models



- Examples:
  - Wilkie model
- Not suited for fair value calculations:
  - sometimes not arbitrage free (e.g. mean reversion)
  - don't produce a "market price"

# Types of asset models

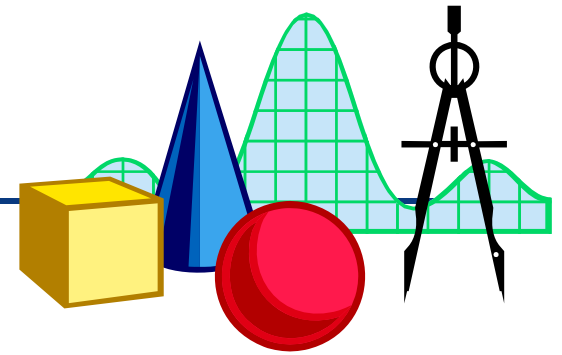
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- Market consistent asset pricing models:
  - aim to price assets relative to other assets. No desire to ‘explain’ the economy and its risk factors
  - arbitrage free
  - market consistency: valuation of future cash flows consistent with observable market prices

# Types of asset models

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- Two approaches:
  - risk neutral approach
  - deflator approach



# What you need to know about deflators

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- State-price-deflators are stochastic discount factors
- They work on the principle of no-arbitrage (no ‘free lunch’). Cash flows are adjusted for the risk taken to achieve them.
- They form the basis of asset pricing theory and are derived from utility theory
- If markets are assumed to be complete the deflator is unique (Harrison/Pliska 1974)

# Risk neutral approach


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- Black Scholes (1973)
- In complete markets investor risk preferences do not influence prices
- We assume 'risk neutrality'
- In a 'risk neutral' world all asset earn risk free rate
- The discount rate is risk-free

'Risk Neutral' world

Claims ( $X^{RN}_1 \dots X^{RN}_{1000}$ )

T      Zero  
t      coupon  
0      bond<sub>T</sub>



OptionPrice = 1/1000\*;

# Approaches lead to same answer

## 'Real' world

T Claims ( $X_1..X_{1000}$ )

t

x Deflator<sub>i,T</sub>

0

## 'Risk Neutral' world

Claims ( $X^{RN}_1..X^{RN}_{1000}$ )

Zero  
coupon  
bond<sub>T</sub>

OptionPrice = 1/1000\*;

- Advantage deflator approach:
  - more intuitive
  - less simulations required



## The way forward

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- 2005 project UK Institute & Faculty of Actuaries
  - development of criteria for accreditation of stochastic approaches and models for use in financial reporting
  - consideration of suitability of stochastic engines available for the production of fair-value financial results and assessments of risk based capital
  - further investigation into the range of methods, models and stochastic engines available, with associated tools such as deflators, and the practical problems of using them and calibrating them to market, including the need to do so within normal reporting timescales