How institutions invest, and why

Portfolio Construction

1 A story: eight clients on one desk

- Eight clients that look alike from far away
- Real shared features: scale, governance, rules
- But each must be tested against the client
- Same checklist, different answers

IN THE LESSON

- Maya Okoro has a busy week.
- On Monday a pension plan calls.
- On Tuesday it is a college endowment, then a family foundation, then a bank.
- At first they look alike.
- Each is large, each has a board, each has rules to follow.
- So Maya is tempted to give them all the same advice.
- That is the mistake this lesson is built to prevent.
- Institutions do share real features, and those features matter.
- But the features are only a checklist.
- The skill is to test every item on the checklist against the one client in front of you, because the answer is different for each.

2 What institutions typically share

Four traits shared by most institutions

Shared trait	What it brings
Scale	Low fees, private access
Governance	Board, policy, delegation
Rules and tax	Limits, often tax free
Agents	Trustees act for others

IN THE LESSON

- Here are the shared features.
- First, scale.
- Institutions manage large pools, and size brings lower fees, an in house team, and access to private markets and co investments.
- Second, governance.
- A board or committee sets a written investment policy statement, and hands the daily work to staff or outside managers.
- Third, rules and tax.
- Almost all face legal and regulatory limits, and many enjoy favourable tax treatment.
- Fourth, the people.
- Trustees and staff act for other people, such as members, a sponsor or the public, and that creates its own agency problems.
- Horizon is missing from the table on purpose.
- Many institutions have long horizons, but not all.

3 Example 1: scale helps, horizon decides

Hollis endowment and Tidewater insurer, 2,000m each

Fee saving from scale	2,000m × 0.30%	**6m a year**
Hollis spends	2,000m × 5%	**100m**
Tidewater's claims in a year	2,000m × 30%	**600m**
Insurer's cash against Hollis	600m ÷ 100m	**6 times**

IN THE LESSON

- Let us test the checklist on two of Maya's clients.
- Hollis College Endowment and Tidewater Mutual, a property and casualty insurer, each hold two thousand million.
- Scale works for both.
- Each can negotiate fees nought point three per cent below retail, a saving of six million a year.
- Now look at the cash they must find.
- Hollis spends five per cent of its assets, one hundred million, and it is a smooth, planned amount.
- Tidewater expects claims equal to thirty per cent of assets within a year, six hundred million, on dates it cannot choose.
- The insurer needs six times as much cash.
- Same size, same board, very different portfolios.

4 Cash needed in the coming year

Cash needed in a year (millions)

Hollis endowment	**100m**
Tidewater insurer	**600m**

Same assets, 2,000m each

IN THE LESSON

- Here are those two cash needs as bars.
- The vertical axis is the cash needed within a year, in millions.
- The first bar is Hollis, the endowment, at one hundred.
- That is its planned spending, known well ahead.
- The second bar is Tidewater, the insurer, at six hundred.
- Remember, both institutions are the same size, and both enjoy the same fee saving.
- The gap comes entirely from what each one owes.
- This is why a consultant never stops at the shared features.
- Size tells you what is possible.
- The liabilities tell you what is sensible.
- A portfolio that locks money away for years suits the short bar and not the tall one.

5 The agent problem in every institution

Who acts for whom

Beneficiaries → Trustees or board → Staff, managers

IN THE LESSON

- One feature deserves its own picture, because it shapes everything else.
- Follow the boxes from left to right.
- At the start are the people the money is really for: members of a pension plan, the citizens of a country, the students of a college.
- They cannot manage the money themselves, so they rely on trustees or a board.
- The trustees in turn rarely pick shares themselves.
- They delegate to staff and outside managers.
- At every step, someone acts for someone else, and interests may not match.
- A manager may chase a bonus, or a trustee may avoid a bold choice.
- Good governance, clear rules and a written policy exist to keep each link honest.

6 Horizons differ widely

- Bank
- P&C insurer
- Mature pension
- Life insurer
- Endowment

IN THE LESSON

- Now to the trap.
- It is tempting to say all institutions have long horizons.
- Place Maya's clients on one line.
- On the far left is the bank, whose deposits can be withdrawn at any time.
- Next comes the property and casualty insurer, paying claims that arrive soon and without warning.
- In the middle is a mature pension plan, with promises that run for decades but large payments each year.
- Then the life insurer, whose promises are long and fairly predictable.
- At the far right is the endowment, which expects to exist for ever.
- The shared features are real.
- The long horizon is not shared by everyone.

7 The trap: assuming every institution can wait

- Not every institution has a long horizon
- Banks and insurers are shaped by near term liabilities
- Accept the shared traits, then test each one
- Liabilities decide how much illiquidity is sensible

IN THE LESSON

- Here is how the exam sets this trap.
- A vignette describes a bank or a property and casualty insurer, and then a character proposes a large allocation to private funds, arguing that institutions have long horizons and can tolerate illiquidity.
- The right answer is partly agree and partly disagree.
- Scale and formal governance are shared, and they help.
- But the liabilities of a bank are short and repayable, and an insurer's claims are uncertain, so liquidity needs are high.
- When you evaluate such a claim, split it into its parts, accept what is true of the whole group, and test the rest against that one investor's liabilities.

8 A story: four recipes

- Few institutions invent an approach from scratch
- Four recognisable models are followed
- Each suits some kitchens and not others
- Match the model to the client

IN THE LESSON

- Think of four kitchens.
- One serves a simple dish made of a few cheap ingredients, cooked the same way every day.
- Another buys rare ingredients from small farms and needs a skilled chef.
- A third cooks a familiar menu with modest flair.
- The fourth plans every meal around a booked dinner party, so the food arrives exactly when guests sit down.
- Institutions are the same.
- Most do not invent an approach from scratch.
- They follow one of four recognisable models, and the best one depends on the kitchen: its size, its skills, its guests and its schedule.
- Maya's job is to match the recipe to the client.

9 Four ways to build the portfolio

Four models, one idea each

Model	Core idea
Norway style	Passive, listed, cheap
Endowment	Alternatives, active managers
Traditional	Listed shares and bonds
Liability driven	Hedge the promises

IN THE LESSON

- Here are the four models.
- The Norway style model holds mostly listed shares and bonds through low cost, largely passive mandates.
- It is cheap and transparent, with little that is hard to value.
- The endowment model puts a large share in alternatives, such as private equity, hedge funds and real assets, and relies on active managers, hoping to earn an illiquidity premium over a very long horizon.
- The traditional model holds mostly listed shares and bonds, with some active management.
- And liability driven investing ties the portfolio to the liabilities, as pension plans and insurers do.
- Notice that two of these are cheap and simple, and two demand skill or liabilities to match.

10 The hurdle for the endowment model

Extra return needed = weight × fee + team cost ÷ assets − passive cost

Alternatives weight	Share held in alternatives
Alternatives fee	All in yearly fee
Team cost over assets	Staff to pick and monitor
Passive cost	Cost of index funds

IN THE LESSON

- The endowment model has a clear cost, and we can put a number on it.
- Start with the share of the portfolio in alternatives, and multiply by their all in fee.
- Then add the cost of the in house team, expressed as a share of total assets.
- That is the total cost of the model.
- Subtract the cost of a simple passive portfolio.
- What is left is the extra return the endowment model must earn just to break even against indexing.
- It is a hurdle.
- Any return above the hurdle is real added value.
- Any return below it means the committee paid for complexity and got nothing back.

11 Example 2: can a small endowment afford it?

400m endowment; 50% in alternatives; index cost 0.08%

Fees on alternatives	50% × 2.5%	**1.25%**
Team cost	1.2m ÷ 400m	**0.30%**
Cost of the model	1.25% + 0.30%	**1.55%**
Index funds cost		**0.08%**
Extra return needed	1.55% − 0.08%	**1.47%**

IN THE LESSON

- Ashdown University has a four hundred million endowment, and its trustees want the endowment model.
- They plan to put fifty per cent in alternatives, at an illustrative all in fee of two and a half per cent.
- Fifty per cent times two and a half is one point two five per cent of the whole portfolio.
- They would also need a team costing one point two million a year, which is nought point three per cent of four hundred million.
- The model costs one point five five per cent in all.
- A passive portfolio costs nought point nought eight.
- So the extra return needed is about one point four seven per cent every year.

12 What each piece costs

Yearly cost (% of portfolio)

Index funds	**0.08%**
Alternatives fees	**1.25%**
In house team	**0.30%**
Endowment model	**1.55%**

Hurdle: 1.55% − 0.08% = 1.47%

IN THE LESSON

- Here are those costs as bars.
- The vertical axis is the yearly cost as a share of the whole portfolio, in per cent.
- The first bar is index funds, nought point nought eight, barely visible.
- The second bar is the fees on the alternatives, one point two five.
- The third is the in house team, nought point three.
- The last bar is the total cost of the endowment model, one point five five.
- The gap between the first bar and the last is the hurdle, about one point four seven.
- The famous endowments cleared it with decades of relationships and access to managers that most investors cannot get into.
- The median private manager may not clear it at all.

13 Liability driven investing

Liability driven investing

Value the promises → Hedge with bonds → Grow with the rest

IN THE LESSON

- The fourth model works differently, so let us draw it.
- Follow the boxes from left to right.
- First, value the promises: the pension benefits or insurance claims that must be paid, and how sensitive their value is to interest rates.
- Second, build a hedging portfolio, usually of bonds, that moves with the liabilities, so that a fall in rates does not open a hole.
- Third, whatever the sponsor can afford to risk goes into a return seeking portfolio, to grow the assets.
- The balance between the two depends on how well funded the plan is and how strong the sponsor is.
- That is why this model is typical of pension plans and insurers.

14 Choosing a model: if this, then that

Match the model to the investor

If the investor has	Lean towards
Small team, wants low cost	Norway style core
Scale, skill, manager access	Endowment model
Large promised payments	Liability driven
Mixed needs, modest team	Traditional mix

IN THE LESSON

- To choose a model, read the client, then pick the fit.
- A small institution with no investment staff and a wish for low cost should lean to a Norway style core, or a traditional mix.
- An institution with scale, a skilled team, strong governance and real access to top managers can consider the endowment model.
- One with large promised payments, like a pension plan or an insurer, should start from liability driven investing.
- And one with mixed needs and a modest team suits the traditional mix.
- Notice that a long horizon alone is never enough.
- The endowment model also needs scale, skill and access, and without those it is an expensive mistake.

15 Mistakes to avoid so far

- Same advice for every institution
- Assuming every institution can wait
- Copying the endowment model for its horizon alone
- Ignoring the fee and team hurdle
- Treating shared features as the answer

IN THE LESSON

- Let us collect the mistakes from the first two topics.
- One: giving every institution the same advice because they look alike.
- Two: assuming every institution has a long horizon, when banks and insurers owe short term money.
- Three: copying the endowment model because the horizon is long, without checking scale, governance and access.
- Four: forgetting the hurdle, the extra return that the model's fees and team must beat before it adds anything.
- Five: treating the shared features as an answer, when they are only a checklist to test against the client.
- A good answer always names the client's own facts.

16 A story: four questions before any portfolio

- Who has a claim on the money?
- What does it owe?
- How long can it wait?
- How much cash might it need soon?

IN THE LESSON

- Before Maya Okoro suggests a single holding, she asks four questions.
- Who has a claim on this money?
- What does the institution owe them?
- How long can it wait before it must pay?
- And how much cash might it need at short notice?
- The first question names the stakeholders.
- The second names the liabilities.
- The third gives the horizon.
- The fourth gives the liquidity need.
- The answers differ sharply from one institution to the next, and they go a long way to deciding what each one should hold.
- Let us ask the four questions of each client in turn.

17 Who has a stake, and what is owed

Stakeholders and liabilities by type

Institution	Stake and what it owes
Defined benefit plan	Members, sponsor: benefits
Sovereign fund	Government: budget, savings
Endowment, foundation	Mission: spending, grants
Bank, insurer	Depositors: deposits, claims

IN THE LESSON

- Start with the stakeholders and the liabilities.
- For a defined benefit pension plan, the stake belongs to the members, the sponsoring employer and the regulator, and what it owes is the promised benefits.
- A sovereign wealth fund answers to the government and, through it, to citizens, and what it owes depends on the fund's purpose.
- An endowment or foundation serves its college or its charitable mission, and that includes future generations, and what it owes is a spending rule or grants.
- Banks and insurers answer to depositors, policyholders, shareholders and regulators, and they owe deposits and claims.
- Each liability has its own size and timing.

18 How long it can wait, how much cash it needs

Horizon and liquidity by type

Institution	Horizon and liquidity
Defined benefit plan	Shortens as it matures
Stabilisation fund	Short, high liquidity
Savings fund	Very long, modest cash
Endowment, foundation	Perpetual, steady cash

IN THE LESSON

- Now horizon and liquidity.
- A defined benefit plan depends on its workforce.
- A young plan can wait decades, but as members retire, the horizon shortens and liquidity needs rise.
- A sovereign wealth fund depends on its type.
- A stabilisation fund exists to be drawn on when revenue falls, so its horizon is short and its liquidity need is high.
- A savings fund invests for future generations, with a very long horizon and modest cash needs.
- Endowments and foundations are perpetual, and modest in cash needs, though a foundation with a minimum payout needs steady cash every year.
- Banks sit at the short, liquid end.

19 Horizon against liquidity need

Chart: Liquidity need (low to high) vs Time horizon (short to long)

- Bank
- Stabilisation fund
- P&C insurer
- Mature pension
- Life insurer
- Foundation
- Endowment
- Savings fund

IN THE LESSON

- Here is the picture.
- The horizontal axis is the time horizon, short on the left and long on the right.
- The vertical axis is the liquidity need, low at the bottom and high at the top.
- The grey lines divide the page into four.
- In the top left, a short horizon with a high need for cash, sit the bank, the stabilisation fund and the property and casualty insurer.
- Just right of centre, near the top, is the mature pension plan, with a middling horizon and large payments.
- The bottom right, long horizon and modest cash, holds the endowment and the savings fund at the bottom.
- Just above them sit the foundation with its payout rule and the life insurer, long but predictable, which need steady cash each year.

20 Example 3: the stabilisation fund

Mesa 20bn; draw 30%; mix 50% shares, 30% private, 20% bonds

Possible draw	20bn × 30%	**6bn**
Safe, short bonds	20bn × 20%	**4bn**
Shortfall	6bn − 4bn	**2bn**
Locked in private markets	20bn × 30%	**6bn**

IN THE LESSON

- Now a case.
- Mesa Stabilisation Fund holds twenty thousand million, and exists to support the government budget when commodity revenue falls.
- In a slump it may be asked for thirty per cent of its assets within a year.
- A consultant proposes fifty per cent global shares, thirty per cent private markets and twenty per cent short government bonds.
- The possible draw is six thousand million.
- The safe assets, the short bonds, are twenty per cent, four thousand million.
- That leaves a shortfall of two thousand million, which would come from shares just after they have fallen.
- Meanwhile six thousand million sits in private markets, and cannot be sold in time.

21 Example 4: a pension plan matures

Birchfield plan, 1,000m of assets

Young plan, net cash	40m − 20m	**+20m in**
Mature plan, benefits paid		**80m**
Mature plan, contributions		**30m**
Mature plan, net cash	30m − 80m	**−50m out**
As a share of assets	50m ÷ 1,000m	**5%**

IN THE LESSON

- Next, the Birchfield Pension Plan, which holds one thousand million.
- When its workforce was young, it paid benefits of twenty million and received contributions of forty million, so it took in twenty million more than it paid.
- Years later the workforce has retired.
- Now benefits are eighty million and contributions only thirty million.
- The plan must find fifty million in cash every year, which is five per cent of its assets.
- The portfolio did not change, but the liquidity need flipped from a surplus to a steady drain.
- As the plan matures the horizon shortens, so Maya moves some money from growth assets into liquid, income producing ones.

22 Example 5: a foundation with a payout rule

Marlow foundation, 300m; minimum payout 5%

Yearly grants	300m × 5%	**15m**
Cash and short bonds	300m × 20%	**60m**
Years of grants covered	60m ÷ 15m	**4 years**

IN THE LESSON

- One more case, this time the Marlow Family Foundation, which holds three hundred million.
- The trustees must pay out at least five per cent of assets in grants each year.
- That is fifteen million, and it is a promise to charity, not a suggestion.
- The foundation has no new money coming in.
- Suppose the trustees hold twenty per cent in cash and short bonds.
- That is sixty million, and it covers four years of grants.
- The rest can be invested for the long term.
- But if a consultant filled the pot with funds that lock money away, the grants would have to be paid by selling shares in a falling market.
- So the payout shapes the liquid layer.

23 The trap: a reserve fund that cannot pay

- Reserve funds need liquid, short dated assets
- Savings funds can wait, so should not hold only cash
- Name the claim, the liability, horizon and cash need
- The portfolio must follow the purpose

IN THE LESSON

- Here is the trap for this topic.
- A reserve or stabilisation fund is handed an equity heavy, illiquid portfolio, because the consultant liked the long run return.
- But the fund's purpose is to pay when the government needs cash, and that is usually when markets are weak.
- The mirror image is also wrong: giving a long horizon savings fund only cash, which wastes its ability to wait.
- In your answers, always name the stakeholders, the liability, the horizon and the liquidity need, and then show how the proposed portfolio fits those four, or fails to.
- The portfolio must follow the purpose.

24 A story: every club has its rulebook

- Each institution has its own rulebook
- Each rulebook concentrates on something different
- Find the rule that bites
- A proposal that ignores it cannot be used

IN THE LESSON

- Every club has a rulebook, and the rulebooks differ.
- In a chess club the rules are about moves.
- In a swimming club they are about lanes and safety.
- Institutions are the same.
- Each type answers to its own rulebook, and each rulebook concentrates on a different thing.
- Pension law is mostly about funding and prudence.
- Charity law is about donors' wishes and minimum payouts.
- Bank and insurance regulation is about the capital held against risk.
- Once Maya knows which rule bites, choices that look odd from outside begin to make sense.
- And a proposal that ignores the binding rule is a proposal that cannot be used.

25 What each rulebook concentrates on

The main concern of each framework

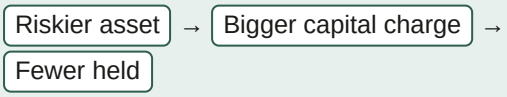
Institution	Rules concentrate on
Pension fund	Funding, prudence, duty
Sovereign fund	Founding law, tax abroad
Endowment, foundation	Donor terms, payouts
Bank, insurer	Capital, liquidity, leverage

IN THE LESSON

- Here is the map.
- Pension funds face rules on funding and fiduciary duty, which means acting prudently in the members' interest, and sometimes limits on concentration or particular assets.
- The fund itself is usually tax exempt.
- Sovereign wealth funds are governed by their founding law and by public accountability, and may be tax exempt at home and seek exemption abroad.
- Endowments and foundations must follow donors' restrictions and charity law, often enjoy tax exemption, and some foundations must distribute a minimum share each year to keep that status.
- Banks are regulated on capital adequacy, liquidity coverage and leverage.
- Insurers face risk based capital or solvency regimes that charge more capital for riskier holdings.

26 How a capital charge steers the portfolio

Rules work through capital



IN THE LESSON

- For banks and insurers, the rules work through capital.
- Follow the boxes from left to right.
- A regulator looks at each holding and decides how risky it is.
- The riskier the holding, the bigger the capital charge, which is the amount of the institution's own money that must be set aside behind it.
- Capital is scarce: it is what lets the firm write new business and absorb losses.
- So a heavy charge makes a holding expensive to own, whatever its return looks like.
- The result, in the third box, is that insurers hold fewer of the assets that carry heavy charges, such as shares, and more of the assets that carry light ones.

27 Return per unit of capital

Return per unit of capital = (E(R) − government return) ÷ capital charge

Expected return	Average return expected
Government bond return	Risk free comparison
Capital charge	Share backed by own capital
Return per unit of capital	Higher means better use

IN THE LESSON

- To compare assets under a capital regime, we need a measure that includes the charge.
- Start with the asset's expected return, then subtract the return on government bonds, which carry no charge.
- That is the extra reward for taking the risk.
- Now divide by the capital charge, the share of the holding that must be backed with the firm's own capital.
- The answer is the extra return earned per unit of capital used.
- The asset with the highest figure uses the scarce resource best.
- This is not a formula from a rulebook.
- It is a simple way to show that the choice depends on the charge as well as the return.
- The real charges depend on the regime.

28 Example 6: Tidewater ranks its assets

Charges: shares 30%, corporates 5%, government 0%

Shares, extra return	7% − 4%	**3%**
Shares, per unit of capital	3% ÷ 30%	**10%**
Corporates, extra return	5% − 4%	**1%**
Corporates, per unit of capital	1% ÷ 5%	**20%**
Capital, shares against bonds	30% ÷ 5%	**6 times**

IN THE LESSON

- Back to Tidewater Mutual.
- Its regulator charges, as an illustration, thirty per cent of capital on shares, five per cent on corporate bonds, and nothing on government bonds.
- Expected returns are seven, five and four per cent.
- Shares earn seven minus four, three per cent more than government bonds.
- Divide by the thirty per cent charge and you get ten per cent per unit of capital.
- Corporate bonds earn five minus four, one per cent more.
- Divide by five per cent and you get twenty per cent.
- Shares offer three times the extra return, but use six times the capital.
- So per unit of capital the corporate bonds are twice as attractive.

29 Return per unit of capital

Extra return per unit of capital (%)

Shares	**10%**
Corporate bonds	**20%**

Government bonds: no charge

IN THE LESSON

- Here are the results as bars.
- The vertical axis is the extra return per unit of capital, in per cent.
- The first bar is shares, at ten.
- It is the asset with the highest expected return, and yet it earns the least per unit of the scarce resource.
- The second bar is corporate bonds, at twenty, double the first.
- Government bonds carry no charge, so the ratio does not apply to them, and they are noted below the bars.
- If you ranked on expected return alone, you would prefer shares, and for this client that would be a mistake.
- It explains why insurers under risk based regimes hold plenty of investment grade bonds and relatively few shares.

30 Example 7: a sovereign fund and tax

Future Fund: 1,000m of foreign shares yielding 3%

Dividends received	1,000m × 3%	**30m**
Foreign withholding tax	30m × 15%	**4.5m**
Kept without exemption	30m − 4.5m	**25.5m**
Value of an exemption	4.5m ÷ 1,000m	**0.45%**

IN THE LESSON

- Tax is the other half of this topic.
- The Mesa Future Fund, a savings fund, holds one thousand million in foreign shares that yield three per cent.
- That is thirty million of dividends.
- The foreign country withholds tax at fifteen per cent, which takes four and a half million.
- Without an exemption the fund keeps twenty five and a half million.
- As a sovereign fund, it may be able to claim an exemption on its foreign investments, and doing so is worth four and a half million, or nought point four five per cent of the fund every year.
- That is a return gain with no extra risk at all, which is why such funds take the legal status seriously.

31 The trap: ignoring the binding rule

- Insurers: count the capital charge
- Banks: capital, liquidity and leverage rules
- Foundations: donor terms and minimum payouts
- Pick the right rulebook before judging

IN THE LESSON

- Here are the traps for this topic.
- The first is proposing assets for an insurer without counting capital charges.
- The proposal may look sensible on return and risk, and still fail because it eats too much capital.
- The second is applying the wrong rulebook, for example quoting a bank liquidity rule to an insurer, or treating a foundation like a pension fund.
- The third is forgetting the payout rule for a foundation, since a minimum distribution is a legal liability, not a preference.
- Before you judge any proposal, ask which framework governs this client, and what that framework concentrates on.
- Then judge the proposal against it.

32 Recap: the lesson in five lines

- Shared traits, but horizons differ
- Four models, matched to the client
- Claim, liability, horizon, liquidity
- Rulebooks concentrate on different things
- Insurers: count the capital charge

IN THE LESSON

- Let us pull the lesson together.
- First, institutions share scale, governance, rules, tax advantages and agency problems, but not a common horizon, so test each trait against the client.
- Second, four models are followed: Norway style, endowment, traditional and liability driven, and the right one depends on horizon, liquidity, scale, governance and liabilities, with the endowment model carrying a cost hurdle.
- Third, ask who has a claim, what is owed, how long it can wait, and how much cash it needs.
- Fourth, each type has a rulebook focused on something different.
- Fifth, for insurers, count the capital charge before you propose a holding.

33 Try three quick questions

1. Fund 5,000m; may be asked for 20% in a year. Liquid assets needed?
   Answer: 5,000m × 20% = 1,000m in cash and short bonds.
2. 60% in alternatives at 2%; team 2m on 500m; index 0.10%. Hurdle?
   Answer: 1.2% + 0.4% − 0.1% = 1.5% a year.
3. Corporate 6%, government 4%, capital charge 8%. Return per capital?
   Answer: (6 − 4) ÷ 8 = 25%.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A stabilisation fund holds five thousand million and may be asked for twenty per cent of its assets within a year.
- How much should sit in cash and short bonds?
- Twenty per cent of five thousand is one thousand million.
- Question two.
- An endowment puts sixty per cent in alternatives at a two per cent fee, with a team costing two million on five hundred million.
- Index funds cost nought point one per cent.
- What extra return is needed?
- One point two, plus nought point four, minus nought point one, gives one point five per cent.
- Question three.
- A corporate bond earns six per cent, a government bond four, and the capital charge is eight per cent.
- What is the return per unit of capital?
- Two divided by eight gives twenty five per cent, so that bond uses the scarce capital well.