CHARTA LEARNING · LESSON NOTES

Human capital, inflation and currency

Private Wealth Pathway

1 A story: the ability to earn

- Gareth, 57, retires at 60: pay is his biggest asset
- He cannot sell it or spread it out
- It can stop or shrink without warning
- Its risks shape the whole plan

IN THE LESSON

- Meet Gareth Hollis, aged fifty seven, a sales director at Brightwater Engineering.
- His house is worth a lot and his investments are decent, yet the most valuable thing he owns is something no statement shows: his ability to earn.
- The present value of that future pay is called human capital.
- He cannot sell it, he cannot easily spread it across several employers, and it can stop or shrink very suddenly.
- A job can end, an illness can strike, and a bonus can vanish in a bad year.
- So before choosing any investment, an adviser first asks what threatens the pay.
- Gareth plans to retire at sixty, so we keep the sums small by looking at his last few years of pay.

2 Valuing human capital

HC = Σ p × E ÷ (1 + rf + premium)^t

E: pay	Expected pay in year t
p: survival	Chance of surviving to year t
rf	Risk-free rate
Premium	Extra rate for the job's risk

IN THE LESSON

- Here is how Nadia Brandt values it.
- Human capital is the present value of expected future pay.
- Take each year's expected earnings.
- Weight them by the chance that the person survives to be paid, because a year of pay that is never earned is worth nothing.
- Then discount each year back at the risk free rate plus a premium.
- The premium reflects how risky the job is, and how closely its pay moves with markets, the employer or the industry.
- Steady pay earns a small premium.
- Pay that rises and falls with the economy earns a big one, so it is worth less today.
- The sum across the years is the human capital.

3 Example 1: Gareth's human capital

Pay 100,000, up 3%; 3 years; rate 3% + 4% = 7%

Year 1	100,000 × 0.99 ÷ 1.07	**92,500**
Year 2	103,000 × 0.98 ÷ 1.07^2	**88,200**
Year 3	106,090 × 0.96 ÷ 1.07^3	**83,100**
Human capital	add the three years	**263,800**
Ignoring survival	same pay, no weights	**270,000**

IN THE LESSON

- Gareth is paid at the end of each year.
- Next year he expects one hundred thousand, growing three per cent a year, so one hundred and three thousand, then one hundred and six thousand and ninety.
- Nadia estimates the chance he survives to be paid at point nine nine, point nine eight and point nine six.
- The risk free rate is three per cent.
- His bonus follows the engineering cycle, so she adds a premium of four points, a discount rate of seven per cent.
- Year one is about ninety two thousand five hundred, year two about eighty eight thousand two hundred, and year three about eighty three thousand one hundred.
- Add them: about two hundred and sixty three thousand eight hundred.
- Skip the survival weights and you would overstate it at two hundred and seventy thousand.
- Survival matters, even if only a little.

4 Example 2: bond-like against market-like pay

Same pay, same survival odds; only the premium differs

Steady pay, rate 4%	3% + 1% premium	**279,100**
Market-linked pay, 7%	3% + 4% premium	**263,800**
Gap	279,100 − 263,800	**15,300**
Gap as a share	15,300 ÷ 279,100	**5.5%**
Portfolio lesson	pay is equity-like	**hold less equity**

IN THE LESSON

- Now the trap.
- Suppose a colleague, Ingrid, has identical pay and identical survival odds, but she is a civil servant with steady, bond like earnings.
- Nadia adds a premium of only one point, a discount rate of four per cent.
- Her human capital comes to two hundred and seventy nine thousand one hundred, against two hundred and sixty three thousand eight hundred for Gareth.
- The gap is fifteen thousand three hundred, about five and a half per cent, and it grows with every extra year of career.
- The lesson goes beyond the value.
- Gareth's pay is closer to equity than to a bond, because it falls just when markets fall.
- So his portfolio already carries hidden market risk, and should not be loaded with more.

5 Five risks to human capital

Where human capital can be lost

Earnings risk	Job loss, wage cut, skills fade
Premature death	Pay stops, needs do not
Disability, illness	Pay falls, costs rise
Market linkage	Pay moves with market, employer
Longevity	Pay gone, savings must last

IN THE LESSON

- Let us list the risks.
- First, earnings risk.
- The client can lose a job, take a wage cut, or find that the skills the market pays for have faded, which is called skill obsolescence.
- Second, premature death.
- The pay stops, but the family's needs do not.
- Third, disability and illness.
- Pay stops or falls while medical costs rise, and a long disability can be worse than death, because the person still has to be supported.
- Fourth, market linkage: pay that moves with the market, the employer or the industry.
- Fifth, longevity risk, which is the mirror image.
- Human capital has run out, and the savings must last as long as the person lives.
- A careful adviser weighs every one of them.

6 Weighing Gareth's risks

Size, chance and link to the portfolio

Bonus, 40% of pay	Fairly likely; hits with markets
Employer shares, 30%	Large; same shock as his job
Death before 60	Rare; large for Priya
Long disability	Rare; huge; cover is 3 months
Skills fade at 57	Slow; small now

IN THE LESSON

- Analysing a risk means asking three questions.
- How big is the loss, how likely is it, and how does it interact with the rest of the family's money?
- Here is Gareth's list.
- His bonus is forty per cent of his pay and follows the cycle, so a downturn is fairly likely and it hurts.
- His employer's shares are thirty per cent of the family's financial assets, so one shock to Brightwater could hit his job, his bonus and his savings together.
- Death before sixty is rare but costly for Priya.
- Long disability is rare too, yet the loss is huge and cover stops after three months.
- Skill fade at this age is slow and small, so it ranks last.

7 Example 3: the mirror image, longevity

Spend 30,000 a year from 60, in today's money; real return 2%

To age 80: 20 years	30,000 × 16.35	**490,500**
To age 90: 30 years	30,000 × 22.40	**671,900**
Extra for the longer life	671,900 − 490,500	**181,400**
Extra as a share	181,400 ÷ 490,500	**37%**
Pay still to come	none, it has stopped	**0**

IN THE LESSON

- Longevity risk begins when pay has stopped.
- Priya and Gareth will spend thirty thousand a year in today's money from age sixty, and Nadia plans in real terms with a return of two per cent after inflation.
- If they live to eighty, twenty years of spending needs a pot of four hundred and ninety thousand five hundred at age sixty.
- If they live to ninety, thirty years need six hundred and seventy one thousand nine hundred.
- That is one hundred and eighty one thousand four hundred more, a rise of thirty seven per cent, for ten extra years of life.
- Nobody knows which way it will go, so a prudent plan prepares for the longer case, or shares the risk through an annuity.

8 The cost of a longer life

Pot needed at 60 (thousands)

To age 80	**490.5k**
To age 90	**671.9k**
The extra	**181.4k**

30,000 a year in today's money, real return 2%

IN THE LESSON

- Here are those figures as bars.
- The vertical axis is the pot needed at age sixty, in thousands.
- The first green bar is the pot to reach age eighty, four hundred and ninety point five.
- The red bar is the pot to reach ninety, six hundred and seventy one point nine.
- The gold bar is the difference, one hundred and eighty one point four, which is the price of being ready for the longer life.
- Notice how risks interact with financial capital, which simply means the savings.
- A lost job or a disability shrinks the pot being built, and a falling market early in retirement hurts more when the pot is smaller.
- Risks rarely arrive one at a time.

9 A story: the dripping tap

- Small, frequent losses: carry them yourself
- Large, rare losses: pass them to an insurer
- Match the response to size and frequency
- Then size the cover properly

IN THE LESSON

- Think of a house.
- A dripping tap is small and happens often.
- You fix it yourself and never call an insurer.
- A fire is rare but ruinous, so you insure against it.
- Protecting human capital works the same way.
- The response depends on how severe a loss would be and how often it happens.
- Small, frequent losses are usually retained, which means you pay for them from your own pocket, or reduced by preventing them.
- Large, rare losses are transferred, which means an insurer carries them in return for a premium.
- The skill is matching the response to the loss, and then, for the large ones, working out how much cover is enough.

10 Frequency, severity and the response

Choosing a response to a risk

Small and frequent	**Retain or reduce**
Small and rare	Retain from a reserve
Large and rare	Transfer: insure it
Large and frequent	Avoid or reduce first

IN THE LESSON

- Here is the grid.
- Small and frequent losses are retained or reduced.
- Small and rare losses are paid from a reserve, because there is no sense paying an insurer's margin to cover them.
- Large and rare losses are the home of insurance.
- An early death or a long disability happens to few people but is devastating for those it hits, so an insurer can pool many people's risk and charge a fair premium.
- Large and frequent losses are too costly to insure at a sensible price, so the first answer is to avoid or reduce the risk.
- For Gareth, death and long disability sit in the large and rare box.
- A dented phone belongs in the small box.

11 Example 4: insuring a small loss

Warranty price 90; 10% chance of a 400 repair

Expected repair cost	10% × 400	**40**
Warranty price	what Priya is offered	**90**
Insurer's margin	90 − 40	**50**
Margin over expected loss	50 ÷ 40	**125%**
Reserve instead	6 months × 5,000	**30,000**

IN THE LESSON

- Priya wants extended warranties on all the family's new phones.
- A warranty costs ninety.
- There is a one in ten chance of a repair costing four hundred, so the expected loss is forty.
- The insurer keeps the other fifty to cover its costs and profit, a margin of one hundred and twenty five per cent over the expected loss.
- Over many gadgets the family would pay far more than it gets back.
- Instead Nadia proposes an emergency reserve of six months of spending.
- At five thousand a month, that is thirty thousand held in cash, which also covers a late bonus or a short spell without work.
- The trap is insuring small losses expensively while a catastrophic risk stays bare.

12 Human life value

HLV = Σ (Earnings − Own spending) ÷ (1 + r)^t

Earnings	Earnings after tax each year
Own spending	What he would spend on himself
r: rate	Discount rate
t: years	Years until retirement

IN THE LESSON

- Now sizing life cover.
- The first method is human life value.
- If a breadwinner dies, the family loses the pay, but not the part of it the breadwinner would have spent on himself.
- So take after tax earnings each year, subtract what the person would spend on his own needs, and discount what is left, the family's share, back to today at a sensible rate.
- Add the years up to retirement.
- The answer is the value of the lost earnings.
- It is simple and a good sense check, but it counts only earnings.
- It ignores debts, school fees and savings the family already holds.

13 Example 5: Gareth's human life value

Gareth: 3 years to 60; discount rate 4%

Pay after tax	per year	**80,000**
Less his own spending	per year	**30,000**
Family's share	80,000 − 30,000	**50,000**
Annuity factor	3 years at 4%	**2.7751**
Human life value	50,000 × 2.7751	**138,800**

IN THE LESSON

- Gareth's pay after tax is eighty thousand a year, and about thirty thousand would go on his own needs, leaving fifty thousand for the family each year.
- He has three years to retirement, and Nadia discounts at four per cent.
- The annuity factor for three years at four per cent is two point seven seven five one.
- Fifty thousand times that is about one hundred and thirty eight thousand eight hundred.
- This is a small number, because he is close to retirement and few earning years remain.
- For a much younger worker it would be far larger.
- So the human life value method says the family loses roughly one hundred and thirty eight thousand eight hundred of earnings.

14 Needs analysis

Cover to buy = PV(needs) − existing resources

PV(needs)	PV of the family's needs
Resources	Cover and savings already held
Cover to buy	Extra cover to buy

IN THE LESSON

- The second method is needs analysis, and it asks a different question: what would the family actually need?
- List everything the survivors must pay for, such as income for the spouse, a mortgage to clear, and education.
- Take the present value of all of them.
- Then subtract the resources already in place, which means existing insurance and savings that can be spent.
- What is left is the shortfall, and that is the extra cover to buy.
- Where human life value says what was lost, needs analysis says what must be replaced.
- Many advisers prefer it, because it fits the real family, and keep the first method as a cross check.

15 Example 6: Priya's needs analysis

Priya needs 40,000 a year for 25 years, at 3%

Income need	40,000 × 17.4131	**696,500**
Mortgage and education	150,000 + 60,000	**210,000**
Total needs	696,500 + 210,000	**906,500**
Existing resources	300,000 + 350,000	**650,000**
Extra cover	906,500 − 650,000	**256,500**

IN THE LESSON

- If Gareth died, Priya would need forty thousand a year for twenty five years, discounted at three per cent.
- The annuity factor is seventeen point four one three one, so the income need is about six hundred and ninety six thousand five hundred.
- Add the hundred and fifty thousand mortgage and sixty thousand for the children's education, and the total need is nine hundred and six thousand five hundred.
- Against that, the family has three hundred thousand of life cover through Brightwater, which ends if he leaves the firm, and three hundred and fifty thousand of liquid assets outside the employer's shares.
- That is six hundred and fifty thousand.
- The shortfall is two hundred and fifty six thousand five hundred, and that is the cover to buy.

16 Example 7: the disability gap

Gareth earns 100,000; the employer pays 3 months

Pay lost, present value	7% rate, 3 years, alive	**270,000**
Employer cover	100,000 ÷ 4	**25,000**
Gap	270,000 − 25,000	**245,000**
Gap as a share	245,000 ÷ 270,000	**91%**
Proposed cover	60% × 100,000 a year	**60,000**

IN THE LESSON

- Now the risk that is easiest to miss.
- Brightwater pays Gareth's salary for three months if he is disabled, then stops.
- Three months of a hundred thousand salary is twenty five thousand.
- If a long disability began today, the pay lost over his remaining three years would be worth about two hundred and seventy thousand, with no survival weights because he would be alive.
- The gap is two hundred and forty five thousand, ninety one per cent of the loss.
- This is a large, rare loss with almost no cover, which is exactly where insurance belongs.
- Nadia proposes long term disability cover paying sixty per cent of pay, sixty thousand a year, until he is sixty.
- Health cover would shield the savings from medical bills.

17 Tools beyond insurance

One tool for each job

Emergency reserve	Cash for small, frequent shocks
Continued education	Keeps skills in demand
Life cover	Replaces pay lost on death
Disability, health cover	Replaces pay, pays bills
Diversified savings	Portfolio avoids the job's risk

IN THE LESSON

- Insurance is only one of the tools.
- An emergency reserve in cash retains the small shocks.
- Continued education limits the risk of obsolescence, because skills that stay in demand keep the pay stream alive.
- Life cover replaces earnings lost to premature death, while disability and health cover replace earnings during illness and pay the bills.
- And there is a tool that is not insurance at all: diversifying financial capital away from the employer or industry.
- If the savings sit in the same business that pays the salary, one shock hits both at once.
- The aim is a plan in which no single event can break both the earning power and the portfolio.

18 Example 8: the employer's shares

Assets 500,000, employer shares 150,000; fund falls 10%

Shares fall 40%	40% × 150,000	**−60,000**
Bonus halves	50% × 40,000	**−20,000**
Bad year, no change	60,000 + 20,000	**−80,000**
After moving 100,000	20,000 + 10,000 + 20,000	**−50,000**
Saved by diversifying	80,000 − 50,000	**30,000**

IN THE LESSON

- Gareth's financial assets are five hundred thousand, and one hundred and fifty thousand of it is Brightwater shares, bought through staff awards.
- Picture a bad year for the firm.
- The shares fall forty per cent, a loss of sixty thousand, and his bonus of forty thousand halves, losing twenty thousand more.
- That is eighty thousand in one year, before any talk of redundancy.
- Now suppose Nadia moves one hundred thousand into a diversified fund, and that fund falls ten per cent in the same year.
- The shares left lose twenty thousand, the fund loses ten thousand, and the bonus still loses twenty thousand.
- The total is fifty thousand, thirty thousand better.
- The job and the portfolio no longer fall together.

19 Mistakes to avoid so far

- Treating risky, market-linked pay as bond-like
- Valuing earnings without survival odds
- Insuring small losses, leaving long disability bare
- Holding savings in the employer's shares
- Forgetting longevity once pay has stopped

IN THE LESSON

- Let us collect the common mistakes so far.
- One: treating risky, market linked pay as if it were bond like, when it is closer to equity.
- Two: valuing earnings without the chance of surviving to receive them.
- Three: insuring small losses expensively, while leaving a catastrophic risk, such as long term disability, uncovered.
- Four: holding the family's savings in the employer's shares, so that job and portfolio fall together.
- Five: forgetting longevity once pay has stopped, so the savings run out before the person does.
- Each mistake comes down to the same idea.
- Look at the earning power and the savings together, as one picture.

20 Real return and tax

Real = (1 + r × (1 − t)) ÷ (1 + π) − 1

Return before tax	Before tax, e.g. 6%
Tax rate on that return	Tax rate on that return
Yearly rise in prices	Price rise, e.g. 3%
What it buys, after both	No tax: 1.06 ÷ 1.03 − 1 = 2.91%

IN THE LESSON

- Inflation is a leak you cannot see on a statement.
- Gareth's balance may rise every year while what it buys shrinks.
- So Nadia plans in real terms: goals, spending and withdrawals are all indexed to inflation.
- The real return equals one plus the nominal return, divided by one plus inflation, minus one.
- A six per cent return with three per cent inflation gives one point oh six over one point oh three, minus one, about two point nine one per cent real.
- Tax makes it worse, because in many places tax is levied on the nominal return, and inflation is taken off afterwards.
- So the order is tax first, then inflation.

21 Example 9: tax first, then inflation

Return 6%, inflation 3%, tax 30% of the nominal return

Real return before tax	1.06 ÷ 1.03 − 1	**2.91%**
Return after 30% tax	6.0 × 0.70	**4.20%**
Real return after tax	1.042 ÷ 1.03 − 1	**1.17%**
Share of real return lost	(2.91 − 1.17) ÷ 2.91	**60%**
Wrong order	(6 − 3) × 0.70	**2.10%**

IN THE LESSON

- Gareth's portfolio is expected to earn six per cent, inflation is three per cent, and tax is thirty per cent of the nominal return.
- Before tax, the real return is two point nine one per cent.
- Now tax: six times point seven is four point two per cent after tax.
- The real return after tax is one point oh four two over one point oh three, minus one, which is one point one seven per cent.
- Tax has taken sixty per cent of the real return, since it started at two point nine one and ended at one point one seven.
- The tempting wrong shortcut subtracts inflation first.
- Six minus three, times point seven, gives two point one per cent, and overstates the real return by almost a full point.
- Never use it.

22 Example 10: the inflation-linked bond

Real yield 1.0%, inflation 3.0%, tax 30% on coupon and uplift

Nominal return	1.01 × 1.03 − 1	**4.03%**
After 30% tax	4.03 × 0.70	**2.82%**
Real return after tax	1.0282 ÷ 1.03 − 1	**−0.17%**
Real return before tax	the bond's real yield	**1.00%**
Lost to tax	1.00 − (−0.17)	**1.17 pts**

IN THE LESSON

- Gareth says his index linked bond fully protects him.
- Let us test that.
- It pays a real yield of one per cent, and its principal is uplifted by inflation of three per cent, so the nominal return is one point oh one times one point oh three, minus one: four point oh three per cent.
- But in this example the coupons and the uplift are both taxed as income each year at thirty per cent, leaving two point eight two per cent.
- After inflation, the real return is minus point one seven per cent.
- Without tax it was one per cent, so tax took one point one seven points.
- The bond protects against inflation before tax, and the tax bill still bites.
- Nadia proposes holding such bonds in a tax sheltered account, where the rules allow.

23 What one unit of money buys

Chart: What one unit buys vs Years, 0 to 30 (inflation 3%)

- Real return 1.17%: 1.42
- Deposits at 3.5%, taxed 30%: 0.85
- Idle cash: 0.41

IN THE LESSON

- Here is the picture.
- Time runs along the bottom, thirty years, and up the side is what one unit of money buys, starting at one.
- Inflation is three per cent throughout.
- Start with the red line, idle cash earning nothing.
- It falls steadily to point four one.
- Next the blue line, bank deposits paying three point five per cent, taxed at thirty per cent, which leaves a return below inflation, so buying power slips to point eight five.
- Finally the green line, an asset earning one point one seven per cent real after tax, like Gareth's portfolio.
- It rises to one point four two.
- A deposit balance grows every year in numbers, and still loses in what it buys.

24 Which assets keep their buying power

- Inflation-linked bonds
- Real assets
- Equities, long horizon
- Long nominal bonds
- Cash

IN THE LESSON

- Now where to look for protection.
- Place assets on a line from keeping buying power on the left to losing it on the right.
- This ordering is only an illustration, not a forecast.
- On the far left are inflation linked bonds, which pay for inflation directly, subject to the tax caution we just saw.
- Next come real assets, such as property and infrastructure, whose income can rise with prices.
- In the middle are equities over a long horizon, because companies can raise prices and earnings tend to follow.
- Further right are long nominal bonds, whose fixed payments are worth less as prices rise, and whose prices fall if interest rates rise with inflation.
- On the far right is cash, the asset that feels safest and quietly loses the most.

25 Investment measures against inflation

Five ways to hold up buying power

Inflation-linked bonds	**Pay rises with prices**
Real assets	Income can rise with prices
Equities, long horizon	Earnings tend to follow prices
Shorter-duration bonds	Less hurt if rates rise
Inflation-linked annuity	Income rises for life

IN THE LESSON

- Here are the investment measures in one place.
- Inflation linked bonds pay a real yield plus the rise in prices.
- Real assets, such as property and infrastructure, often earn income that rises with prices.
- Equities over a long horizon tend to follow prices up, though not year by year.
- Shorter duration fixed income is less damaged when interest rates rise to fight inflation, and its cash returns sooner to be reinvested at higher rates.
- An inflation linked annuity from an insurer pays an income that rises with prices for life, which also answers longevity risk.
- Nadia proposes spreading across several of these rather than choosing one, because each has its own weakness.

26 Planning measures against inflation

Planning, not only investing

Plan in real terms	Index goals and withdrawals
Spending 60,000 today	108,400 in 20 years at 3%
Flexible spending rule	Trim after a bad year
Preserve human capital	Keep skills; phase retirement
Limit idle cash	Hold only what is needed

IN THE LESSON

- Planning matters as much as investing.
- First, plan in real terms.
- Gareth and Priya hope to spend sixty thousand a year in today's money.
- At three per cent inflation, the same lifestyle costs one hundred and eight thousand four hundred in twenty years, so withdrawals must be indexed.
- Second, a flexible spending rule.
- After a poor year for the portfolio, trim spending a little, and let it recover in good years.
- This protects the pot against inflation and bad markets at once.
- Third, preserve human capital.
- Keep skills current and consider phasing into retirement, since every extra year of pay is a year the portfolio is not drawn down.
- Last, limit idle cash to what is truly needed.

27 Currency and the client's return

Home return = (1 + local) × (1 + FX move) − 1

Return in foreign currency	Foreign return, e.g. +5%
Move in the foreign currency	Currency move, e.g. −3%
Return to the home-based client	1.05 × 0.97 − 1 = 1.85%

IN THE LESSON

- Imagine two cousins who own the same foreign share.
- One lives in the country where it trades and spends there.
- The other lives at home and spends at home.
- Their experience differs, because only the second one cares about the exchange rate.
- What matters is the currency of the client's spending and liabilities.
- For a home based client, a foreign asset's return is one plus the foreign currency return, times one plus the change in the foreign currency's value, minus one.
- Note the multiplication.
- A five per cent gain abroad with a three per cent currency loss nets one point oh five times point nine seven, minus one, which is one point eight five per cent, not two.
- That small difference is easy to miss.

28 Example 11: the Hollises' foreign shares

Foreign shares worth 200,000 in the family's home currency

Local return	in foreign currency	**+5.0%**
Currency move	foreign falls against home	**−3.0%**
Home return	1.05 × 0.97 − 1	**1.85%**
Wrong: add them	5.0 − 3.0	**2.00%**
Gain on 200,000	1.85% × 200,000	**3,700**

IN THE LESSON

- The Hollis family holds two hundred thousand in foreign shares.
- Last year they gained five per cent in the foreign currency, and the foreign currency lost three per cent against the family's home currency.
- The return the family actually received is one point oh five times point nine seven, minus one, which is one point eight five per cent.
- Adding the two figures gives two per cent, which overstates the result.
- On two hundred thousand, the gain in home currency is three thousand seven hundred.
- Now the key question for the plan.
- Does the family spend any of this money abroad?
- If every cent will be spent at home, the currency swing is pure risk.
- If some will be spent abroad, part of the swing is already offset.
- That is the next example.

29 Example 12: the natural hedge

Daughter studies abroad; foreign spending, present value 80,000

Foreign assets	held in foreign currency	**200,000**
Foreign spending ahead	present value	**80,000**
Exposed amount	200,000 − 80,000	**120,000**
Foreign currency falls 4%	4% × 200,000	**−8,000**
Net, after cheaper spending	−8,000 + 3,200	**−4,800**

IN THE LESSON

- Global families often spend in several currencies.
- The Hollises' daughter will study abroad, and the present value of those foreign currency costs is eighty thousand.
- So of the two hundred thousand of foreign assets, eighty thousand matches spending that will also be in the foreign currency.
- If that currency falls four per cent, the assets lose eight thousand, but the future bills also become cheaper, by three thousand two hundred, so the real damage is four thousand eight hundred, which is four per cent of just the one hundred and twenty thousand exposed.
- That matching is a natural hedge.
- The trap is to hedge everything into a reporting or passport currency, when the family actually spends elsewhere.
- Hedge all two hundred thousand and the matched eighty thousand becomes exposed.

30 Example 13: what a forward costs

Home rate 2.0%, foreign rate 4.5%; expected foreign return 7.0%

Rate difference	4.5% − 2.0%	**2.5%**
Hedged return, about	7.0% − 2.5%	**4.5%**
Cost, hedge 120,000	2.5% × 120,000	**3,000**
Cost, hedge all 200,000	2.5% × 200,000	**5,000**
Saved by matching	5,000 − 3,000	**2,000**

IN THE LESSON

- Now suppose Nadia hedges the exposed one hundred and twenty thousand.
- She would sell the foreign currency forward, which is a contract today to exchange at a fixed rate on a future date.
- The cost is driven by the gap in interest rates.
- The home rate is two per cent and the foreign rate is four and a half per cent, a difference of two point five per cent a year.
- Hedging into the lower rate currency typically gives up about that much, so a seven per cent expected foreign return becomes about four and a half per cent hedged.
- Hedging one hundred and twenty thousand costs about three thousand a year, and hedging all two hundred thousand costs five thousand.
- Matching first saves two thousand a year, and avoids hedging away money that was already well matched.

31 Deciding how much to hedge

Match first

List spending currencies → Match assets to spending → Find what is left

Then decide

Cost against risk removed → Hedge with forwards → Review each year

IN THE LESSON

- Here is the decision as a flow, and it starts with the client, not the market.
- First, list the currencies the family will actually spend in.
- Second, match assets to that spending, which is a natural hedge and costs nothing.
- Third, find the exposure left over.
- The second row is the decision about that leftover.
- Weigh the hedging cost, driven by the rate gap, against the volatility the hedge removes and any diversification lost, because a foreign currency sometimes moves the opposite way to the family's other holdings.
- If the case is good, hedge with forwards or other derivatives.
- Then review each year, since spending plans and rate gaps both change.

32 Recap: the lesson in five lines

- Human capital: survival-weighted, risk-matched discount
- Retain small losses, insure large; size by needs
- Plan in real terms; tax first, then inflation
- Currency risk depends on where the client spends
- Natural hedge first, then hedge the rest if worth it

IN THE LESSON

- Let us pull the lesson together.
- First, human capital is the present value of expected pay, weighted by the chance of surviving to earn it and discounted at a rate that rises with the risk of the job.
- Second, retain small frequent losses, insure large rare ones, and size cover by human life value or by needs analysis.
- Third, plan in real terms, remember that tax comes before inflation, and do not treat cash as safe for a long life.
- Fourth, currency risk depends on where the client spends.
- Fifth, match assets to spending first, and hedge only what remains if the cost is worth the risk removed.

33 Try three quick questions

1. Needs 600,000; resources 350,000. Extra cover?
   Answer: 600,000 − 350,000 = 250,000.
2. Return 5%, tax 40%, inflation 2%. Real after tax?
   Answer: 5 × 0.6 = 3.0%; 1.03 ÷ 1.02 − 1 ≈ 0.98%.
3. Foreign +10%, currency −6%. Home return?
   Answer: 1.10 × 0.94 − 1 = 3.4%, not 4%.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A family would need six hundred thousand if the breadwinner died, and already holds resources of three hundred and fifty thousand.
- How much extra cover?
- Needs less resources is two hundred and fifty thousand.
- Question two.
- A portfolio earns five per cent, taxed at forty per cent, with inflation at two per cent.
- What is the real return after tax?
- Five times point six is three per cent, and one point oh three over one point oh two, minus one, is about point nine eight per cent.
- Question three.
- A foreign asset gains ten per cent, but the foreign currency falls six per cent.
- What does a home based client earn?
- One point one times point nine four, minus one, is three point four per cent, not four.
- Those are good habits to keep.