The Actuarial Profession
making financial sense of the future

Sponsor Covenant Risk and Actuarial Advice

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Incorporating sponsor covenant risk

- How do traditional methodologies fit?
- Disclosure & advice
- Effect on management of schemes

Different points of reference

- Trustee concerns
  - Ensure payment of promised pension for scheme members
  - Whilst trying not to bankrupt sponsor
- Company concerns (= shareholder concerns?)
  - Keep cost of providing pension to a minimum
  - Whilst keeping rest of company going
- Sponsor covenant has to be key to any funding plan

Trustees' point of view

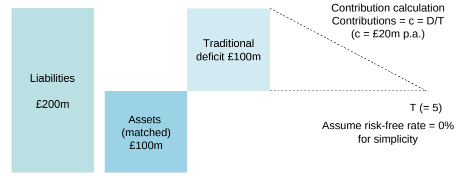
- Members' "assets":
  - Value of current pension fund assets
  - Value of promise from company to make good any deficit
  - Value of contingent assets available on default
    - Ring-fencing of company assets / Escrow accounts
- Liabilities: Value of promised pensions (buyout value?)
- Trustees' aim: Members' "assets" = Liabilities

Shareholders' point of view

- Shareholders' "liability":
  - Deficit in pension fund now
  - Possible deficit in pension fund in the future
    - e.g. if risky assets are held
- Cost to shareholders:
  - Contributions to meet deficit from actuarial valuation
  - Economic cost of any deficit in the future
  - PPF Levy
- Shareholders' aim:
  - Continuation of company
  - Members' "assets" = Liabilities ??

Company promise

Traditionally, no allowance for sponsor default risk in contribution calcs



No sponsor default => Present value of contributions = D (=£100m)

But sponsor default risk exists

- Can think of promised contributions as a corporate bond
- Credit risk lowers value of promise
  - Less chance of receiving all contributions
- How significant is this risk?

Credit ratings as measure of risk

- AAA rated company: minimal risk of default
  - Bank of England etc.
- BB/B rated companies: sub-investment grade
  - Encompasses majority of UK private companies & public company subsidiaries (Source: S&P)
- CCC rated company: very high risk of default

Simple example of credit risk

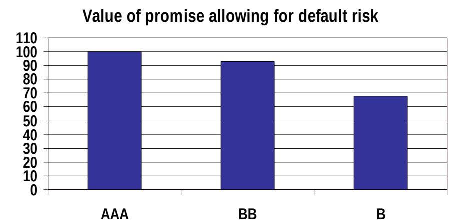
- Company promises £100m in 5 year’s time
  - Assume risk-free rates are 0%
  - No default risk => promise worth £100m now
- Assume annual default probability
  - Use S&P historic default probabilities
  - Sufficient for illustrative purposes
  - Wrong for pricing purposes
    - Typically understates cost of default risk

Simple example of credit risk

- AAA default probability: <0.02% p.a.
- BB default probability : 1-2% p.a.
- B default probability : 5-10% p.a.

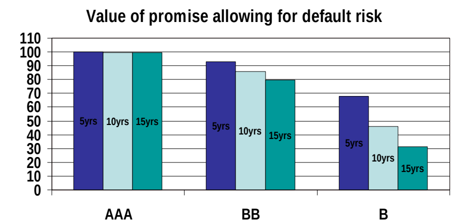
- Probability of company existing in 5 years
  - AAA: $(1 – 0.02\%)^5 = 99.9\%$
  - BB: $(1 – 1.5\%)^5 = 92.7\%$
  - B: $(1 – 7.5\%)^5 = 67.7\%$

Simple example of credit risk



What about changing the time period?

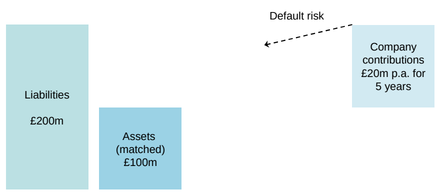
Simple example of credit risk



How does this affect traditional advice?

Impact on traditional advice

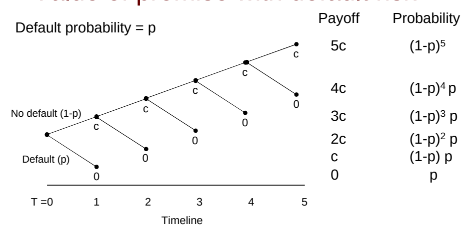
Default risk will reduce the value of the promise



But by how much?

Value of promise with default risk

Default probability = p

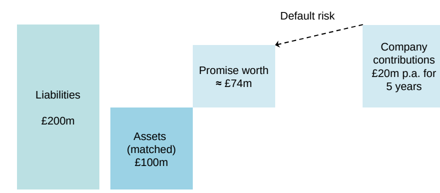


Present value of future contributions (PVfc) = $\sum$ payoff * probability

If c = £20m p.a. and p = 10% p.a. then PVfc ≈ £74m < Deficit

Impact on traditional advice

A more accurate representation would be…



But trustees wanted £100m?

Implications

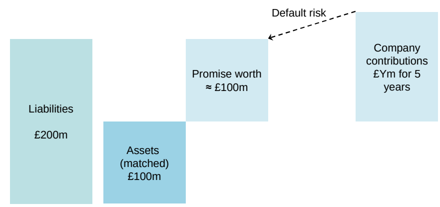
- Trustees’ want Members’ “assets” = Liabilities
- By ignoring sponsor default risk, traditional advice leads to Members’ “assets” < Liabilities
- Traditional advice not sufficient to secure members’ benefits

Making up the difference

- Higher contributions?
  - Similar to increased coupons on corporate bonds
  - Such that promise including default risk = £100m
- Credit risk mitigation?
  - Credit Insurance / contingent assets / …

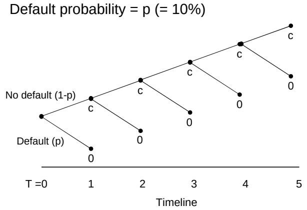
Increased contributions?

Set contributions such that promise including default risk worth deficit



Increased contributions?

Default probability = p (= 10%)



Payoff	Probability
5c	$(1-p)^5$
4c	$(1-p)^4\,p$
3c	$(1-p)^3\,p$
2c	$(1-p)^2\,p$
c	$(1-p)\,p$
0	p

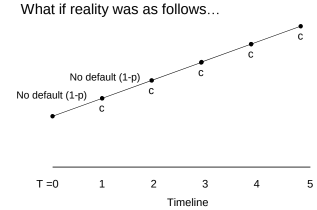
In this example we would need c = £27.1m for PVfc = £100m

Problem solved?

- Are higher contributions the answer?
- We can solve for the contribution amount such that value of promise = deficit
- But higher contributions have risk

Reality is just one outcome

What if reality was as follows…



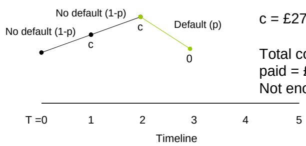
c = £27.1m

Total contributions paid = £135.5m
Too much!

Company never defaults

Reality is just one outcome

What if reality was as follows…



c = £27.1m

Total contributions paid = £54.2m
Not enough!

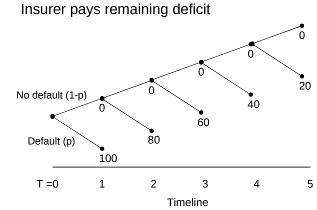
Company defaults after 2 years

Insurance contracts

- Instead need to think of £27.1m p.a. as £20m p.a. + an insurance premium
  - Cost of protection against company default
- Remember, deficit would only be guaranteed if insurance was actually purchased

Pricing an insurance contract

Insurer pays remaining deficit

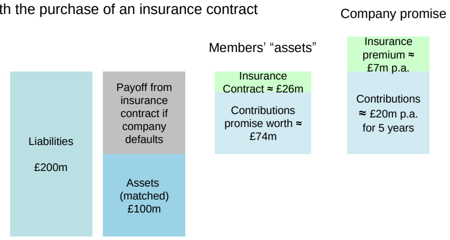


Payoff	Probability
0	$(1-p)^5$
20	$(1-p)^4 p$
40	$(1-p)^3 p$
60	$(1-p)^2 p$
80	$(1-p) p$
100	p

Cost of this insurance contract is ≈ £26m
As expected: deficit = contributions (£74m) + insurance (£26m)

Incorporating default risk

With the purchase of an insurance contract



What types of "insurance" are available?

Default risk mitigation

- Credit default swap (CDS)
  - Traded instrument
  - Typically only larger companies
  - Payout linked to a reference bond
    - So priority can be an issue
- Credit Insurance
  - Typically valid only for a limited period of time
  - Limited availability / expensive

Default risk mitigation

- Third-party guarantees i.e. letter of credit
  - Calling conditions can be complex
  - Typically enforces an extension at end of initial term
  - Expensive compared to borrow & fill
    - Providers will charge a significant fee
- Cross-group guarantees
  - Make any support obligations clear

Default risk mitigation

- Priority of debt
  - *pari passu* clauses – prohibition of creating prior ranking debt
  - Limited opportunity for improving pension fund priority
  - Negative pledges
- Financial covenants
  - i.e. accelerated funding if covenant deteriorates
  - Complicated – could cause full default

Default risk mitigation

- Security
  - Charge over assets (contingent assets)
    - E.g. Property
    - Inventory
    - Subsidiaries
  - Escrow account
- Value of security on company default not the same as market value of security now!

Contingent assets

- Example of charge on assets
  - Property with market value of £100m
  - Charge given such that property passes to pension fund should company default
- But would this be sufficient?

Contingent assets

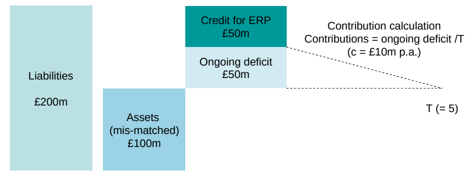
- Property might not be worth £100m at default?
- So value now of charge over property < £100m
- Pension fund might need more/less than £100m at company default
  - Dynamic process
  - Charge could reduce as contributions made
  - Charge might have to increase as economic conditions change

But aren't equities the answer?

- Typical pension fund assets are mis-matched
- Traditional advice takes advance credit for the equity risk premium (looks at the "long-term")
- But ignores the risks
- And default risk doesn't allow for the "long-term"

Company promise with mis-matching

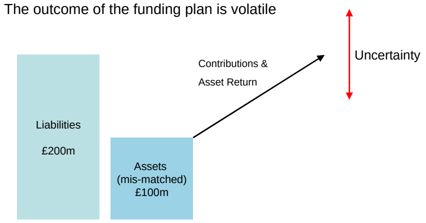
No allowance for sponsor default risk and advance credit for equity risk



But what about the asset volatility?

Company promise with mis-matching

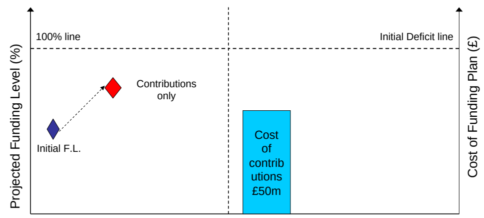
The outcome of the funding plan is volatile



Uncertainty comes with a cost

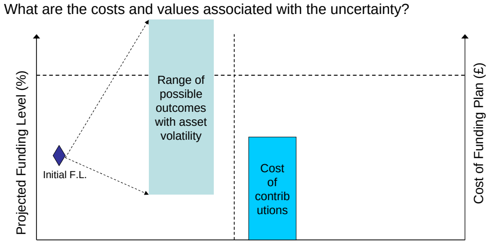
Company promise with matching

Cost of contributions only



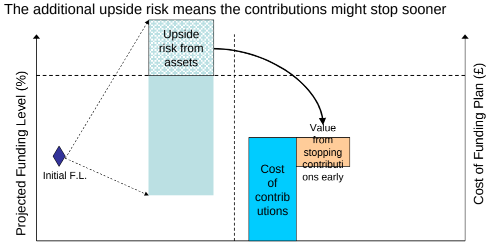
Company promise with mis-matching

What are the costs and values associated with the uncertainty?



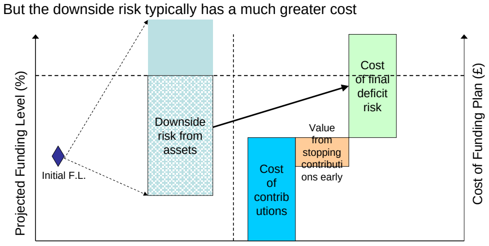
Company promise with mis-matching

The additional upside risk means the contributions might stop sooner



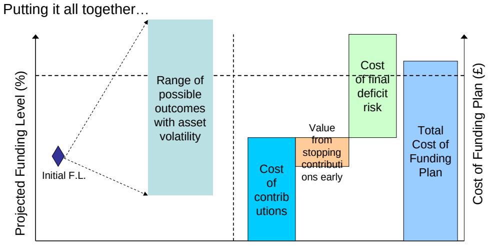
Company promise with mis-matching

But the downside risk typically has a much greater cost



Company promise with mis-matching

Putting it all together…



Refresher: call & put options

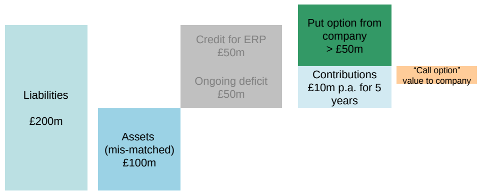
- "call option" – contract which gives the right but not the obligation to buy an asset at some time in the future for a price fixed at the current date
  - Purchase of call option gives exposure to up-side risk
- "put option" – contract which gives the right but not the obligation to sell an asset at some time in the future for a price fixed at the current date
  - Purchase of put option gives protection against down-side risk

Contributions & options

- If risky assets perform better than expected Company can stop paying contributions early
  - A type of call option
- If risky assets don't perform as well as expected the Company has to make up the deficit
  - A type of put option

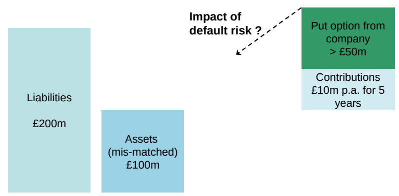
Company promise with mis-matching

So a better depiction of the funding plan might be…



But what about the default risk?

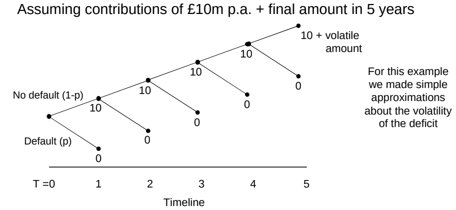
Company promise with mis-matching



Both contributions and put option are subject to default risk

Value of promise

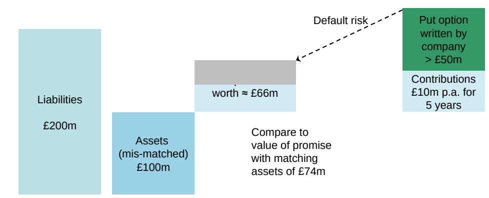
Assuming contributions of £10m p.a. + final amount in 5 years



Approximate value of the promise is £66m
Only if company promises to make volatile final payment in 5 years

Company promise with mis-matching

At best the promise is only worth £66m



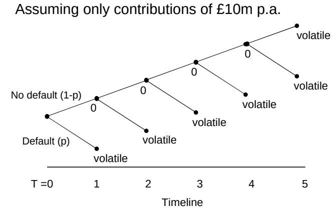
But only if company guarantees to make volatile final payment

How much would security cost?

- Put option from company is typically not recognised as part of the funding plan
- So to guarantee security Trustees would need to insure against default risk and the risk of any final deficit

Cost of security

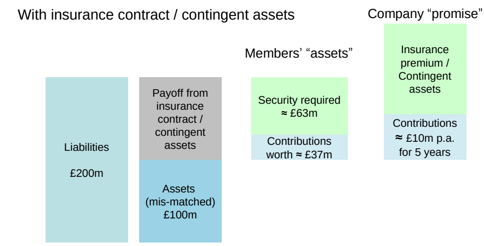
Assuming only contributions of £10m p.a.



Need to protect against the risk that final deficit in 5 years time is greater than 0

Approximate cost of this security is £63m

Incorporating default risk



Without insurance or contingent assets Members’ “assets” << liabilities

How does advice need to change?

- Disclosure of economic reality is vital
  - Significant change from current practice
  - Important for both Trustees and Shareholders
- A minimum demand from Trustees?
  - Members' "assets" should have economic value equal to the current deficit allowing for default risk (& risky assets)
- An awareness that uncertainty represents a cost for shareholders

How does advice need to change?

- Higher contributions not necessarily sufficient
  - Unless insurance purchased (but not easily available)
- Need to think about contingent assets
  - Won't guarantee benefits unless structured appropriately
  - Could require significant amount of capital to be set aside by the company

Opportunities

- Innovation - involvement in the discussions on structuring of company assets to back the promise
- Modelling all this is difficult but not impossible
  - Not an excuse for ignoring the problem
  - Education about the principles would be a start
- If actuaries don't advise on this someone else will
  - The market – M & A
  - Investment banks / ratings companies