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Annual Pensions Convention 2005

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Mission Impossible:
Accounting for employee share options

Presenters

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Agenda

- Changes in accounting rules
- So what is a share option?
- Methods for valuing employee share options
- Practical issues and how actuaries can help
- Questions and discussion

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All Change on the P&L

Old UK GAAP

- Generally no charge for Executive options
- SAYE schemes specifically exempted
- Charges for shares based on value at grant

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All Change on the P&L

IFRS 2

Charge for all plans based on “fair value” at grant

- Calculated using option pricing models
- Charges for options and SAYE where more previously
- Generally a higher charge!

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All Change on the P&L

Plan	Grant level	Current GAAP (UK)	IFRS charge
Performance share plan	£5m	£3m	£3m
Option plan – grant at market value	£30m	-	£10m
SAYE plan	£10m	-	£3m
Free share plan	£5m	£5m	£5m
Total		**£8m**	**£21m**

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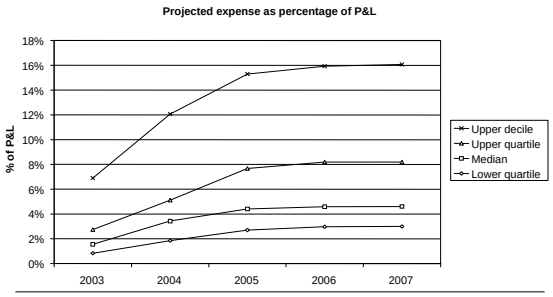
All Change on the P&L



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IFRS2 - Background

- Employees provide service to the employer
- Employer pays the employee in the form of share-based payment, e.g. share options, share awards.
- IFRS 2 requires the employer to recognise the cost of services received.
- If the amount of payment provided in respect of services received is not known, share-based payment awards can be valued by considering the fair value of the equity instruments granted i.e. by valuing the options or shares awarded.

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IFRS2 - Scope

- All share-based payment arrangements
  - Equity-settled (including all employee plans – SAYE)
  - Cash-settled
  - Where either party may choose form of settlement
- Applies from
  - 1 January 2005 for listed companies
  - 1 January 2006 for unlisted companies
- Covers equity settled awards issued after 7 November 2002 not vested by above dates – also covers modifications

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IFRS2 – Equity-settled transactions

- Measured at fair value:
  - Directly: fair value of goods or services received
  - Indirectly: fair value at grant date of equity instrument issued
- Indirect method required for transactions with employees
- Direct method presumed for other transactions
- Charge recognised over vesting period, with adjustment made for actual forfeitures (estimated upfront)
- Debit to P&L account, corresponding credit to equity

IFRS2 - Performance conditions

Market conditions	Non market conditions
Vesting depends on the market price of entity's shares	Any condition other than a market condition!
Absolute TSR target	EPS target
Relative TSR target	ROCE target
Share price target	Relative EPS
	EBITDA target

IFRS2 – Market -v- non-market

- Market condition
  - Measure fair value at start including performance target
  - Do not adjust for failures of performance target
- Non-market condition
  - Measure fair value at start *excluding* performance target
  - Assess likelihood of performance target being met
  - Reassess the likelihood of hitting the targets each reporting period
  - Adjust for failures of performance target

IFRS2 - Calculating the charge

Charge calculated as:

FAIR VALUE PER OPTION **x** [NUMBER GRANTED **-** FORFEITURES[1]]

[1]Includes impact of lapses due to e.g. EPS conditions, but excludes impact of lapses due to e.g. TSR conditions.

Charge spread on straight-line basis over performance period, and may be adjusted in line with revised estimates at each year end.

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What is an "Employee share option"

- Option to buy shares in the company
- Typically fixed exercise price
- Benefit to employees
- Subject to:
  - Service conditions
  - Performance conditions
  - Many different types

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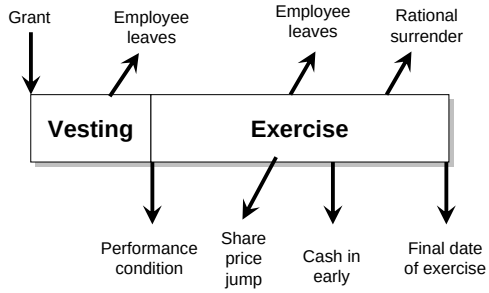
Employee share options



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Some jargon explained

- Dates: grant, vesting & expiry
- Periods: vesting & exercise
- Exercise / strike price
- Performance conditions
  - EPS
  - TSR
  - Retesting
  - Graded vesting

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Why provide share plans?

- Incentivise key employees
  - 25% of senior executives' pay
- Align shareholder & employee interests
  - share price growth
  - performance criteria
- Helps recruit & retain key employees
- Tax incentives on approved schemes
- Enhance company performance

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Placing a value on remuneration to employees

- Purpose of the calculation
  - accounting
  - decision taking
- "Market value" for traded options
- "Fair value"
  - intrinsic value
  - time value

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IFRS2 says

"For many entities, this might **preclude the use of the Black-Schöles-Merton formula**, which … may not adequately reflect the effects of expected **early exercise**.

It also does not allow for the possibility that expected volatility and other **model inputs** might **vary** over the option's life."

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What is the Actuarial Binomial Model?

The established binomial valuation method…

…extended to value "human factors"

- leaving the employer
- early exercise patterns

… and complex option features

- performance conditions
- phased vesting
- closed periods

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Available models

	Black Schöles	Binomial model	Actuarial Binomial model	Stochastic model

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Black-Schöles made easy

$$f(S) = Se^{-qT}\Phi(d_1) - Ke^{-rT}\Phi(d_2)$$

$$d_1 = \frac{\log\frac{S}{K} + T(r - q + \frac{\sigma^2}{2})}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

S = **Price** of the stock today
K = **Strike price** of the option
r = Risk free **discount rate**
q = Annualised dividend **yield**
T = **Time** to exercise of the option
σ = **Volatility** of stock price

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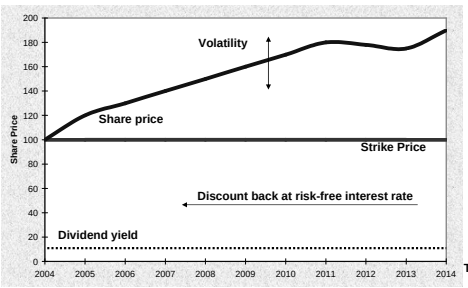
Black-Schöles made easy



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Black-Schöles

- Allows for movement in share price
- Places market value on *vanilla options*
- Used extensively in financial options industry
- Does not allow for vesting period or multiple exercise periods accurately
- Use binomial model to allow for these

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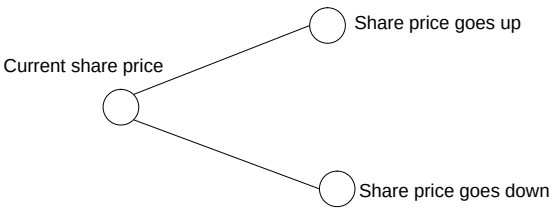
Textbook Binomial Model



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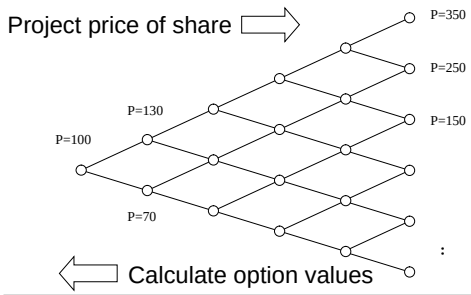
Binomial model



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Binomial model

- Consistent with Black-Schöles
- Allows for vesting and exercise periods
- Cannot assess “human factors”
  - leaving the employer
  - financially “irrational” - though personally rational - decisions
- We could **value** human factors using the Actuarial Binomial model

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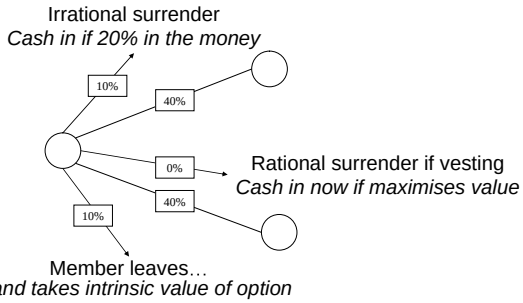
Actuarial Binomial model



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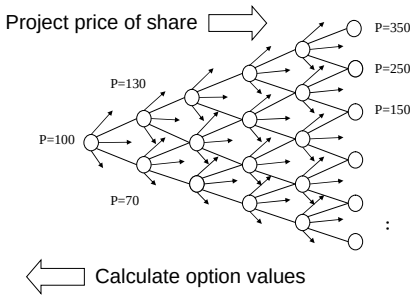
Actuarial Binomial model



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Actuarial Binomial model

- Consistent with Black-Schöles
- Allows for vesting and exercise periods
- Allows for human factors
  - leaving the employer
  - financially "irrational" - though personally rational – decisions
- Allows for most vesting criteria

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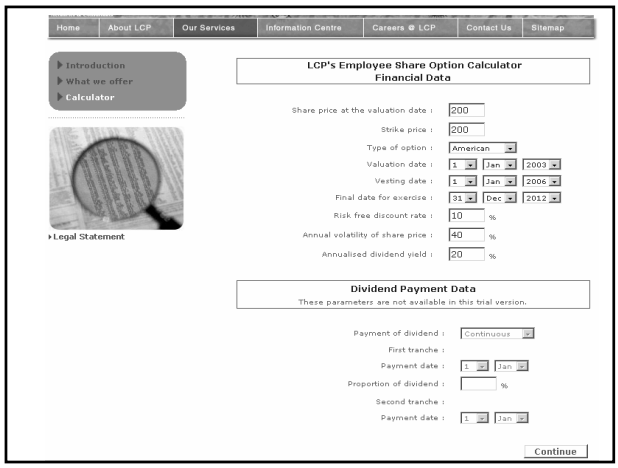

Summary of models

	Black Schöles	Binomial model	Actuarial Binomial model	Stochastic model
Exercise period	X	✓	✓	✓
Employees leaving	X	X	✓	✓
"Irrational" early surrender	X	X	✓	✓
Performance criteria	Some	Some	Most	All

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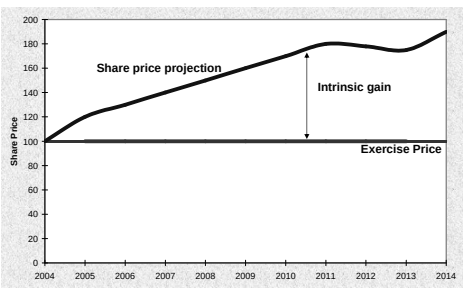
Projection Models: the principles



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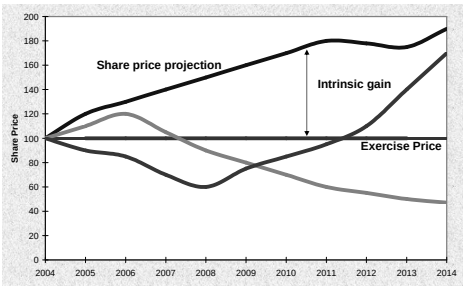
Projection Models: the principles



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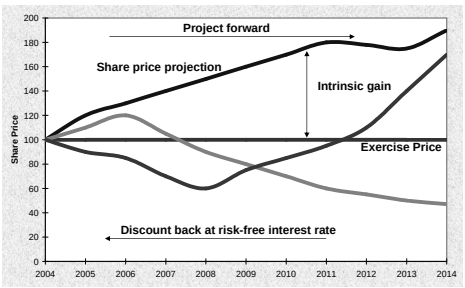
Projection Models: the principles



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Projection Models: technical notes

- Total shareholder return is projected on a risk neutral basis, ie E(TSR) = rfr
- Share price growth derived from TSR projection
- No real world assumptions as to expected returns from risky assets
- All cashflows discounted back at the risk free interest rate

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Market based performance conditions

Performance condition: Options only vest if company's total Shareholder Return (TSR) beats that of an index over a three year period

- needs to be included in Fair Value calculations
- important to recognise that the chances of meeting the performance condition in a given projection is heavily related to the share price performance of the company …… and hence the options gain

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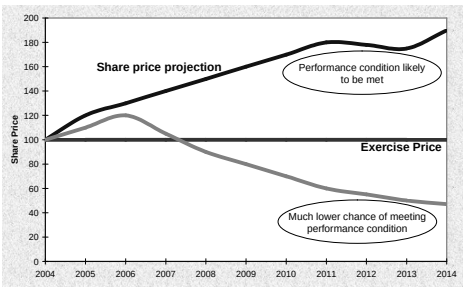
Market based performance conditions



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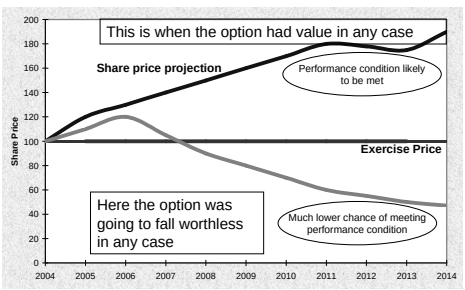
Market based performance conditions



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Market based performance conditions

- Therefore assess condition on a case by case basis

Simulation	TSR	Index TSR	Share Price	Vesting FTSE
1	2.0269	1.8461	£2.03	100%
2	0.8327	1.5799	£0.83	0%
3	0.8841	1.1285	£0.88	0%
4	2.1380	1.8621	£2.14	100%
5	1.2134	0.9047	£1.21	0%
6	1.6900	0.9008	£1.69	100%
7	1.2248	1.1264	£1.22	100%
8	1.1298	1.3583	£1.13	36%
9	2.3000	1.3154	£2.30	100%
10	0.9707	0.7317	£0.97	0%
11	0.4058	1.0173	£0.41	0%
12	0.9502	0.8527	£0.95	0%
13	1.9228	1.1999	£1.92	57%
14	0.5324	0.9208	£0.53	0%
15	1.0076	1.0003	£1.01	0%
16	1.5367	0.9781	£1.54	98%

Projection Models: other considerations

- Projection models are very powerful and can value a wide range of share-based schemes
- Models only converge to a solution based on the number of projections made (let n be the number of iterations)
- The quality of the estimate only improves with an increase in the square root of n……. sometimes n has to be surprisingly large

Questions

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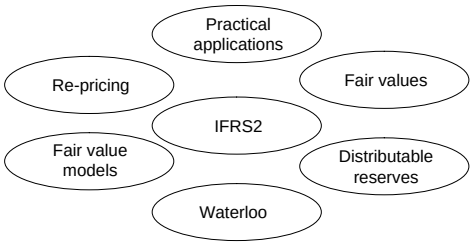
Further issues for discussion



Another Mission Impossible?

		8	2			4		
	9			7		3	5	
	1							6
4					7		2	
				3				
	8		1					4
5							8	
	7	6		8			3	
		2			5	1		