DB Pension Benefits

An Off-Market Approach

Jon Spain (23 March 2016)

setting scene (1 of 2)

views expressed are in no way endorsed by GAD
… or by UK actuarial profession (yet?)
the work has not been peer reviewed
... which worried IFoA Pensions Board
all files will be published on open-source basis
... so anyone can investigate for themselves
probably during April 2016
at www.jonspain.com

setting scene (2 of 2)

funded UK defined benefits pensions alone

- not insurance (pension scheme claims not catastrophic)

trustees and sponsors (who seek and consider advice)

mustn't ignore potential for sudden shocks

… but don't be too pessimistic

pension schemes originally created to protect people

… they're not just financial entities

society, especially EU, has pushed for guarantees

- “best” really can be enemy of “good” (Confucius)

aims for this presentation

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seeking actuarial profession’s USP (2008 challenge)

trying to capture long-term dynamics of markets

at least two specific weaknesses of financial markets:

- prone to herding (following trends for too long)
- inability to price tail risk (or even to perceive it)

I’m not criticising scheme actuaries or regulator

- just framework within which they are forced to operate

financial scientists need to follow evidence (GG)

… please suspend disbelief (or belief) until the end

agenda

critical points
the funding nightmare
higher returns **DO** reduce costs
actuary **DOESN'T** say market is wrong
possible forecasting approaches
random numbers
simple financial contracts (Monte Carlo)
more complex assets plus liabilities (Monte Carlo)
tentative conclusions

critical points

"three actuarial laws"

- we don't know future (but must make assumptions)
- when, which way, how far, how long
- no such thing as free lunch over time

all the rest is merely commentary

very long-term can imply **different** restraints

- can't simultaneously aim "long" **and** "short"

"broadly right" better than "precisely wrong"

risk quantification very poorly captured by scalars

… so our answers should never just be scalars

single numbers presented as results

single numbers are not appropriate results
… for representing many future uncertainties
especially when we don't even say what it is
- mean? median? mode? specified percentile?

we should be looking at multi-dimensional results
- matrices (or tensors?)
- with confidence intervals

cannot do that with deterministic approach
doesn’t apply solely to DB pensions

the funding nightmare

“overall deficit rose/fell by £??b yesterday”
great headline but total poppycock
huge amounts injected by sponsors (see later)
… with zero or worse apparent funding impact
this has been economic illiteracy and capital destruction
… on a colossal scale
panic has been spread …
good schemes have been closed to many members
really not just due to people living longer

higher returns DO reduce costs

fund increased by:

- contributions
- investment returns (tend to form major element)

fund reduced by:

- benefits (plus premium payments and other expenses)
- investment returns

that is reality, accounting numbers are merely imaginary

we need to concentrate upon cashflows

- even if guaranteed

actuary DOESN'T say market wrong

market may sometimes appear illogical

… impling that opportunities exist for profits

markets run by traders

- traders decide where **THEY** want to be (pricing)
- where **THEY** want to be **NOW**

PF trustees don't need to share traders' views

- dissent is still legitimate

actuaries should look towards long-term future

- if, of course, that is justified (see slide 14)

no statement being made by actuaries about "now"

possible forecasting approaches

pick a number from the air
- "fudge, judge & bodge" (Staple Inn 25 October 1999)

look at what other actuaries do
- but how did they obtain their numbers?

both far from professional IMHO

no logical rationale for using "today" alone

consider past experience?

"more actuarial" approaches to be more robust?

consider past experience? (1 of 2)

some actuaries have claimed that "today" is only evidence

simply not true - there is far more

huge variability in any useful time series
- ignoring variability excludes virtually all data
- surely "spot" can't be superior to "whole population"?

must actuaries assume that future will always be worse?
- I find that deeply depressing.

consider past experience? (2 of 2)

we need to focus upon strategy rather than tactics

off-market is actuary's tool for soaking up volatility

- for truly long-term entities

we need to attack volatility

… as a better defense

volatility needs more attention – some other time

is there a long-term?

is there a long-term?

predators exist

- private (competition)
- public (regulators)

how much confidence can there be?

- for trustees, members and sponsor

essential for issues to be discussed in depth

trustees and sponsor entitled to take own views and act

crucial that agreed approaches are fully documented

- do SIP and SFP really cover long-term issues?

mark-to-market absolutely right for transactions

more actuarial approaches (1 of 2)

tied to clients' legal requirements and purposes

- where? when? why? affecting whom?
- membership profile highly relevant

consistency between assets and liabilities

- future cashflows in both directions (Heywood & Lander)
- risks and discounting

what about financial economics?

- FE mainly concerned with analysis of assets
- liabilities tend only to be considered as negative assets

approaches adopted for DB need not be same as for FE

more actuarial approaches (2 of 2)

take account of actual assets (including equities)

- because it affects actual funding requirements
- because good performance lowers ultimate costs

ding-dong, wicked dividend discount model is dead

- long live amended dividend discount model
- give alternative description (estimating future MV?)

actuaries claim to understand risk

risk quantification very poorly captured by scalars

stochastic processes much better approach

random numbers (1 of 3)

yields and returns modelled (end-1962 until end-2014)

- ILG yields and returns from end-1983

correlations originally ignored – not best practice

correlations now included

… with added expert judgment

full details will be on website

10,000 scenarios (1 in 200 based on 50 cases)

random numbers (2 of 3)

eight different UK financials considered

- equity returns over 1 year
- equity yields
- long conventional gilt returns over 1 year
- long conventional gilt yields
- ILG returns over 1 year (shorter experience available)
- ILG yields (shorter experience available)
- RPI inflation over 1 year
- RPI inflation over 15 years

longer true data series for RPI than for CPI

random numbers (3 of 3)

financials not best modelled as Normal

- nor log-Normal

"near best fits" taken instead

- adjusted for correlations (earlier and later periods)
- … and then blended

current financial conditions unprecedently low

so random numbers used atypical of "now"

- but typical of where we have been
- … and where we might be again

simple financial contracts (1 of 9)

can we cope with simplicity in mark-to-market world?

new financial business to be set up

two single-premium contracts

- annuity (£1,000 pa in arrears) over 15 years
- pure endowment of £10,000 payable in 15 years
- payments either fixed or fully RPI-linked

need to add expenses, profit, contingencies …

- no allowance for demographics

how much should basic cashflows cost?

simple financial contracts (2 of 9)

mark-to-market taken as implying using gilt yields
- conventional gilts for nominal benefits
- index-linked gilts for inflationary benefits

simplistic but near enough (margins will be common)

off-market allows longer-term approach

aligned to intended investment policy

how far away from desired destination will we be?

how should initial pricing yield be varied?

how significant are those variations from initial pricing?

simple financial contracts (3 of 9)

six asset portfolios
- conventional gilts alone
- index-linked gilts alone
- equities alone
- three 50:50 combinations

discount rates arbitrarily set:
- CG : 1.25 times initial yield
- equ : 3.00 times initial yield
- ILG : initial yield + expected long inflation + 1% pa

simple financial contracts (4 of 9)

why were discount rates arbitrarily set in that way?

Pension Fund Valuations & Market Values WP (1999)

Valuation Rates of Interest WP followed on

- from Jan 2003 until end 2004, closed down suddenly

VRIWP concluded that multiple approach had potential for long conventional gilts over 15 years:

- actual experience : 0.98
- random values (Y) : 1.67
- random values (N) : 1.30
- so multiple of 1.25 not totally outlandish – has been used

simple financial contracts (5 of 9)

simple financial contracts (6 of 9)

simplicity is harder than it looks

- technically known as Dolly Parton lemma

first two multiples higher than actual experience

- 3.00 v 2.67 (Eq) and 1.25 v 0.98 (Fi)
- higher multiples justified by random experience
- especially if correlated random variables used

yes, fund did tend to run away

… implying that initial discount rate was too low

… for budgeting purposes

simple financial contracts (7 of 9)

simple financial contracts (8 of 9)

extracted mean yield adjustments (% pa)

endowment (Corr_Yes)	MV	OM	Delta
Linked (RPI)			
Fi	1.91	1.74	0.17
Eq	4.83	1.68	3.15
IL	1.39	0.57	0.82
Nominal			
Fi	1.83	0.18	1.71
Eq	4.88	0.00	4.88
IL	1.29	4.87	(3.59)

simple financial contracts (9 of 9)

how could we even have guessed how much in advance?
employers paid DB Q2 2009 - Q4 2015 {ONS MQ5}
total paid £90.8 b (special £39.4 b, 77% of normal)
suppose discount rate under-estimated by 1.5 % pa
implies at least 30% difference in capital value
so at least £30 b (private sector) misallocated in UK

- my personal estimate
- choose your own yield adjustment

complex assets & liabilities (1 of 7)

two separate universes "MV" and "OM"

same market asset returns and benefit cashflows

different initial assets, matched to liability

- MV for MV
- OM for OM

different measuring rod ("capital coverage" or A/L)

different rules for funding ("+" or "–")

… MV and OM discount rates fluctuate over time

- OM discount rate originally fixed for whole period

complex assets & liabilities (2 of 7)

members age over time (no new entrants)

CPs and DP groups each start with £1 m pa

weighted mean ages 74 (CPs) and 50 (DPs)

no in-service decrements

fixed post-retirement mortality (PMA92 C=2040)

solely interested in financials, not demographics

all benefits fully linked to RPI (no deflation)

benefits paid annually in arrears from 66 (NRA 65)

neither cash nor dependants' benefits provided

complex assets & liabilities (3 of 7)

36 different combinations

- members (CPs, DPs, both 50:50) 3
- assets (bonds, equities, both 50:50) 3
- refund states (N, Y) 2
- top-up states (N, Y) 2

same 10,000 sets of random numbers as before

- correlated alone

complex assets & liabilities (4 of 7)

three measures considered

- capital coverage achieved (A/L on consistent basis)
- discounted capital (initial reserve plus any adjustments)
- fund development over time

six statistical points for each measure

mean, standard deviation plus 4 other points

- upper (0.5%, 5.0%)
- lower (0.5%, 5.0%)

originally thinking of Solvency 2

- hoping it wouldn't become relevant (we'll see)

complex assets & liabilities (5 of 7)

complex assets & liabilities (6 of 7)

extracted mean results (with adjustments)

	Discounted Capital_MV	Discounted Capital_OM	Coverage_MV (%)	Coverage_OM (%)
Pen:Fix	9.80	8.41	104	90
Pen:Mix	8.57	7.79	106	94
Pen:Equ	8.99	6.99	106	102
Def:Fix	9.83	5.86	107	91
Def:Mix	7.65	5.00	109	113
Def:Equ	8.40	3.98	112	134

complex assets & liabilities (7 of 7)

both approaches indicate too much being paid in
… unless refunds are allowed (100% trigger)
intellectually, actuaries should favour off-market
using off-market approach can save on total cost
BUT it is aimed at long-term
… so it's NOT designed to fund earlier wind-ups
wind-up failure was an unfair original criticism of OM
… unless real need to focus upon imminent wind-up

smoothing IS relevant

most finance directors want to be able to budget
shareholders should be comfortable with concept
even analysts seem to smooth earnings forecasts
by using multiples dependent upon

- industry and location (and other factors?)

analysts do not like profits warnings
actuaries used to tend to focus upon long-term
because short-term very poor indicator of future

DB funding inferences

DB PF trustees can and should form own views

- off market **can** be (**NOT "is"**) appropriate and rational

trustees/sponsor(s) should agree timeframe

- scheme-specific/sponsor-specific

assets won't be held forever (nothing is)

needn't focus upon short-term alone

- can't simultaneously aim "long" **and** "short"

include equity returns for **agreed** timeframe

- costs reduction rational/reasonable
- short-term focus alone too volatile (IAS19)

tentative conclusions

mortality has not been the real DB problem

- people have been living longer, yes
- financials generally far more significant than demographics

for prudence, one needs best estimate benchmark

- using bond yields alone may be imprudent

rather, capitalisation has hidden reality from us

risk quantification very poorly captured by scalars

… so our answers should never just be scalars

stop relying upon discount rates

capitalisation was original actuarial tool

- it was all the UK profession had
- it is no longer the only tool available
- it obscures more than it reveals

discount rates are:

- simple and simplistic
- readily available to anyone
- dangerous in “wrong hands” – and in “right hands”

actuaries should stop using discount rates

- for long-term projects