CHARTA LEARNING · LESSON NOTES

The business cycle, unemployment and inflation

Economics

1 A picture: an economy that breathes

- A town with busy summers and quiet winters
- Economy: output swings up and down
- Business cycle = the wobble around the long run trend
- Not fixed in length: no calendar

IN THE LESSON

- Picture a seaside town.
- In summer the cafes are packed, the owners hire extra staff, and everyone is a little optimistic.
- In winter the town goes quiet, staff hours are cut, and owners wait for spring.
- The whole economy behaves a bit like this, only the seasons are irregular and nobody can set a calendar by them.
- Economists call these swings the business cycle.
- It is the rise and fall of total output, meaning everything the country produces, around its long run trend.
- Notice the words around the trend.
- The trend is the steady upward path.
- The cycle is the wobble around it, not the path itself.

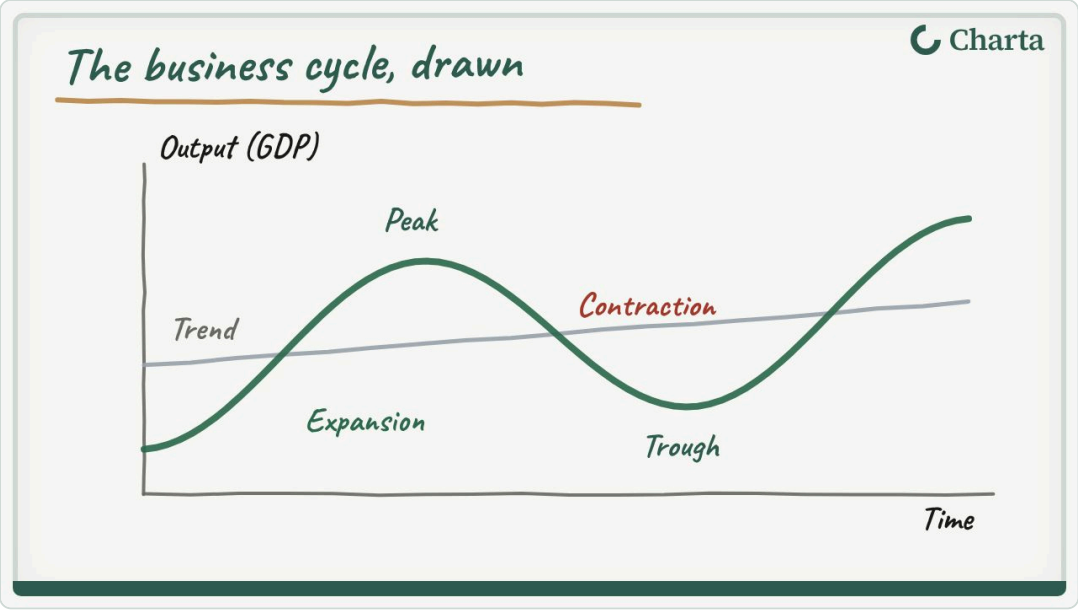
2 The four stages

- Expansion: output and jobs rise
- Peak: the top, where the climb turns
- Contraction: output and jobs fall
- Trough: the bottom, then expansion again

IN THE LESSON

- The cycle has four stages, and they repeat in this order.
- Expansion, peak, contraction, trough.
- Expansion is the climb: output, jobs and spending are all rising.
- The peak is the top, the turning point where the climb stops.
- Contraction is the fall: output and jobs are dropping.
- The trough is the bottom, the turning point where the fall stops, and then a new expansion begins.
- Remember the two kinds of words.
- Expansion and contraction are periods of time, with a direction.
- Peak and trough are single turning points.
- A common slip is to call a peak a period of falling output.
- The peak is only the top.
- The falling is the contraction that follows.

3 The business cycle, drawn



IN THE LESSON

- Now let us draw it.
- Follow the green line from the left.
- It is climbing: this is an expansion.
- At the top it turns.
- That turning point is the peak.
- Then the line falls, and this stretch is a contraction.
- At the bottom it turns again.
- That is the trough, and the climb of the next expansion begins.
- Now look at the grey line running through the middle.
- That is the trend, the steady long run path.
- The cycle is the green wobble around the grey.
- Sometimes output sits above the trend and sometimes below, but over the years the economy follows the trend upward.

4 What each stage looks like

Typical signs, stage by stage

Expansion	output and jobs rising	**Up**
Near the peak	spare capacity is gone	**Prices rise**
Contraction	sales and jobs falling	**Down**
Near the trough	plenty of spare capacity	**Prices calm**

IN THE LESSON

- Let's see what each stage looks like in everyday terms.
- In an expansion, firms sell more, so they produce more and hire more.
- Unemployment falls.
- As factories and shops run near full capacity and workers become scarce, wages and prices start to rise, so inflationary pressure builds.
- Near the peak, that pressure is at its strongest.
- In a contraction, sales weaken, firms cut production, then jobs.
- Unemployment rises, and price pressure fades.
- At the trough there is a lot of spare capacity and many people looking for work, so inflation is low.
- Output and employment move together through the whole cycle.
- They do not move in opposite directions.

5 Example 1: finding the turning points

Real output growth each quarter (made-up numbers)

Quarter	Real output growth
Quarters 1 and 2	+0.8%, +0.3%
Quarter 3	−0.2%
Quarter 4	−0.5%
Quarter 5	+0.4%

IN THE LESSON

- Here is a made up example.
- An economy's real output, which means output with price changes removed, grows by these amounts in five quarters.
- A quarter is three months.
- Quarter one, up zero point eight per cent.
- Quarter two, up zero point three.
- Quarter three, down zero point two.
- Quarter four, down zero point five.
- Quarter five, up zero point four.
- Where is the peak, where is the trough, and when would we call it a recession?
- A rule of thumb many people use is two quarters in a row of falling output.
- The official definition is a little looser: a significant fall in activity across the economy, lasting more than a few months.

6 Example 1: working it out

Start at 1,000 and apply each quarter's growth

Peak: end of quarter 2	1,008.00 × 1.003	**1,011.02**
End of quarter 3	× 0.998	**1,009.00**
Trough: end of quarter 4	× 0.995	**1,003.96**
Fall from peak to trough	1,003.96 ÷ 1,011.02 − 1	**−0.70%**
End of quarter 5	× 1.004	**1,007.97**

IN THE LESSON

- Start output at one thousand.
- After quarter one it is one thousand and eight.
- After quarter two, up another zero point three per cent, it is about one thousand and eleven.
- That is the highest level so far, and the next quarter falls, so the peak is at the end of quarter two.
- Quarter three takes it to about one thousand and nine.
- Quarter four takes it to about one thousand and four, the lowest point, because quarter five rises again.
- So the trough is the end of quarter four.
- From peak to trough output fell about zero point seven per cent.
- Quarters three and four are two falls in a row, so the rule of thumb calls this a recession.

7 Indicators: leading, coincident, lagging

- Leading: turns before the economy
- Coincident: moves with the economy
- Lagging: turns after the economy
- Early signals can be false alarms

IN THE LESSON

- How do we know where we are in the cycle?
- We watch indicators, which are data series that move with it.
- They come in three types, depending on timing.
- Leading indicators turn before the economy does.
- Think of new orders, building permits and share prices.
- A permit is filed before any building happens, so it moves early.
- Coincident indicators move together with the economy, like industrial production.
- They tell us where we are now.
- Lagging indicators turn after the economy has already turned.
- The usual example is how long people stay unemployed, because firms wait to be sure before they rehire.
- The trap is that leading indicators give early hints, but sometimes false alarms.
- Lagging ones are reliable, but late.

8 Sorting the indicators

Which way does each series point?

Series	Type
Building permits	Leading
New orders for machinery	Leading
Industrial production	Coincident
How long people stay unemployed	Lagging

IN THE LESSON

- Let's practise the sorting, because it is a favourite question.
- Ask one thing: does this series show something that happens before the activity, during it, or after it?
- Building permits are filed before building, so they lead.
- New orders for machines come before production, so they lead.
- Industrial production is output itself, so it is coincident.
- The average length of unemployment keeps rising after a recovery has begun, so it lags.
- Notice a pattern.
- Near a peak, the leading series have already started to fall while lagging ones still look strong.
- Near a trough, the opposite: leading ones improve first, and the lagging ones are still bad.
- Strong lagging data tells you where we have been, not where we are heading.

9 The credit cycle: a story

- Credit = money lent now, repaid later
- Good times: lenders compete, rules loosen
- Bad times: rules tighten, borrowing costs more
- Cycle in lending: its availability and its price

IN THE LESSON

- Now the second idea, the credit cycle.
- Credit just means borrowing: money lent now that will be repaid later.
- Think of a bank manager.
- In good times, business is booming, borrowers look strong, and few loans go wrong.
- Other banks are competing for customers, so each lender relaxes its rules and accepts weaker borrowers, at lower prices.
- Then the first losses appear.
- The manager becomes nervous, asks for more proof and more security, and charges more.
- Credit gets harder to find and dearer, exactly when borrowers need it most.
- This loosening and tightening, in both the availability and the cost of credit, is the credit cycle.
- It is a cycle in lending, just as the business cycle is a cycle in output.

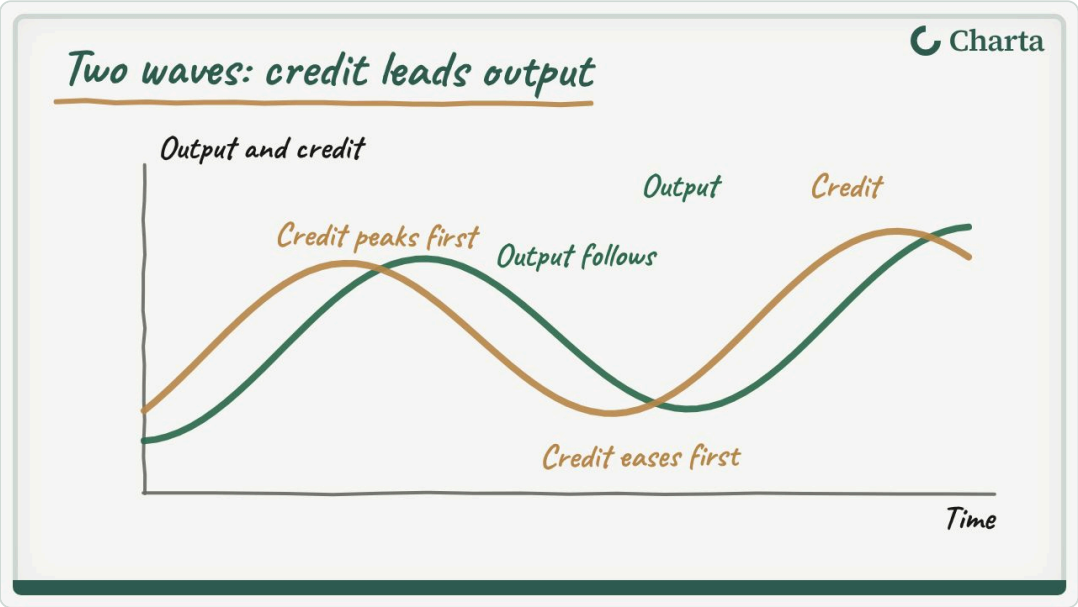
10 How credit and the business cycle feed each other

- Boom: easy credit, more spending, stronger boom
- Slump: tight credit, less spending, deeper slump
- Credit is procyclical: it amplifies the cycle
- Countercyclical would damp it

IN THE LESSON

- Now the key point: how the two cycles interact.
- In an expansion, easy credit lets households buy and firms invest, which speeds up the expansion.
- Higher spending improves profits, and lenders feel safer still.
- When the economy slows, defaults rise and lenders lose money.
- They tighten.
- Firms that cannot borrow cut spending and staff, which slows the economy further.
- So credit moves in the same direction as the business cycle.
- That is called procyclical.
- It amplifies the swings in both directions, rather than smoothing them out.
- A countercyclical force would do the opposite, lending more in a slump.
- Credit does not.
- It is a wave that rides on the wave.

11 Two waves: credit leads output



IN THE LESSON

- Now see it as a picture.
- Two waves.
- The green line is output, the business cycle you already know.
- The gold line is credit, how freely and cheaply lenders are willing to lend.
- Look at the tops.
- The gold line peaks first and turns down first.
- Lenders grow cautious and tighten while the economy still looks strong.
- Then output follows it down, because firms that cannot borrow cut back.
- Look at the bottoms.
- Credit eases first and turns up first, which helps lift output out of the trough.
- So credit leads, and it pushes the cycle further in the same direction.

12 Example 2: what a wider spread costs

Government rate 5.0%; company owes £100 million

Good times: spread 1.0%	5.0% + 1.0%	**6.0%**
Yearly interest	6.0% of £100m	**£6.0m**
Bad times: spread 4.0%	5.0% + 4.0%	**9.0%**
Yearly interest	9.0% of £100m	**£9.0m**
Extra cost of the turn	£9.0m − £6.0m	**£3.0m**

IN THE LESSON

- Here is a numerical illustration.
- A company borrows one hundred million pounds.
- The safe government rate is five per cent.
- Lenders add a credit spread, which is the extra yield above the government rate for the risk of non payment.
- In good times, with lenders confident, the spread is one per cent.
- The company pays six per cent, which is six million pounds a year.
- Then the credit cycle turns.
- Fear rises, and the spread widens to four per cent.
- The same company, with the same business, now pays nine per cent.
- That is nine million pounds.
- The extra cost is three million pounds a year, and nothing about the company itself has changed.
- Spreads narrow in good times and widen in bad times.

13 Credit as an early warning

- Credit tightens before output falls
- Leading: an early warning of a slowdown
- Refinancing risk: new debt scarce and dear
- Matters for forecasts and for risk

IN THE LESSON

- Why do investors care?
- Because credit conditions usually turn before output does.
- Lenders set their rules according to the losses they expect, so they tighten ahead of the downturn.
- That makes a sharp tightening of lending standards an early warning, much like a leading indicator.
- It would be a mistake to treat it as a lagging signal that merely confirms what already happened.
- There is a second reason.
- Borrowers who need to refinance, meaning to replace maturing debt with new debt, face refinancing risk.
- When credit is scarce and dear, a company with a debt due may find no lender, or a very high price.
- So the credit cycle matters for both forecasting and for risk.

14 Unemployment: who counts?

- Working-age population: everyone old enough to work
- Labour force = employed + unemployed
- Unemployed = no job, but actively looking
- Not looking? Outside the labour force

IN THE LESSON

- Now the labour market.
- To measure unemployment we first have to sort a country's people.
- Start with the working age population: everyone old enough to work.
- Within it, some people are in the labour force.
- That means they either have a job, or they do not but are actively looking for one.
- The first group are employed, the second are unemployed.
- Everyone else is outside the labour force: students, retirees, people caring for family, and those who have given up looking.
- Being without a job is not enough to be unemployed.
- You must also be looking.
- This one rule explains most of what is odd about the headline figures.

15 The two rates

Unemployment rate = unemployed ÷ labour force
Participation rate = labour force ÷ working-age population

Unemployed	People without work, looking
Labour force	Employed plus unemployed
Working-age population	Everyone old enough to work

IN THE LESSON

- Two rates, and each has its own denominator.
- The unemployment rate is the unemployed divided by the labour force.
- That is the share of people who want work and cannot find it.
- The participation rate is the labour force divided by the working age population.
- That is the share of everyone old enough to work who is either working or looking.
- Notice what each one uses.
- The unemployment rate counts only people in the labour force.
- Do not divide by the whole population.
- The participation rate is the only place where the whole working age population appears.
- Remember: the labour force is employed plus unemployed.
- The people outside it are in neither group.

16 Example 3: the set-up

A small country, made-up numbers

Working-age population		**100,000**
Employed	have a job	**62,000**
Unemployed	no job, looking	**4,000**
Outside the labour force	not looking	**34,000**

IN THE LESSON

- Let's use a small made up country.
- Its working age population is one hundred thousand people.
- Of those, sixty-two thousand have jobs.
- Four thousand have no job but are actively looking.
- The other thirty-four thousand are students, retirees and people who are not looking.
- The question is: what are the unemployment rate and the participation rate?
- Then we will add a twist.
- Next month one thousand of the unemployed lose hope and stop looking.
- Nobody finds a job, and nobody is hired.
- What happens to the two rates?
- Think about your guess before the next slide.
- Most people expect the unemployment rate to stay the same.
- Let's see.

17 Example 3, step 1: the rates

Step 1: before anyone gives up

Labour force	62,000 + 4,000	**66,000**
Unemployment rate	4,000 ÷ 66,000	**6.06%**
Participation rate	66,000 ÷ 100,000	**66.0%**

IN THE LESSON

- Step one.
- The labour force is the employed plus the unemployed: sixty-two thousand plus four thousand, which is sixty-six thousand.
- The unemployment rate is four thousand divided by sixty-six thousand.
- That is zero point zero six zero six, or six point zero six per cent.
- The participation rate is the labour force, sixty-six thousand, divided by the working age population, one hundred thousand.
- That is sixty-six per cent.
- Notice the trap.
- If we had divided four thousand by one hundred thousand, we would have got four per cent.
- That is wrong, because the unemployment rate uses the labour force, not the whole population.
- Now to the twist.

18 Example 3, step 2: the discouraged workers

Step 2: 1,000 people stop looking, no one is hired

Unemployed	4,000 − 1,000	**3,000**
Labour force	66,000 − 1,000	**65,000**
Unemployment rate	3,000 ÷ 65,000	**4.62%**
Participation rate	65,000 ÷ 100,000	**65.0%**
Employed, still	no one hired	**62,000**

IN THE LESSON

- Step two.
- One thousand unemployed people give up looking.
- They are called discouraged workers.
- They leave the labour force, so they are no longer counted as unemployed.
- Unemployed falls from four thousand to three thousand.
- The labour force falls from sixty-six thousand to sixty-five thousand.
- The unemployment rate is three thousand divided by sixty-five thousand, which is four point six two per cent.
- It has fallen by more than a full percentage point, yet nobody found a job.
- Employment is still sixty-two thousand.
- The participation rate dropped to sixty-five per cent, which gives the game away.
- So when the unemployment rate falls while participation also falls, ask whether people have simply stopped looking.

19 Kinds of unemployment, and hidden slack

- Frictional: between jobs, always present
- Structural: skills do not match the jobs
- Cyclical: rises in contraction, falls in expansion
- Underemployed count as employed: hidden slack

IN THE LESSON

- Not all unemployment is alike.
- Frictional unemployment is the short gap when people move between jobs or first enter the market.
- It exists even in a healthy economy.
- Structural unemployment is a mismatch between the skills workers have and the skills employers want, for instance when an industry shrinks.
- Cyclical unemployment comes from the business cycle itself, rising in contractions and falling in expansions.
- The headline rate also misses underemployment.
- That means people in part time work who want full time work, or in jobs far below their qualifications.
- They count as employed.
- So the headline figure understates the slack in the labour market.
- One more point: when a recovery begins, discouraged workers return and the rate may rise.

20 Inflation: a basket of shopping

- Inflation = sustained rise in the general price level
- Price a typical household's basket, again and again
- Items weighted by how much households spend
- Most common: the consumer price index (CPI)

IN THE LESSON

- Last topic: inflation.
- Inflation is a sustained rise in the general level of prices, so each unit of money buys less.
- How do we measure that?
- You cannot follow every price in the economy, so statisticians build a basket.
- A basket is a typical household's shopping: so much food, so much rent, so much transport, so much clothing.
- Each month they price the same basket.
- If the basket costs more, prices have risen.
- The most common measure built this way is a consumer price index, written CPI, which spells out as C P I.
- The items are weighted by how much a typical household spends on them, so a big expense like housing counts for more than a small one.

21 The price index and the inflation rate

Index = basket cost now ÷ base-year cost × 100
Inflation = index now ÷ index a year earlier − 1

Basket cost now	What the basket costs today
Basket cost in base year	Cost in the year set to 100
Index now	This year's index level
Index a year earlier	Last year's index level

IN THE LESSON

- Two formulas.
- First, the price index.
- Pick a base year and set the index to one hundred.
- In any later year, the index equals the cost of the basket now, divided by its cost in the base year, times one hundred.
- Second, inflation.
- The inflation rate is the index now divided by the index a year earlier, minus one.
- Notice the starting point.
- Inflation is measured against the earlier price level, not against today's.
- And remember what an index is.
- It is a level, not a rate.
- An index of one hundred and eight does not mean eight per cent a year.
- It means eight per cent higher than the base year.
- Only a comparison of two index levels gives you the rate.

22 Example 4: building the index

Same basket each year. Base year cost £200

Base year	200 ÷ 200 × 100	**100.00**
One year later	210 ÷ 200 × 100	**105.00**
Two years later	216.30 ÷ 200 × 100	**108.15**

IN THE LESSON

- Let's build an index.
- In the base year, the basket costs two hundred pounds, so the index is one hundred.
- One year later, the same basket costs two hundred and ten pounds.
- The index is two hundred and ten divided by two hundred, times one hundred, which is one hundred and five.
- Another year later, the same basket costs two hundred and sixteen pounds thirty.
- The index is two hundred and sixteen thirty divided by two hundred, times one hundred, which is one hundred and eight point one five.
- Look carefully.
- The basket is the same each year.
- Only the prices change, so the index is measuring prices and not quantities.

23 Example 4: from index to inflation

Inflation = new index ÷ old index − 1

Year one inflation	105 ÷ 100 − 1	**5.0%**
Year two inflation	108.15 ÷ 105 − 1	**3.0%**
Rise in index points	108.15 − 105	**3.15**
Points as a rate	3.15 ÷ 105	**3.0%**

IN THE LESSON

- Now the inflation rate.
- In the first year, the index went from one hundred to one hundred and five, so inflation was five per cent.
- In the second year, it went from one hundred and five to one hundred and eight point one five.
- Divide the new by the old: one hundred and eight point one five divided by one hundred and five is one point zero three.
- Subtract one, and inflation is three per cent.
- Here is the trap.
- The index rose by three point one five points, but that does not mean three point one five per cent.
- Points convert to a rate only when the starting level is one hundred.
- Here it is one hundred and five, so we divide three point one five by one hundred and five, which is three per cent.
- So inflation fell, from five to three per cent, yet prices are still rising.

24 Headline versus core inflation

Food and energy are 25% of the basket, the rest 75%

Food and energy	25% × 8%	**2.0 pts**
Everything else	75% × 2%	**1.5 pts**
Headline inflation	2.0 + 1.5	**3.5%**
Core inflation	the rest of the basket	**2.0%**

IN THE LESSON

- Prices of food and energy swing wildly, because of weather, wars and oil supply.
- These swings can hide the underlying trend.
- So statisticians publish two figures.
- Headline inflation covers the whole basket.
- Core inflation strips out food and energy.
- Take a made up example.
- Food and energy are a quarter of the basket and their prices rose eight per cent.
- Everything else is three quarters of the basket, and rose two per cent.
- Headline is a weighted average.
- A quarter of eight is two.
- Three quarters of two is one and a half.
- Add them, and headline is three and a half per cent.
- Core is just the rest of the basket: two per cent.
- A big gap between the two tells you the rise is mostly food and energy, not broad.

25 Why the index is imperfect

- Substitution bias: index overstates, shoppers switch
- Quality: a better product costs more, not inflation
- New goods missed until the basket is updated
- Disinflation: rate falling. Deflation: prices falling

IN THE LESSON

- No index is perfect, and there are three well-known flaws.
- First, substitution bias.
- When beef gets dear, shoppers switch to chicken.
- But a fixed basket still prices the beef, so it overstates the rise in the cost of living.
- Second, quality changes.
- If a phone costs more because it is better, part of that price rise is not inflation, but separating the two takes judgement.
- Third, new goods.
- Products that arrive after the basket was set are missed at first.
- Two related words are worth knowing.
- Disinflation means inflation is still positive but falling, as in our example.
- Deflation means the price level itself is falling.
- They are not the same thing at all.

26 Demand-pull inflation

- Spending outruns what the economy can produce
- Causes: rising incomes, easy credit, tax cuts, exports
- Late expansion: output above trend, jobs rising
- Prices rise while output and jobs rise
- Cure: cool demand (higher rates, less spending)

IN THE LESSON

- Finally, what causes inflation, because the cause decides the cure.
- Start with demand-pull inflation.
- Here spending grows faster than the economy can produce, so too much money chases too few goods and pulls prices up.
- Typical causes are rising incomes, easy credit, tax cuts, or strong demand from abroad.
- It tends to appear late in an expansion, when output is above trend and unemployment is low, so prices rise while output and jobs rise too.
- The cure is to cool demand: higher interest rates or less government spending.
- Hold on to the picture of a hot economy.
- Prices go up because buyers are competing for scarce goods and workers.

27 Cost-push inflation

- Costs rise: wages, oil, raw materials
- Firms pass the higher costs on in prices
- Output falls, unemployment rises: stagflation
- Not caused by too much demand
- Higher rates deepen the slump: a poor cure

IN THE LESSON

- Now the other kind, cost-push inflation.
- Here the push comes from the supply side.
- Firms face higher costs, such as dearer wages, oil or raw materials, and pass them on in higher prices.
- Notice the difference.
- Output falls, not rises, and unemployment tends to rise, so you get rising prices with a weak economy.
- That combination has a name, stagflation.
- It is not caused by too much demand.
- So raising interest rates is a poor cure.
- It cools demand, but the problem is on the supply side, so it deepens the slump while prices stay high.
- Remember both look the same in the index.
- The cause is what decides the response.

28 Mistakes to avoid

- 1. A peak is a point, not a period of falling
- 2. Credit leads and amplifies the cycle
- 3. Divide by the labour force, not the population
- 4. Lower unemployment with falling participation: check
- 5. Index points are not a rate: divide by the earlier level

IN THE LESSON

- Before we finish, five mistakes that cost marks.
- One.
- Calling a peak a falling period.
- Peaks and troughs are single turning points.
- Two.
- Treating tight credit as a lagging signal or as a cushion.
- It leads, and it amplifies.
- Three.
- Dividing the unemployed by the whole population.
- Use the labour force.
- Four.
- Cheering a lower unemployment rate when participation is falling too.
- People may have given up.
- Five.
- Reading index points as per cent, or comparing against today's level instead of last year's.
- Compare two index levels, divide by the earlier one, and subtract one.
- Keep these five in mind and you will pick up easy marks.

29 Recap: the formulas to remember

Unemployment rate = U ÷ LF Participation = LF ÷ population
Index = cost now ÷ base cost × 100 Inflation = index ÷ prior index − 1

Unemployed	Unemployed: no job, looking
Labour force	Labour force: working or looking
Working-age population	Population of working age
Index now	Index: this year's level
Index a year earlier	Index: last year's level

IN THE LESSON

- Let's pull it together.
- The cycle runs expansion, peak, contraction, trough, and credit rides on it, loosening in booms and tightening in busts, so it amplifies the swings.
- Leading indicators turn first, coincident ones with the economy, and lagging ones after.
- The unemployment rate is the unemployed divided by the labour force.
- The participation rate is the labour force divided by the working age population.
- People who stop looking leave both counts.
- The index is the cost of the basket now over its base year cost, times one hundred.
- Inflation is the index now over the index a year earlier, minus one.
- Headline includes food and energy, and core does not.

30 Try three quick questions

1. Labour force 80,000; unemployed 4,000. What is the unemployment rate?
   Answer: 4,000 ÷ 80,000 = 5.0%
2. An index rises from 120 to 123.6. What is the inflation rate?
   Answer: 123.6 ÷ 120 − 1 = 3.0%
3. Lenders tighten standards sharply while output still grows. Signal?
   Answer: Early warning: credit leads and amplifies.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A labour force is eighty thousand people, of whom four thousand are unemployed.
- What is the unemployment rate?
- Four divided by eighty is five per cent.
- Question two.
- A price index rises from one hundred and twenty to one hundred and twenty three point six.
- What is inflation?
- Divide the new by the old, one point zero three, and subtract one, so three per cent.
- Question three.
- Lenders sharply tighten their lending standards while output is still growing.
- What does it signal?
- An early warning of a slowdown, because credit leads the cycle and is procyclical.
- Well done.