Cycle, equities, property and active value

Portfolio Management

1 A story: the bad winter

- Near-term earnings swing with the cycle
- Long-term growth moves much less
- Value rests on many years of earnings
- A bad year is not a bad decade

IN THE LESSON

- Picture a farm that makes a steady profit for decades.
- One winter is terrible, and profit falls by almost half.
- Would you value the whole farm at half its old price?
- Of course not.
- The farm still has good land, and spring will come.
- Companies work the same way.
- A recession can cut this year's and next year's profits sharply, but the value of a share rests on decades of future profit, and only a small part of that sits in the next year or two.
- So there are two different questions.
- What happens to near term earnings forecasts?
- And what happens to long term growth?
- The first swings hard.
- The second barely moves.

2 Earnings around their trend

Chart: Company earnings vs Time

- Peak earnings
- Trough earnings
- Trend

IN THE LESSON

- Here is the picture.
- Time runs along the bottom and company earnings up the side.
- First look at the grey line.
- That is the long run trend, growing steadily with the size of the economy.
- Now follow the green line.
- It climbs above the trend at a peak, when business is booming and profits are unusually strong.
- Then it drops well below the trend at a trough, when sales are weak and profits collapse.
- Notice that the green line swings much further than the grey line moves.
- And it always comes back towards the trend.
- Analysts cut their forecasts for the next year or two at the trough, but the trend itself changes only a little.

3 Why profits fall faster than sales

- Fixed costs do not shrink when sales fall
- High operating leverage: profit falls much faster
- Cyclical firms swing most, then rebound fastest
- Long-run growth stays anchored to the economy

IN THE LESSON

- Why do profits swing so much more than sales?
- The reason is operating leverage.
- A firm with large fixed costs, such as a factory, machines and a head office, pays them whether sales are strong or weak.
- Suppose sales fall ten per cent.
- The fixed costs do not fall at all, so profit falls by far more than ten per cent.
- Cyclical firms, such as makers of machine tools or cars, have high operating leverage, so their earnings fall hardest in a recession and rebound fastest in a recovery.
- Steady firms such as food sellers swing less.
- This is why analysts cut near term forecasts deeply for cyclical firms, while their view of long run growth stays close to the growth of the whole economy.

4 A simple value rule

Value = E1 ÷ (r − g)

Value of the share	What the share is worth today
Next year's earnings	Earnings expected in year one
Required return	Return investors demand
Long-run growth	Steady growth rate forever

IN THE LESSON

- To see how little a bad year matters, we need a simple valuation rule.
- Assume a company pays out all its earnings, and those earnings grow at a steady rate forever.
- Then the value of one share equals next year's earnings divided by the required return minus the growth rate.
- The required return is what investors demand for holding the share.
- Look at the pieces.
- The top is only one year of earnings.
- The bottom, required return minus growth, is a number that captures the whole long future.
- Because the bottom is small, perhaps five per cent, the value is large, about twenty times a year's earnings.
- That tells you most of the value sits far away in the future, not in next year.

5 Example 1: a recession year

Illustrative company: E1 = 10, g = 4%, r = 9%

Value before	10 ÷ (0.09 − 0.04)	**200**
Value lost: one year	(10 − 6) ÷ 1.09	**3.7**
Value after	200 − 3.7	**196.3**
Trap: trough as the norm	6 ÷ (0.09 − 0.02)	**85.7**
Implied change	85.7 ÷ 200 − 1	**−57%**

IN THE LESSON

- Let us test it.
- A made up company is expected to earn ten next year, growing four per cent a year, and the required return is nine per cent.
- The value is ten divided by five per cent, which is two hundred.
- Now a recession cuts next year's earnings forty per cent, to six, but from year two the earnings are back on the old path.
- Only one year loses four.
- Discounted one year at nine per cent that is worth three point seven, so the value is about one hundred ninety six, down under two per cent.
- Now the trap.
- Suppose we treat the trough as the new normal, using six as the base and cutting growth to two per cent.
- The value drops to about eighty six, down fifty seven per cent.

6 Temporary shock or new normal

Value of the share

Before	**200**
Temporary shock	**196.3**
Trough as norm	**85.7**

Same company, same recession, two very different views

IN THE LESSON

- Here are three values as bars, with the value of the share up the side.
- The first bar is the value before the recession, two hundred.
- The second bar is the value after the recession if the shock is treated as temporary, one hundred ninety six point three.
- It is almost as tall as the first.
- The third bar is the value if an analyst wrongly extrapolates the trough and lowers the growth rate, eighty five point seven.
- It is less than half the height.
- The lesson is clear.
- The forecast for next year's earnings fell forty per cent, but the right change in value was under two per cent.
- The mistake of extrapolating a collapse is far more costly than the recession itself.

7 A story: the thermometer

- P/E = price ÷ earnings, and earnings swing with the cycle
- Trough: earnings tiny, so trailing P/E looks high
- Peak: earnings huge, so trailing P/E looks low
- Prices look ahead; trailing earnings look back

IN THE LESSON

- Imagine you judge a restaurant by one night's takings divided into its price.
- On a night when it is almost empty, takings are tiny, so the restaurant looks absurdly expensive.
- On a Saturday when it is packed, takings are huge and it looks cheap.
- Nothing about the restaurant's value changed that much.
- A price to earnings ratio works the same way.
- It divides the price of the market by earnings, and earnings swing with the cycle.
- At the bottom of a recession earnings are depressed, yet the price already looks ahead to recovery, so the ratio looks high.
- At the top earnings are unusually strong, so the ratio looks low even when prices are stretched.

8 Smoothing the earnings: CAPE

CAPE = Price ÷ 10-year average real earnings

Index price	The index level today
Ten-year average real earnings	Earnings in today's prices
CAPE	Compare with its history

IN THE LESSON

- Analysts fix the problem by smoothing the earnings.
- The most famous version is the cyclically adjusted price to earnings ratio, called CAPE.
- Instead of one year of earnings, it uses the average of the last ten years of earnings.
- And each year's earnings are first adjusted for inflation, so that old dollars are stated in today's prices.
- Look at the pieces.
- The top is the current price.
- The bottom is that ten year average of real earnings.
- A recession year and a boom year both sit inside the average, so neither dominates.
- That makes CAPE a fairer number to compare with its own long run history, which is exactly what an analyst wants when asking whether the market is dear.

9 Example 2: trough and peak

Illustrative index; long-run average CAPE = 20

Trough, trailing P/E	2,700 ÷ 90	**30.0**
Trough, CAPE	2,700 ÷ 150	**18.0**
Peak, trailing P/E	3,600 ÷ 240	**15.0**
Peak, CAPE	3,600 ÷ 160	**22.5**
Price change	3,600 ÷ 2,700 − 1	**+33%**

IN THE LESSON

- Now a made up index.
- At a trough it stands at two thousand seven hundred.
- Trailing earnings are ninety, so the trailing ratio is thirty.
- The ten year average of real earnings is one hundred fifty, so CAPE is eighteen.
- At the next peak the index is three thousand six hundred, trailing earnings are two hundred forty, so the trailing ratio is fifteen, while the ten year average is one hundred sixty and CAPE is twenty two point five.
- Suppose the long run average CAPE is twenty.
- At the trough, CAPE is below average and the market looks cheap.
- At the peak it is above and the market looks dear.
- The trailing ratio said exactly the opposite.

10 Two rulers, opposite answers

Price to earnings ratio

Trough trailing	**30**
Trough CAPE	**18**
Peak trailing	**15**
Peak CAPE	**22.5**

Red: trailing ratio. Green: cyclically adjusted ratio

IN THE LESSON

- This picture lays the four ratios side by side, with the ratio up the side.
- The first two bars are the trough, the trailing ratio of thirty and CAPE of eighteen.
- The last two bars are the peak, a trailing ratio of fifteen and CAPE of twenty two point five.
- Look at the trailing bars.
- They fall from thirty to fifteen, as if the market got cheaper, yet the price rose by a third.
- Now look at the CAPE bars.
- They rise from eighteen to twenty two point five, which fits a market that became more expensive.
- The trailing ratio is distorted by the cycle in earnings.
- CAPE is the better tool for comparing different dates.

11 What else moves a multiple

Full payout: P/E = 1 ÷ (r − g)

Base case	1 ÷ (0.09 − 0.04)	**20.0**
Required return falls to 8%	1 ÷ (0.08 − 0.04)	**25.0**
Growth falls to 3%	1 ÷ (0.09 − 0.03)	**16.7**

IN THE LESSON

- The cycle in earnings is only one reason multiples move.
- Even with earnings fixed, a multiple depends on the discount rate and growth.
- Take a company that pays out all its earnings, so the multiple is one divided by required return minus growth.
- With a required return of nine per cent and growth of four, the multiple is twenty.
- Suppose real interest rates fall or investors need a smaller risk premium, and the required return drops to eight per cent.
- The multiple jumps to twenty five.
- Suppose instead long term growth expectations fall to three per cent with the required return back at nine.
- The multiple drops to about sixteen point seven.
- Multiples rise when rates or risk premiums fall, or growth improves.

12 Mistakes slide: cycle and multiples

- Do not extrapolate a trough or a peak
- Temporary shock: small change in fair value
- High trailing P/E in recession is not proof of dearness
- Rates and risk premiums move multiples too

IN THE LESSON

- Here are the common mistakes so far.
- First, extrapolating the trough.
- When a recession cuts earnings forecasts by forty per cent, do not cut long run growth by the same amount.
- A temporary shock moves fair value far less than it moves current earnings.
- Second, the opposite error at the peak.
- Booming profits are not a new permanent level, so do not capitalise them forever.
- Third, reading a high trailing price to earnings ratio in a recession as proof that the market is expensive.
- Earnings are depressed, so the ratio is inflated.
- Smooth the earnings first.
- Fourth, forgetting that rates and risk premiums move multiples too, quite apart from the cycle.

13 A story: two kinds of landlord

- Property sits between bonds and equities
- Long leases, strong tenant: bond-like income
- Short leases, vacancies: equity-like income
- Ask: lease length and tenant strength

IN THE LESSON

- Meet two landlords.
- The first owns a warehouse let for twenty years to a very strong company, at a rent that never changes.
- Her income arrives like a bond coupon, and what matters to her building's value is mainly the level of interest rates.
- The second owns a small office block let to many tenants on one year leases.
- Each year some leave, and the rent depends on how the local economy is doing.
- His building behaves more like an equity.
- Commercial property sits between bonds and equities, and where a particular building sits depends on two questions.
- How long are the leases?
- And how strong are the tenants?

14 From bond-like to equity-like

- Long lease, strong tenant
- Long lease, weak tenant
- Short lease, strong tenant
- Short lease, weak tenant
- Hotel, no lease

IN THE LESSON

- Here is a line with bond like at the left end and equity like at the right end.
- Let us place some buildings on it.
- Far left, a long lease to a strong tenant.
- The rent is contractual, the payer is creditworthy, and value moves mainly with interest rates.
- A little further right, a long lease to a weaker tenant.
- Now there is credit risk, because the rent is only as good as the tenant.
- In the middle, a short lease to a strong tenant brings re letting risk, since the income resets often.
- Further right, short leases to weak tenants bring vacancy risk and tie the income to the economy.
- At the far right, a hotel with no lease at all, earning whatever the rooms earn each night.

15 Valuing property: the cap rate

Value = NOI ÷ cap rate; cap rate = Rf + premium − g

Net operating income	Rent less running costs
Real risk-free rate	Safe real return
Property risk premium	Illiquidity and cycle risk
Expected real rent growth	Rent growth investors expect

IN THE LESSON

- The simplest way to value an income property is to divide its income by a rate.
- The income is net operating income, which is rent collected, less the costs of running the building.
- The rate is called the capitalisation rate, or cap rate.
- It works like a yield.
- A building earning five million a year, valued at a cap rate of five per cent, is worth one hundred million.
- The cap rate itself is built from three things.
- The real risk free rate, plus a risk premium for illiquidity and exposure to the cycle, minus the growth in rents that investors expect.
- Higher rates or higher risk make the cap rate bigger, and a bigger cap rate means a smaller value.

16 Example 3: a slowdown hits the building

Illustrative office building; loan 60 million

Value before	5.0 ÷ 0.05	**100m**
Income falls 10%	4.5 ÷ 0.05	**90m**
Cap rate widens to 6%	4.5 ÷ 0.06	**75m**
Change in value	75 ÷ 100 − 1	**−25%**
Owner's equity	(75 − 60) ÷ (100 − 60) − 1	**−62.5%**

IN THE LESSON

- Now the case.
- A made up office building has net operating income of five million, valued at a five per cent cap rate, so it is worth one hundred million.
- The owner borrowed sixty million against it.
- A slowdown arrives.
- Vacancies rise and rents fall, so income drops ten per cent to four point five million.
- At the same cap rate, the value would be ninety million.
- But investors also demand more for the added risk, and the cap rate widens to six per cent.
- Four point five divided by six per cent is seventy five million.
- The value is down twenty five per cent.
- After repaying the loan of sixty million, the owner's equity falls from forty million to fifteen million, down sixty two point five per cent.

17 Two channels of a slowdown

Income channel

Slowdown → Vacancies rise → Rents fall → Income lower

Discount rate channel

Risk premium up → Rent growth down → Cap rate wider → Value lower

IN THE LESSON

- Here is the chain of cause and effect, in two rows.
- The first row is the income channel.
- A slowdown comes, then vacancies rise, then rents fall, and finally net operating income is lower.
- The arrow shows each step leading to the next.
- The second row is the discount rate channel.
- Investors see more risk and less rent growth, so the risk premium rises and expected growth falls, then the cap rate widens, and finally the value falls again.
- Both rows end in lower value, and they work at the same time.
- That is why value fell twenty five per cent when income fell only ten.
- Short leases make the first row bite fast.

18 Example 4: building the cap rate

Cap rate = real Rf + premium − rent growth

Before	2.0 + 4.0 − 1.0	**5.0%**
Premium rises to 4.5	2.0 + 4.5 − 1.0	**5.5%**
Rent growth falls to 0.5	2.0 + 4.5 − 0.5	**6.0%**
Value at 6.0%	4.5 ÷ 0.06	**75m**

IN THE LESSON

- Where does the cap rate come from?
- Build it.
- Suppose the real risk free rate is two per cent, the property risk premium is four per cent, and expected real rent growth is one per cent.
- The cap rate is two plus four minus one, which is five per cent, the rate we used before.
- Now the slowdown.
- Investors want half a point more for the cyclical risk, so the premium becomes four and a half, and the cap rate is five and a half.
- Then expected rent growth falls to half a point, and the cap rate reaches six per cent.
- Apply it to the lower income of four point five million, and the value is seventy five million.
- This is the exam trap.
- A rise in the cap rate is never neutral for owners.

19 Reading property: bond or equity

- Long leases: rate-sensitive, bond-like
- Short leases: economy-sensitive, equity-like
- Slowdown: income falls and cap rate widens
- Two buildings, two different risk profiles

IN THE LESSON

- Let us tie it together.
- If a building has long leases to strong tenants, treat its income like a bond.
- Its value is sensitive to interest rates, because a rise in the real risk free rate lifts the cap rate and cuts the price.
- If a building has short leases and weaker tenants, treat it like an equity.
- Its value is sensitive to the economy, because vacancies and rents move with growth.
- In a recession a short lease building suffers on both counts, with falling income and a wider cap rate.
- A long lease to a strong tenant is shielded from the first channel.
- Never say that both buildings will fall by the same amount just because both are commercial property.

20 A story: subtract the right thing

- Value added = portfolio return − benchmark return
- Benchmark must carry the same systematic risk
- Cash is the wrong yardstick for a risky fund
- Then split it: allocation and selection

IN THE LESSON

- Imagine a runner who finishes a race in nine minutes.
- Is that good?
- It depends on the course.
- If the course was flat and the typical runner finishes in ten minutes, she gained a minute.
- If you compared her with someone walking, you would say she gained a lot, but that is not fair.
- Active management is the same.
- A fund returned nine per cent and its benchmark returned eight, so the manager added one point.
- Compared with cash at two per cent, it looks like seven points, but most of that gap is just market return that anyone could have bought cheaply.
- So we subtract a benchmark with the same risk, then split what is left into the decisions that produced it.

21 Value added and active weights

Value added = Rp − Rb = Σ (wp − wb) × R

Value added	Return over the benchmark
Portfolio return	What the fund earned
Benchmark return	What the benchmark earned
Active weight (wp − wb)	Fund weight less benchmark

IN THE LESSON

- Here is the first rule.
- Value added is the return on the actively managed portfolio minus the return on its benchmark.
- Now write the portfolio and the benchmark by their weights in each asset.
- Since each set of weights adds to one, the differences between them, called active weights, add to zero.
- If the manager holds ten points more in equities, she must hold ten points less somewhere else.
- That gives a neat result.
- Value added equals the sum over all assets of each active weight times that asset's return.
- An overweight in an asset that did well adds value, and an underweight in an asset that did badly also adds value.

22 Example 5: a sixty forty fund

Benchmark 60/40; equities 10%, bonds 4%; cash 2%

Benchmark	0.6 × 10 + 0.4 × 4	**7.6%**
Portfolio	0.7 × 11 + 0.3 × 3.5	**8.75%**
Value added	8.75 − 7.6	**1.15%**
Active weights	equities +10, bonds −10	**sum 0**

IN THE LESSON

- Take a made up fund against a sixty forty benchmark.
- Equities in the benchmark return ten per cent, and bonds four.
- The benchmark return is sixty per cent of ten plus forty per cent of four, which is seven point six.
- The fund holds seventy per cent in equities earning eleven, and thirty per cent in bonds earning three and a half.
- The fund return is seven point seven plus one point zero five, which is eight point seven five.
- Value added is eight point seven five minus seven point six, so one point one five points.
- The active weights are plus ten in equities and minus ten in bonds, and they add to zero.
- Cash returned two per cent, but cash is not the benchmark.

23 Splitting value added in two

Allocation = Σ (wp − wb) × RB; Selection = Σ wp × (Rp − RB)

Asset allocation	Active weight × benchmark return
Security selection	Fund weight × active return
Portfolio weight	Weight in the fund
Active return in class	Fund class less benchmark class

IN THE LESSON

- Now split value added into the two decisions a multi asset manager makes.
- The first is asset allocation, deciding how much to hold in each asset class.
- Its contribution is the active weight of each class times the benchmark return for that class.
- The second is security selection, choosing securities inside each class.
- Its contribution is the fund's own weight in the class times the active return the fund earned in that class, meaning its class return minus the benchmark return for that class.
- Add the two and you get total value added.
- An easy way to remember: allocation uses benchmark returns and active weights, selection uses the fund's weights and active returns.

24 Example 6: allocation and selection

Same fund; split the 1.15 points

Allocation	0.10 × 10 + (−0.10) × 4	**0.60%**
Selection	0.7 × 1 + 0.3 × (−0.5)	**0.55%**
Total	0.60 + 0.55	**1.15%**
Trap: against cash	8.75 − 2	**6.75%**

IN THE LESSON

- Back to the same fund.
- Allocation: the active weight in equities is plus point one, times the benchmark equity return of ten, giving plus one.
- The active weight in bonds is minus point one, times four, giving minus point four.
- Together allocation adds point six of a point.
- Selection: in equities the fund earned eleven against ten, an active return of one, times a weight of point seven, giving point seven.
- In bonds it earned three and a half against four, minus half a point, times point three, giving minus point one five.
- Together selection adds point five five.
- Point six plus point five five makes one point one five, matching the total.
- Against cash the fund would wrongly seem to add six point seven five.

25 From benchmark to portfolio

Return (%)

Benchmark	**7.6**
Allocation	**0.6**
Selection	**0.55**
Portfolio	**8.75**

Benchmark plus two decisions makes the portfolio

IN THE LESSON

- This picture is a bridge.
- The side axis shows the return in per cent.
- The first bar is the benchmark, seven point six, where the bridge starts, because the benchmark is what the investor could have had without paying the manager.
- The next bar is allocation, point six, from holding more equities than the benchmark.
- The next is selection, point five five, from picking securities within each class.
- The last bar is the portfolio itself, eight point seven five, the sum of the three.
- Notice that the two small steps are the manager's contribution.
- The big bar is the benchmark.
- The value added is measured only from the first bar to the last, not from zero or from cash.

26 Same risk: the benchmark rule

- Extra beta is market exposure, not skill
- Cash and mismatched benchmarks flatter the fund
- A fair benchmark is matched to risk
- Then value added shows the manager's decisions

IN THE LESSON

- One last point matters a great deal.
- The benchmark must carry the same systematic risk as the portfolio.
- Suppose a fund simply runs a higher market beta than its benchmark, say by holding more of the riskier stocks.
- In a rising market it will beat the benchmark, and the difference will look like skill.
- But an investor could have bought that extra market exposure cheaply, for example by borrowing a little.
- So it is only market exposure, not skill.
- Comparing with cash makes the same mistake more severely.
- A fair benchmark is appropriate, specified in advance, investable, and matched to the fund's risk.
- Only then does the difference between the two tell you what the manager added.

27 Recap: the four ideas

- Earnings swing; long-term growth barely moves
- Trailing P/E is distorted by the cycle; use CAPE
- Property value = NOI ÷ cap rate: slowdown hurts twice
- Value added = allocation + selection, vs matched benchmark

IN THE LESSON

- Let us recap.
- One: short term earnings swing with the cycle, especially for firms with high operating leverage, but long term growth is anchored to the economy, so a temporary shock moves value only a little.
- Do not extrapolate a trough.
- Two: multiples are cyclical.
- Trailing ratios look high at the trough and low at the peak, so smooth earnings with CAPE before comparing with history.
- Rates and risk premiums move multiples too.
- Three: property is bond like with long leases and strong tenants, and equity like with short leases.
- Value is income divided by the cap rate, so a slowdown hurts twice.
- Four: value added is the fund minus a matched benchmark, split into allocation and selection.

28 Quick check

1. Index 1,800; trailing earnings 60; 10-yr avg real 90. Ratios?
   Answer: 1,800 ÷ 60 = 30 trailing; 1,800 ÷ 90 = 20 CAPE
2. NOI 3m, cap rate 6% widens to 7.5%, income same. Value?
   Answer: 50m falls to 40m: down 20%
3. Fund 60/40 vs benchmark 50/50; equities 7 vs 6; bonds 2 vs 2. Value added?
   Answer: 5.0 − 4.0 = 1.0 = 0.4 allocation + 0.6 selection

IN THE LESSON

- Question one.
- An index stands at eighteen hundred.
- Trailing earnings are sixty, and the ten year average of real earnings is ninety.
- What are the trailing ratio and CAPE?
- Eighteen hundred over sixty is thirty.
- Eighteen hundred over ninety is twenty, so CAPE is much lower than the trailing ratio suggests.
- Question two.
- A building earns three million a year and is valued at a cap rate of six per cent.
- The cap rate widens to seven and a half with income unchanged.
- What happens?
- It was worth fifty million.
- It is now worth forty million, a fall of twenty per cent.
- Question three.
- A fund holds sixty per cent equities and the benchmark fifty.
- Equities return six for the benchmark and seven for the fund, bonds two for both.
- What is value added?
- The benchmark earns four, the fund five, so value added is one point, made of point four from allocation and point six from selection, and that is the answer.