Economic Policy Issues

Modern Monetary Policy
(Sample Teaching Slides I)

Modern Monetary Policy

References:

Fraser W. 'Central Bank Independence: What Does It Mean?'. The 20th SEANZA Central Banking Course 1994.

Fuentes S. 'The 3-Equation Model' 2016 lecture slides, Depart of Economics, University of Warwick.

Macfarlane, I. 'Monetary Policy Regimes: Past and Future'. Opening address to the 26th Conference of Economists, Hobart, 1997.

Review of the Reserve Bank of Australia. 'An RBA fit for the future'. March 2023.

Ruberl H, Ball M, Lucas L and Williamson T. 'Estimating the NAIRU in Australia'. Treasury Working Paper 2021-01.

Some history

Post-war monetary policy experience in Australia:

- **Until early 1970s**: the fixed exchange rate period;

- **1976-1985**: a period of monetary targeting;

- **1986-1992**: a transitional period which followed the demise of monetary targeting; and

- **1993-present**: the inflation targeting regime.

> *"The use of quantity of money as a target has not been a success. I'm not sure I would push it as hard as I once did."*
>
> Milton Friedman (Financial Times, 2003)

Inflation targeting to anchor inflation.
Real interest rate used to influence output gap.

The Reserve Bank Act 1959, Australia

The Reserve Bank Act 1959 directs the Reserve Bank Board to conduct monetary policy in a way that, in its opinion, will best contribute to

1. Stability of the currency of Australia (flexible $2 - 3\%$ inflation target);
2. The maintenance of full employment in Australia; and
3. The economic prosperity and welfare of the people of Australia.

Source: Review of the Reserve Bank of Australia (Chapter 1, page 30)

The objectives set for central banks, at least in advanced economies, share some common characteristics but are NOT the same. For example,

- **The Bundesbank (Germany): '**safeguard the currency'

- **The Reserve Bank of New Zealand**: 'pursuing an inflation target $0 - 2\%$'

- **The Federal Reserve (US):** 'maximum employment, stable prices, and moderate long-term interest rates' as required by the *Humphry-Hawkins Act*

Central bank independence and goal defining

Broadly: The freedom to pursue price stability.

Specifically: Instrument independence, and NOT goal independence.

Three approaches to goal setting:

1. **A single goal of price stability**

2. **Price stability + an intermediate target**: Mechanical rule-based to help anchor monetary policy (e.g., target a particular money aggregate growth)

3. **Price stability + multiple other goals**: give priority to price stability while having other goals such as employment and welfare in mind.

Debatable:

- **Type 1** is very constraining.

- **Type 2** and **3** offer more flexibility but are (i) highly subject to interpretation, (ii) can weaken independence and (iii) downgrade the price stability priority.

Central Bank: The basic idea

The CB is forward looking.

- CB forecasts inflation and other key variables such as NAIRU and wage growth by analysing the state of the economy.

- Lags matter:
  → Fiscal policy (inside lag) versus Monetary policy (outside lag)

The CB's response to shocks depends on, but not limited to:

1. **CB's preferences**: What objectives is it trying to achieve?
2. **CB's constraints**: What prevents the CB from achieving its objectives?

Evaluation: An extremely challenging task.

- How much of the observed outcome should we attribute to monetary policy?
- How do we untangle the effects of market force, fiscal policy and monetary policy?

Central Bank: The basic idea

As presented in the lecture,

$$\dot{w} = a + b(U - U^*) + c\pi^e$$

where:

- U^* is the NAIRU (**N**on-**A**ccelerating **I**nflation **R**ate of **U**nemployment)

- $\dot{w} = \dfrac{dw}{dt}$ is just the change in nominal wages over time (nominal wage growth)

- b is the correlation coefficient between the deviation of the actual unemployment U from NAIRU $(U - U^*)$ to the nominal wage growth $\dot{w}$

- π^e (or **Exp** in the lecture slides) is the inflation expectation

- c is the correlation coefficient between the inflation expectation Exp to the nominal wage growth $\dot{w}$

What is NAIRU?

NAIRU allows us to infer information about **the unemployment gap** $(U - U^*)$ (in a more intuitive term, the '**spare capacity**') in the economy.

All else constant,

$U - U^* > 0$ or $U > U^*$ implies *spare capacity*. Thus, an increase in aggregate demand (either via market force or policies) is NOT going to result in an inflationary pressure.

$U - U^* < 0$ or $U < U^*$ implies *insufficient capacity*. Thus, an increase in aggregate demand is going to cause an inflationary pressure.

Unemployment measurements and NAIRU

We have talked about the unemployment rate, but not other relevant measures and their implications on NAIRU. Suppose, with our unemployment (U) data, we estimate NAIRU to be 4.5%.

We observe the 2022 unemployment rate, $U_{2022} = 3.5\%$. What should be our conclusion about inflationary pressure?
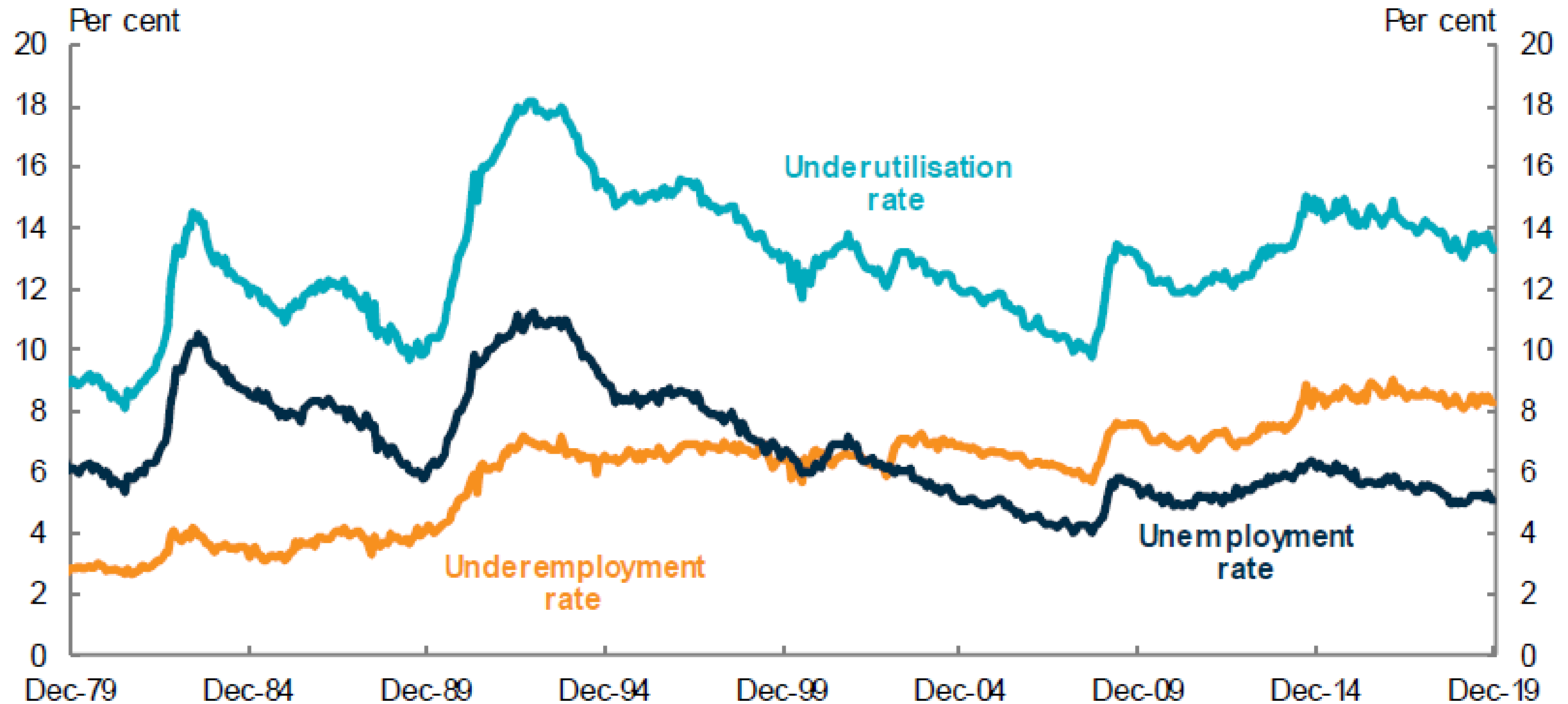
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$$U_{2022} - U^* = 3.5\% - 4.5\% = -1\%$$

This suggests insufficient capacity and we should **expect inflation to rise**.

What if we incorporate other measurements of unemployment???

Unemployment measurements and NAIRU

Chart 11: Unemployment, Underemployment and Underutilisation rates

Source: ABS Cat. no. 6202.0

Unemployment measurements and NAIRU

What if we incorporate other measurements of unemployment???

Our simple calculation using the unemployment rate:

$$U_{2022} - U^* = 3.5\% - 4.5\% = -1\%$$

We conclude that this **insufficient capacity implies inflationary pressure**.

However, the **under-employment rate** suggests that even with low unemployment, there might have been spare capacity in 2022 as workers wanted to work more hours and employers could have given them more hours instead of hiring more workers and raising wages.

So, there should be **smaller inflationary pressure and actual $U^* < 4.5\%$.**

Unemployment measurements and NAIRU

Deep economic recessions and slow recovery can result in long-term unemployment and eventually discouraged workers (not to mention the firm side of the story e.g., job destruction due to firm closure). This results in loss of skills.

This effect is known as '**Hysteresis**'. Increased structural and frictional unemployment (e.g., harder to match firms and workers) can lead to lower spare capacity (or more insufficient capacity).

This implies **stronger inflationary pressure and $U^* > 4.5\%$**.

Estimating NAIRU (only if you're interested!)

Does NAIRU exist in practice? Maybe. It is the same idea as the Gini coefficient, the HDI, the shadow interest rate, the shadow price of regulated labour market, etc. They are estimates employed to summarize the more complex reality and allow us to infer the unobserved from the observed.

How do you estimate it? The treasury uses the State-Space model.

The basic idea:

- A theoretical model/process driving the NAIRU (e.g., $U^*_{t,m} = U^*_{t-1,m} + e_t$)

- The observed measurement (signal equation): $\dot{w}_t = a + b(U_{t,s} - U^*_{t,s}) + c\pi^e + u_t$

- Find U^* to minimize errors between model-based and signal equation based predicted values taking our theoretical understanding into account.

Note:

$U^*_{t,m}$ denotes U^* predicted by the theoretical model

$U^*_{t,s}$ denotes U^* predicted by the signal equation

Measuring inflation expectations

- Inflation expectations (π^e) affects the level of the NAIRU. A higher inflation expectations series will result in a lower estimate of the NAIRU and vice versa, all other things equal.

- π^e used in the PC equation is a weighted average of
  - **Backward-looking inflation expectations** (using historical data)
  - **Forward-looking inflation expectations** (using consumer/firm/expert surveys of expectations or market-based expectations).

- The Treasury's NAIRU estimate is mainly used as an input to wage forecasting.

- A key assumption is that the *most appropriate inflation expectations for wage bargaining purpose* is those over shorter-term horizons (**3- to 5-year inflation expectations**).

Measuring inflation expectations

Chart 4: Example measures of inflation expectations
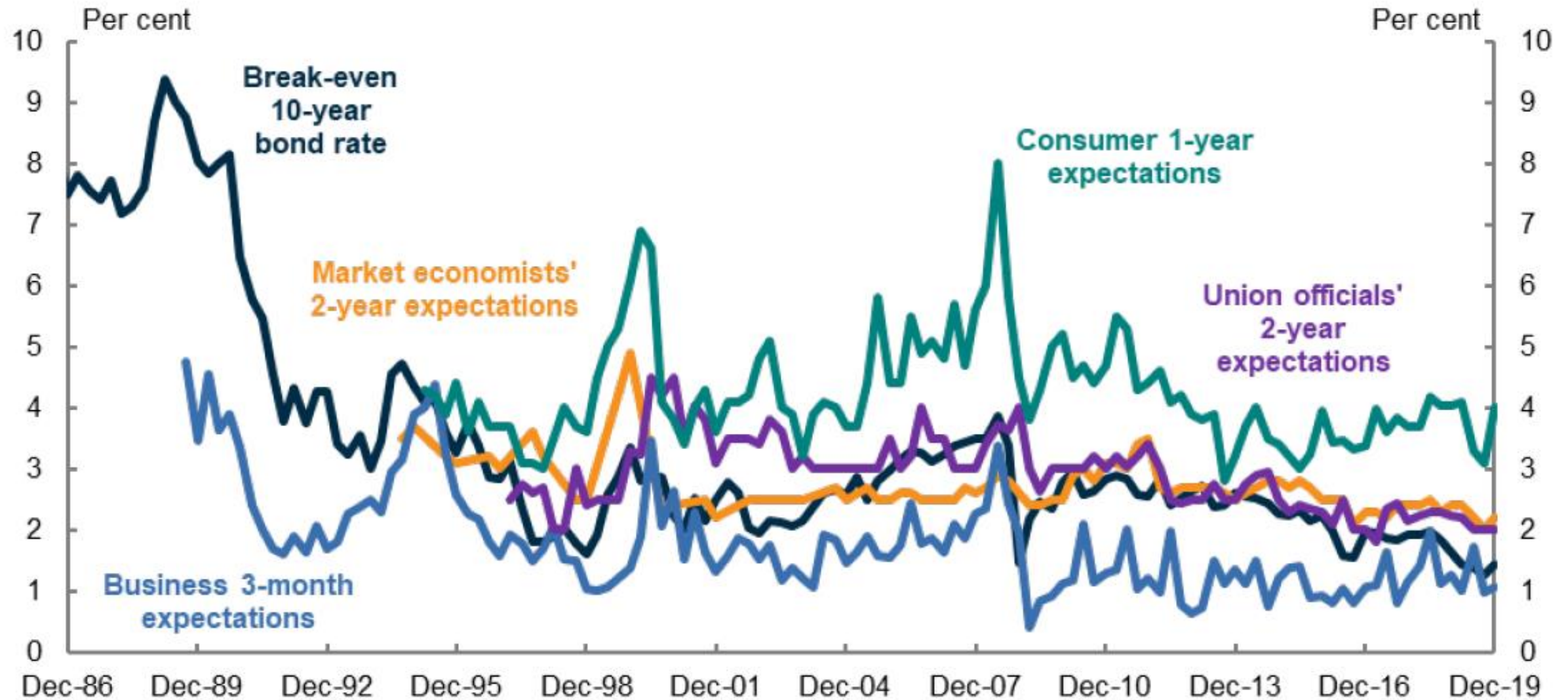
Source: Melbourne Institute, RBA.

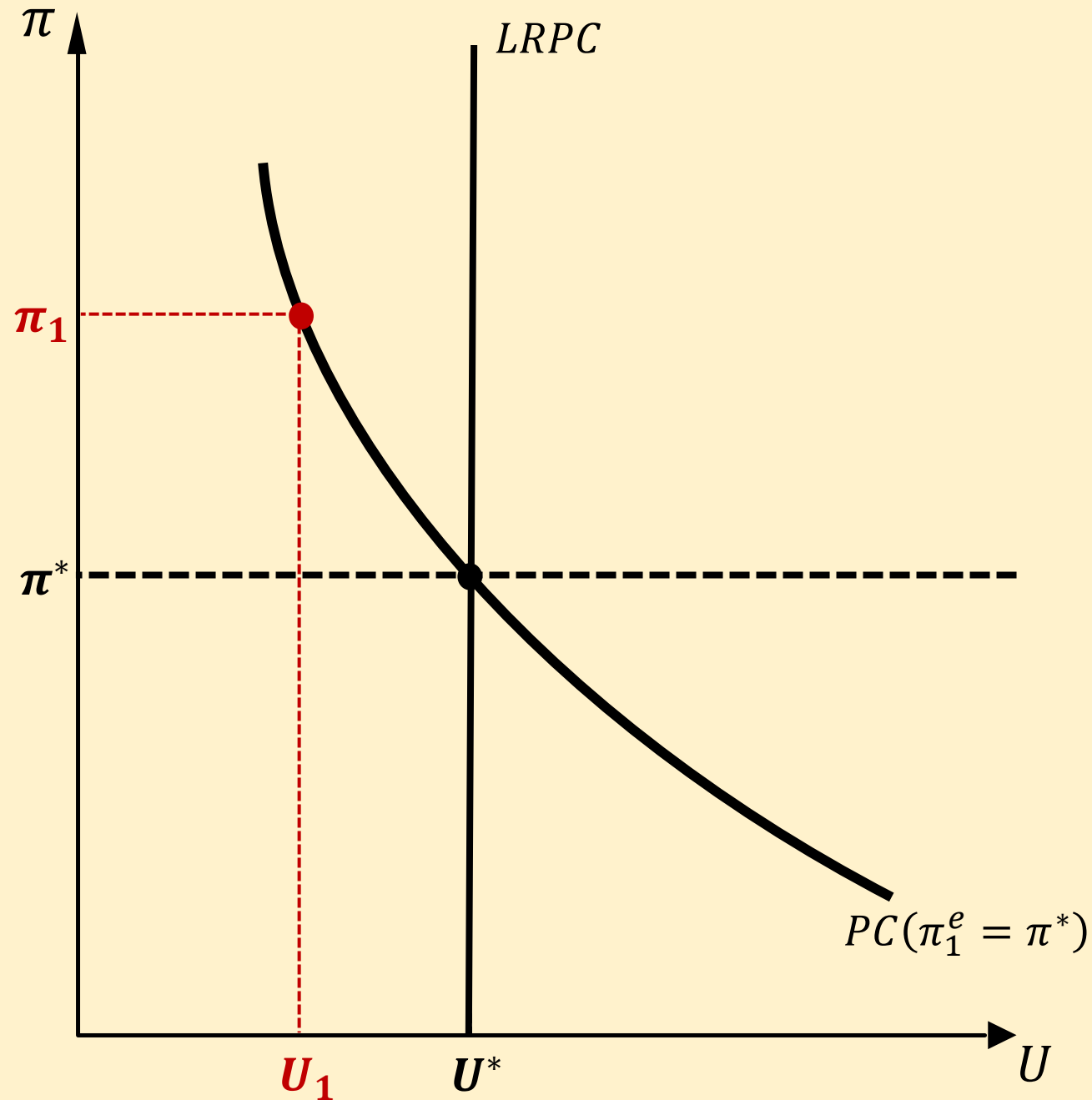# Understanding the Phillips Curve and NAIRU
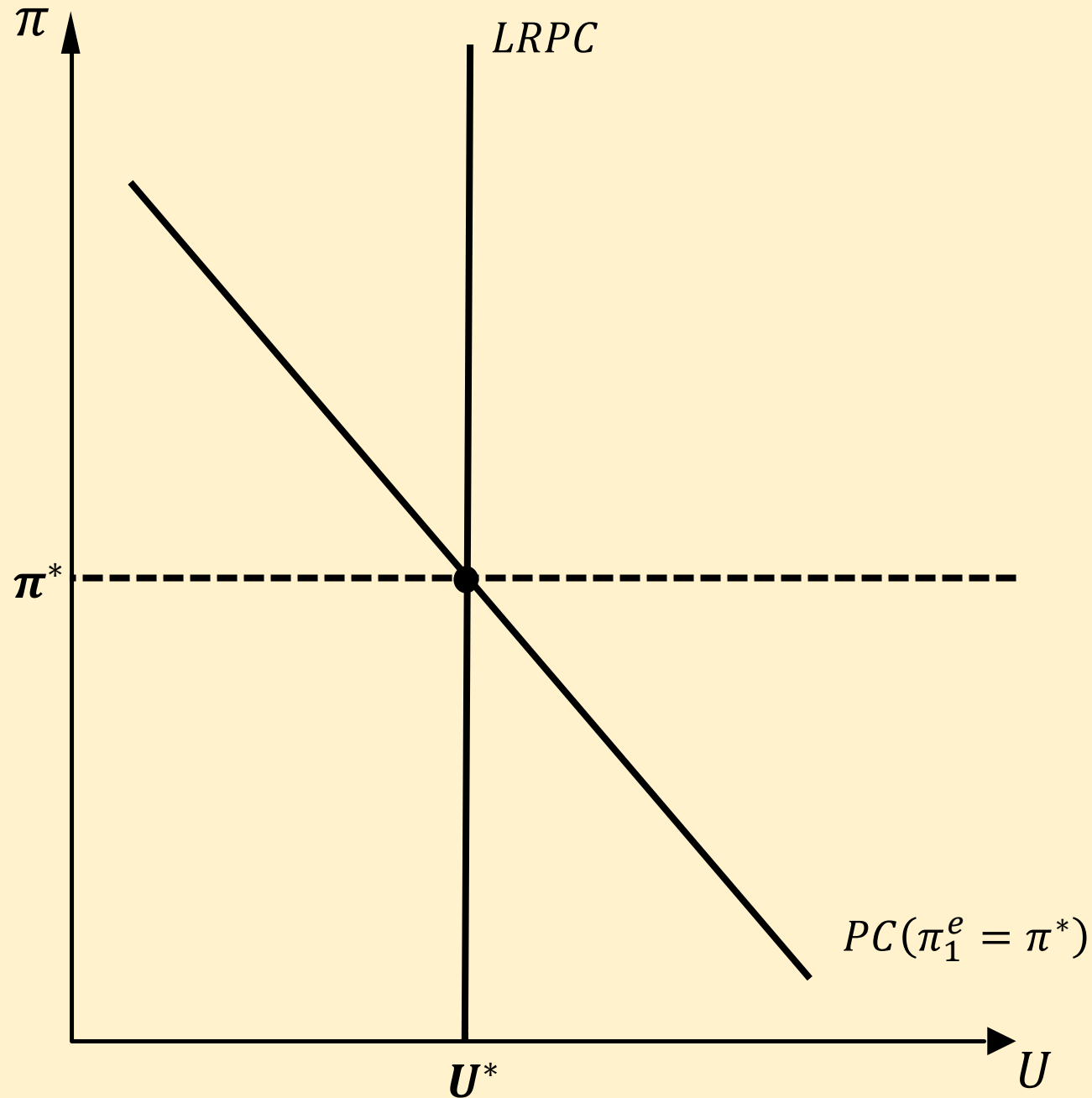
Case 1:
- Target specific inflation value $\pi^* = 2.5\%$
- Expectation is in line with the inflation target
- Cash rate (i) is not at the effective lower bound (ELB) $\rightarrow$ there is room to move
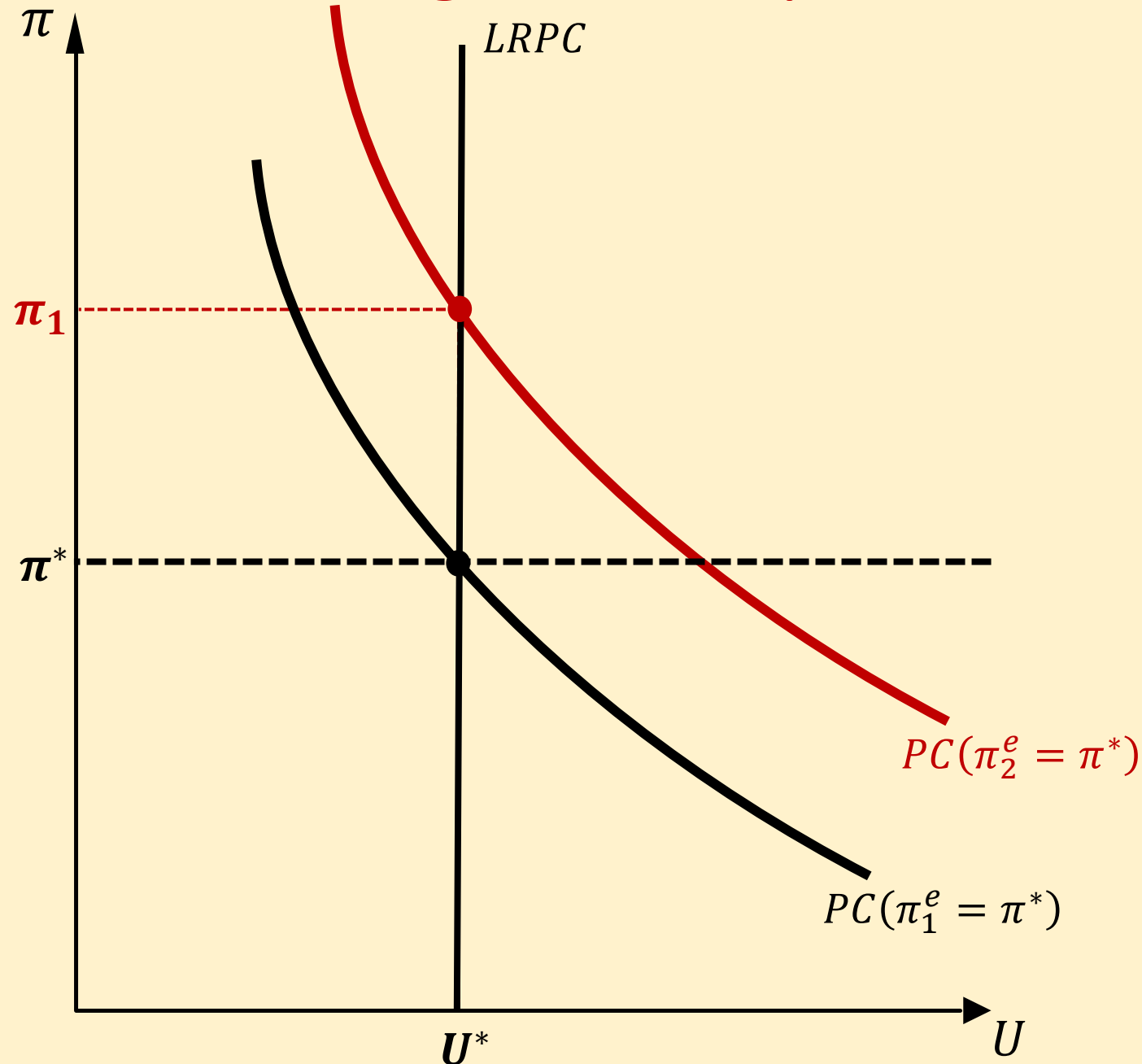
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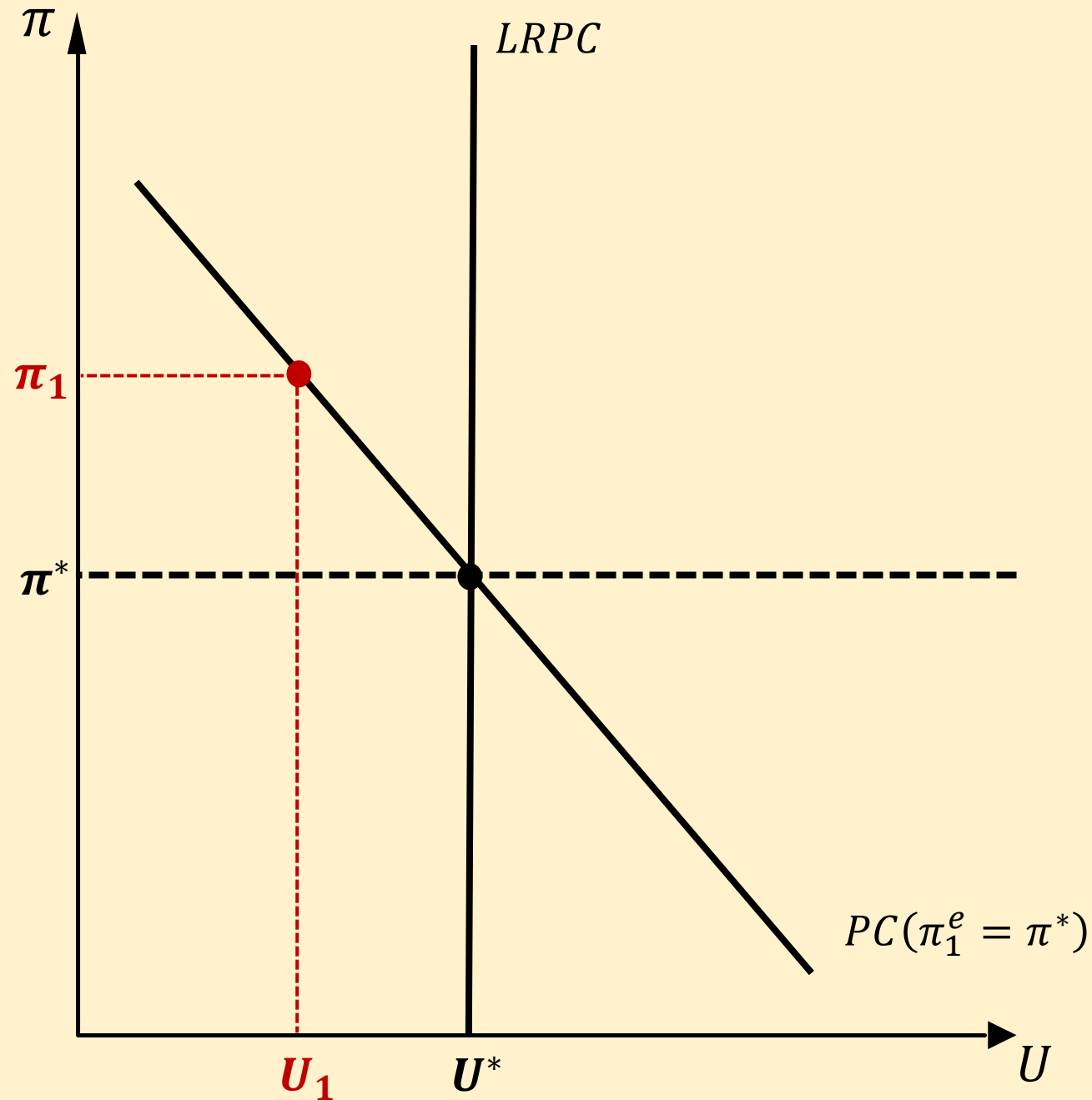
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In the short-term, the CB can stimulate the economy (with lag) by lowering i

Understanding the Phillips Curve and NAIRU

A short note on the curvature of PC and sticky price

The curvature of PC is important.

Compared to the case of linear PC, Observe how the same U_1 leads to higher π_1 under the case of convex PC.

Understanding the Phillips Curve and NAIRU
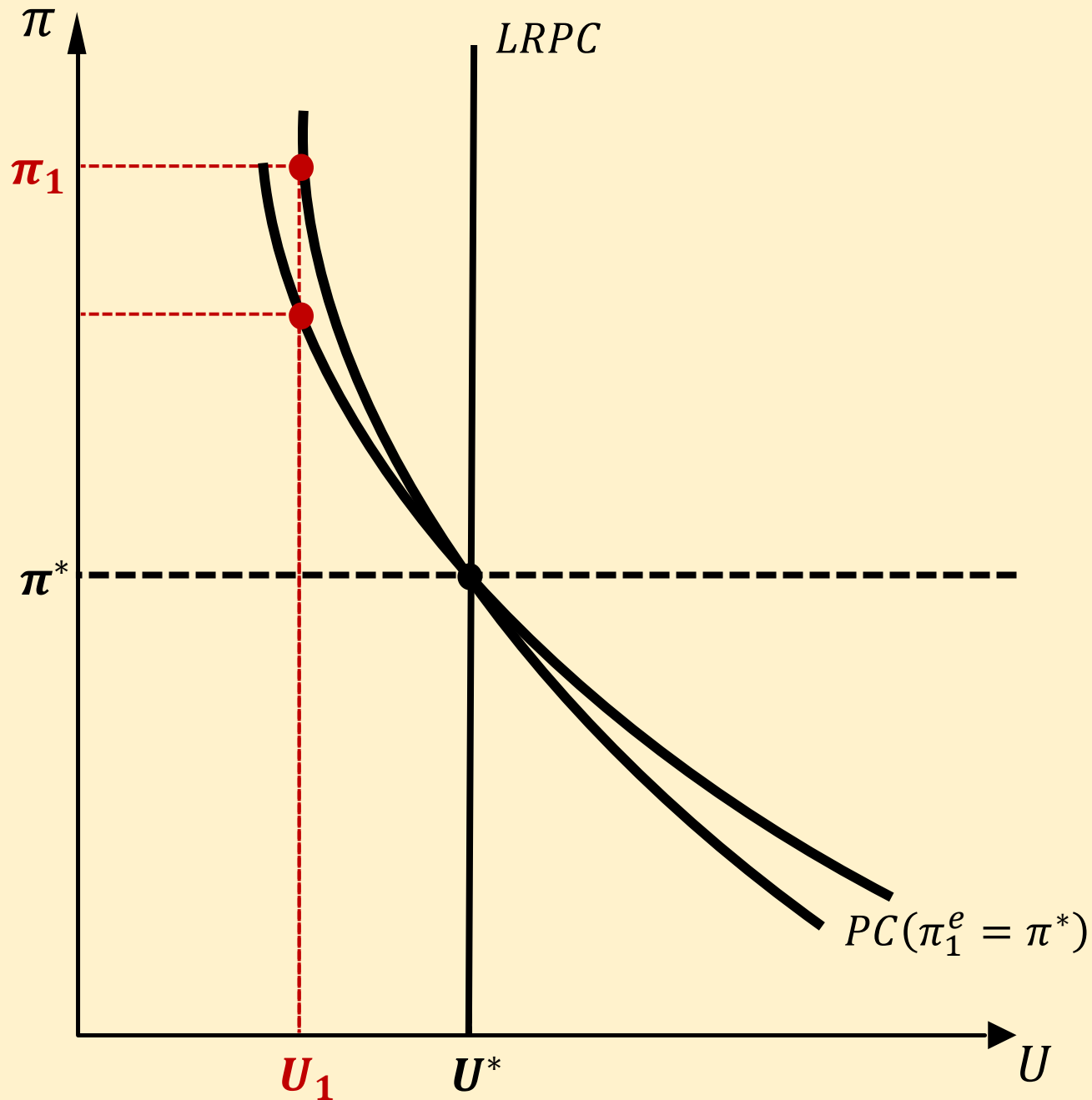
A short note on the curvature of PC and sticky price

New Keynesian economists believe in the theory of sticky price (sensible).

If price is sticky (e.g., menu cost, wage bargaining, contract, etc), then we should expect

The stickier the price, the flatter the slope. The reverse is true if price is less sticky.

Understanding the Phillips Curve and NAIRU
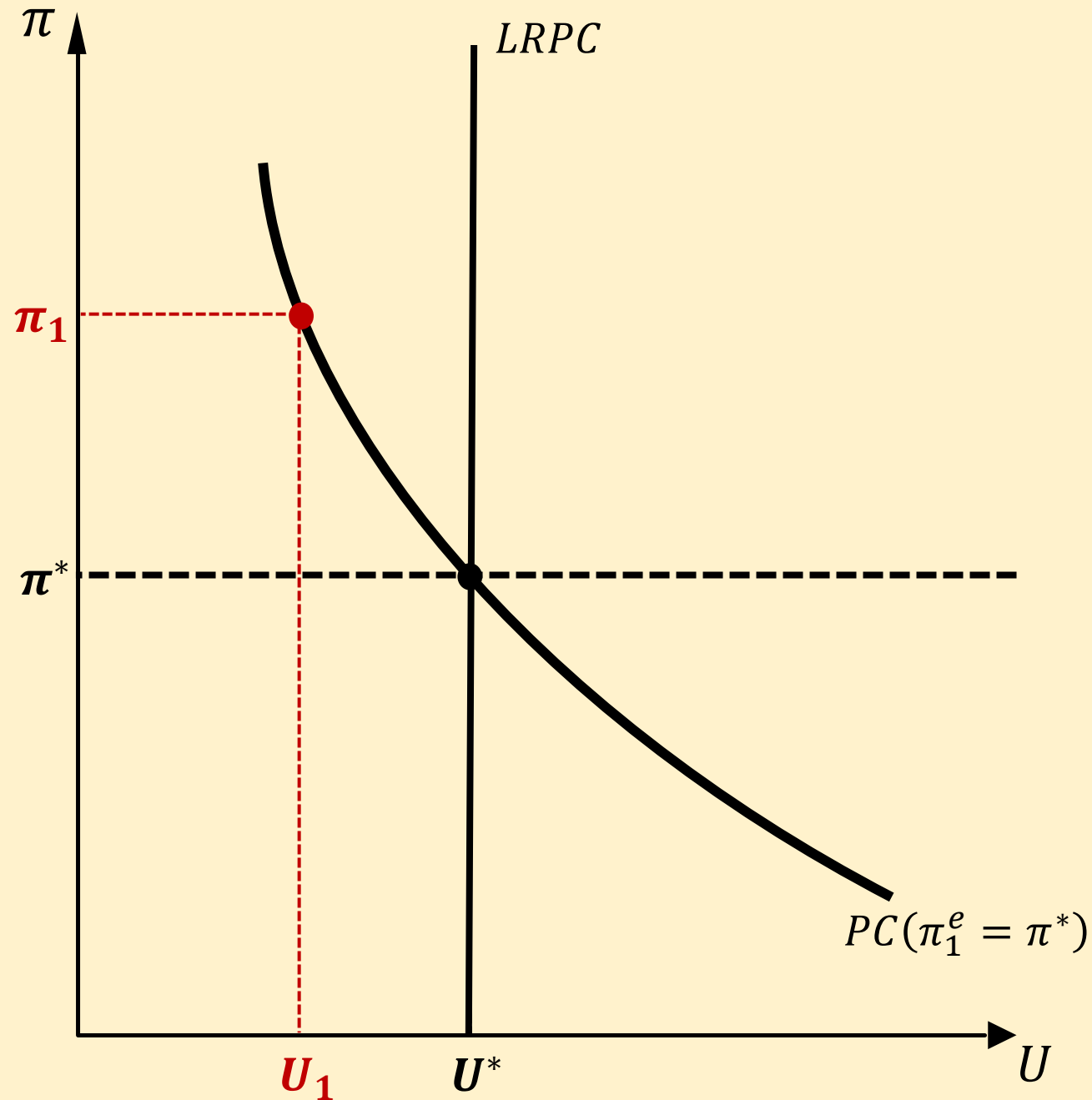
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Understanding the Phillips Curve and NAIRU

Case 1:
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In the short-term, the CB can stimulate the economy (with lag) by lowering i

In the long-term, $U_1 < U^*$
→ higher inflation expectation causes the PC curve to shift up.

Independence of central bank is thus important since it can be forced to move away from the target to lower unemployment by the government ignoring the long-term cost on price stability.
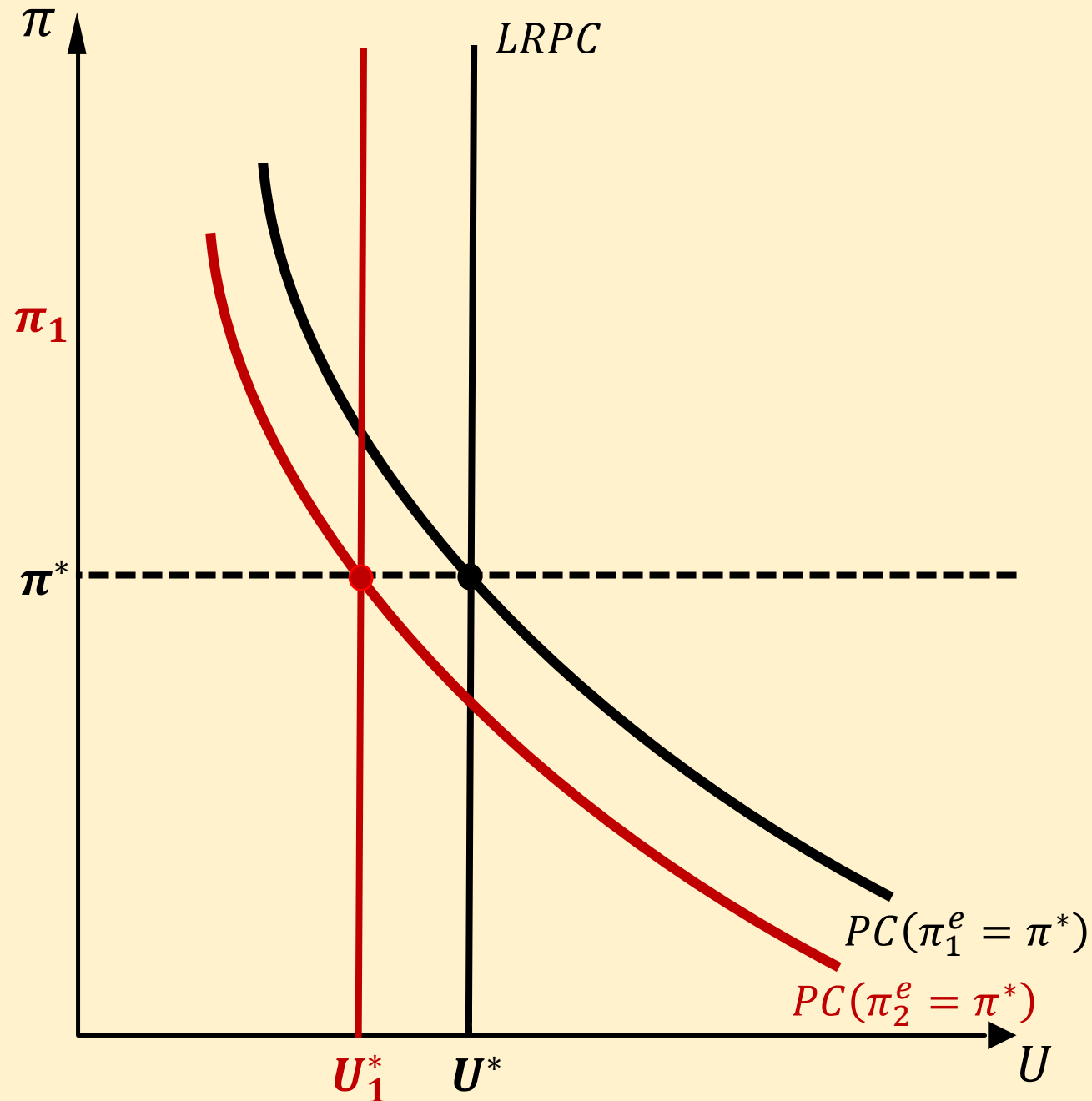
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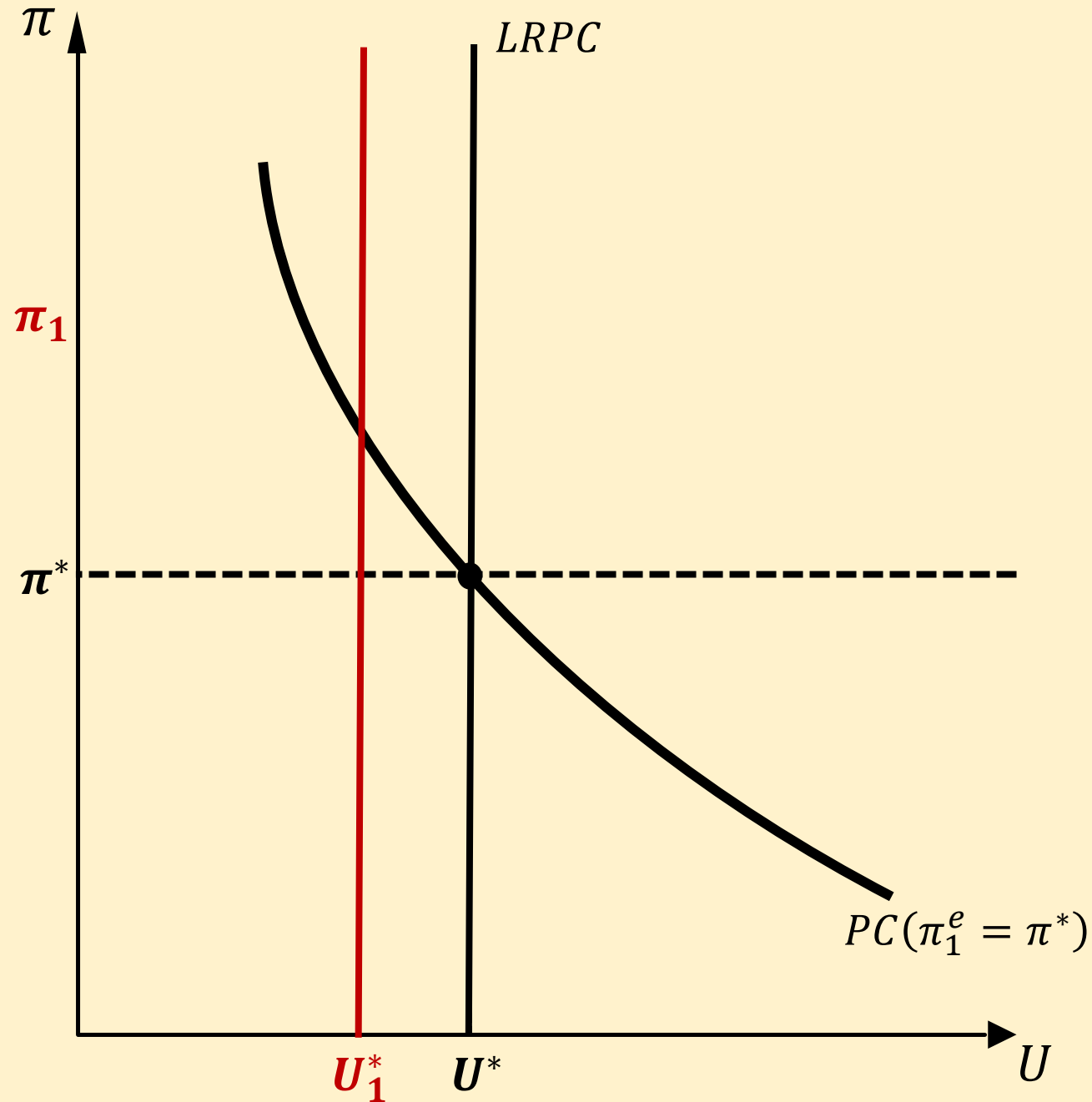
Suppose NAIRU falls from U^* to U_1^*

What should we expect?

π

$LRPC$

π_1

π^*

$PC(\pi_1^e = \pi^*)$

U_1^* U^*

U

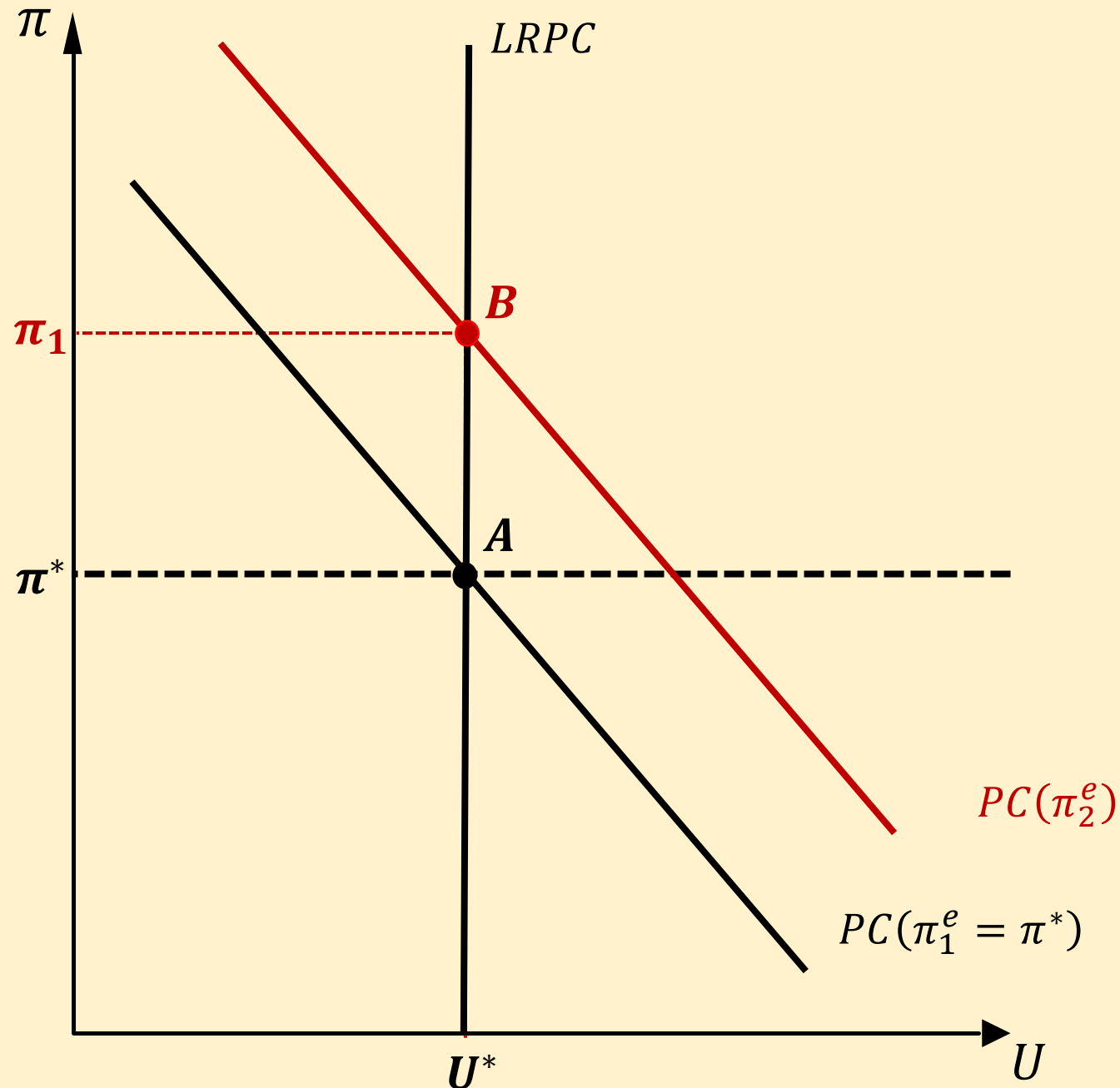# Understanding the Phillips Curve and NAIRU

Suppose NAIRU falls from U^* to U_1^*

Now, $U_1^* < U^*$

Which means there is more spare capacity, more unemployed that can be supported by the status quo inflation target.

With more unemployment, it seems sensible to expect inflation to fall. And that is exactly what the model tells us.
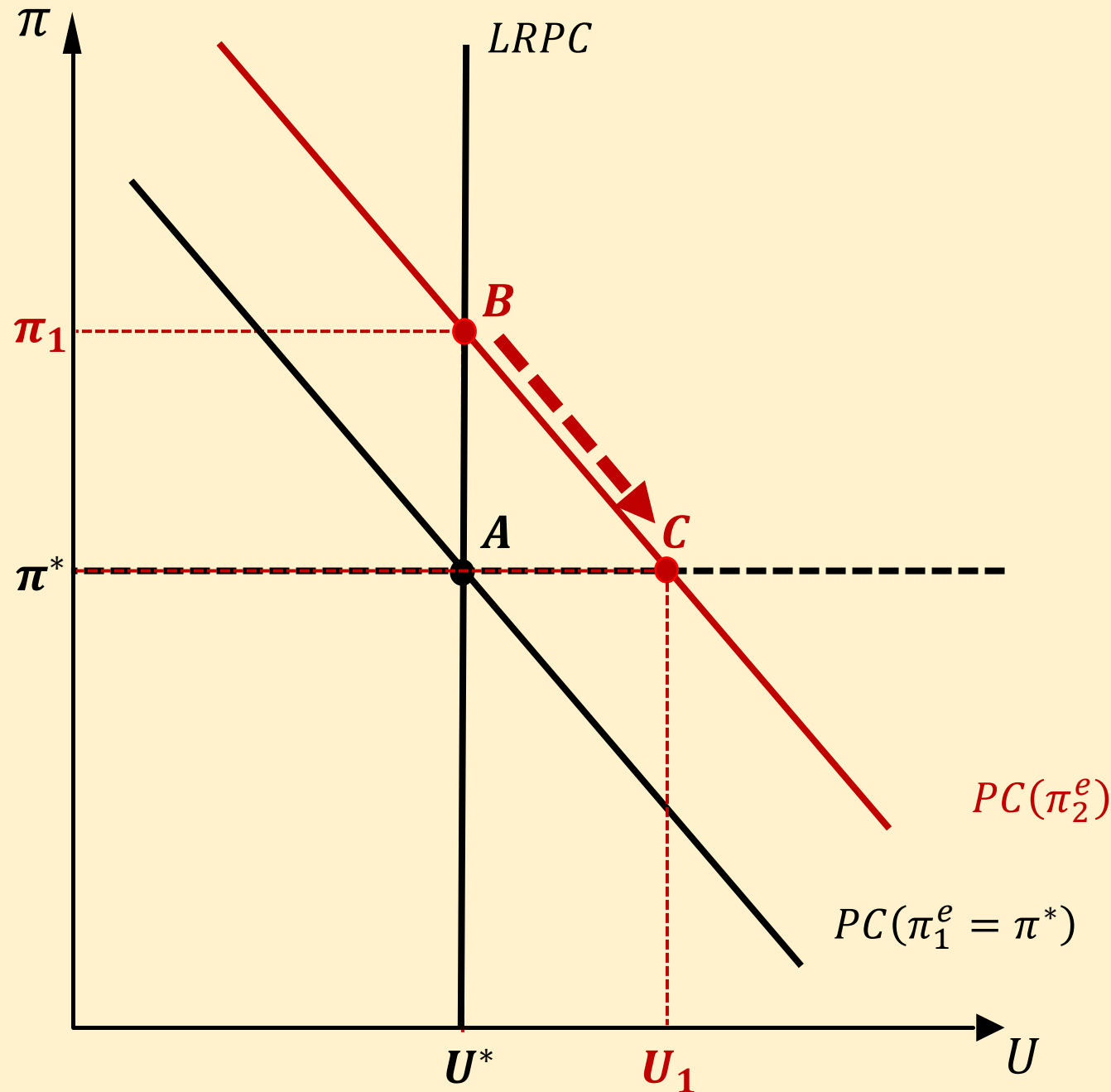
Understanding the central bank's objectives

I have shown you the implication of non-linear PC. Given that our focus has shifted to the CB's objectives, let us simplify by assuming linear PC.
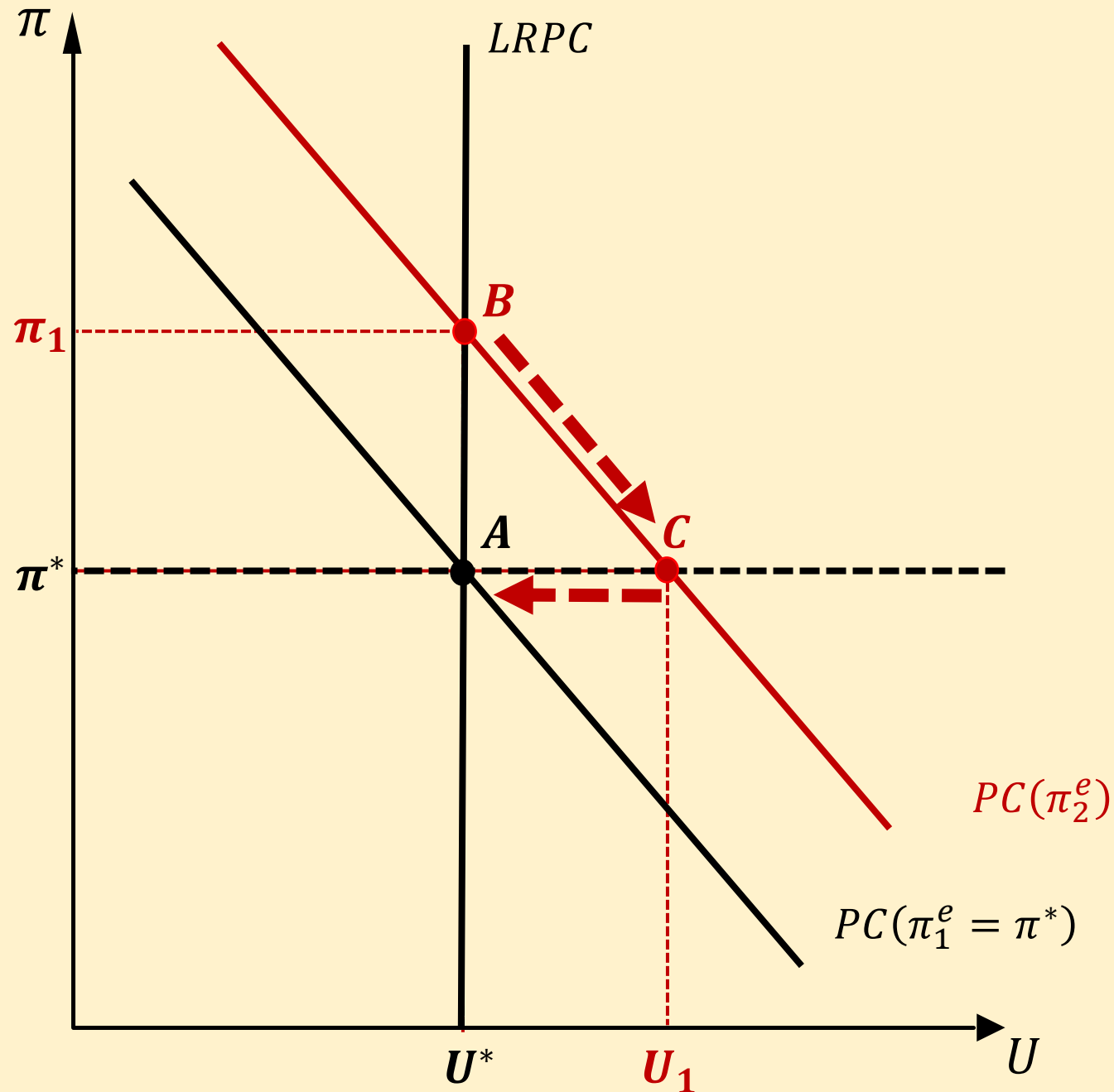
Suppose inflation expectation increases.

Then the CB can bring inflation down to π^* by increasing the cash rate.

Understanding the central bank's objectives

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Suppose inflation expectation increases.

Then the CB can bring inflation down to π^*. Specifically, the CB increases i to lower π at the cost of higher unemployment.

Since $U_1 > U^*$, inflation expectation will fall. Assuming lower inflation passes through to lower wage growth, and lower unemployment as a result.

This brings the economy back to point A.

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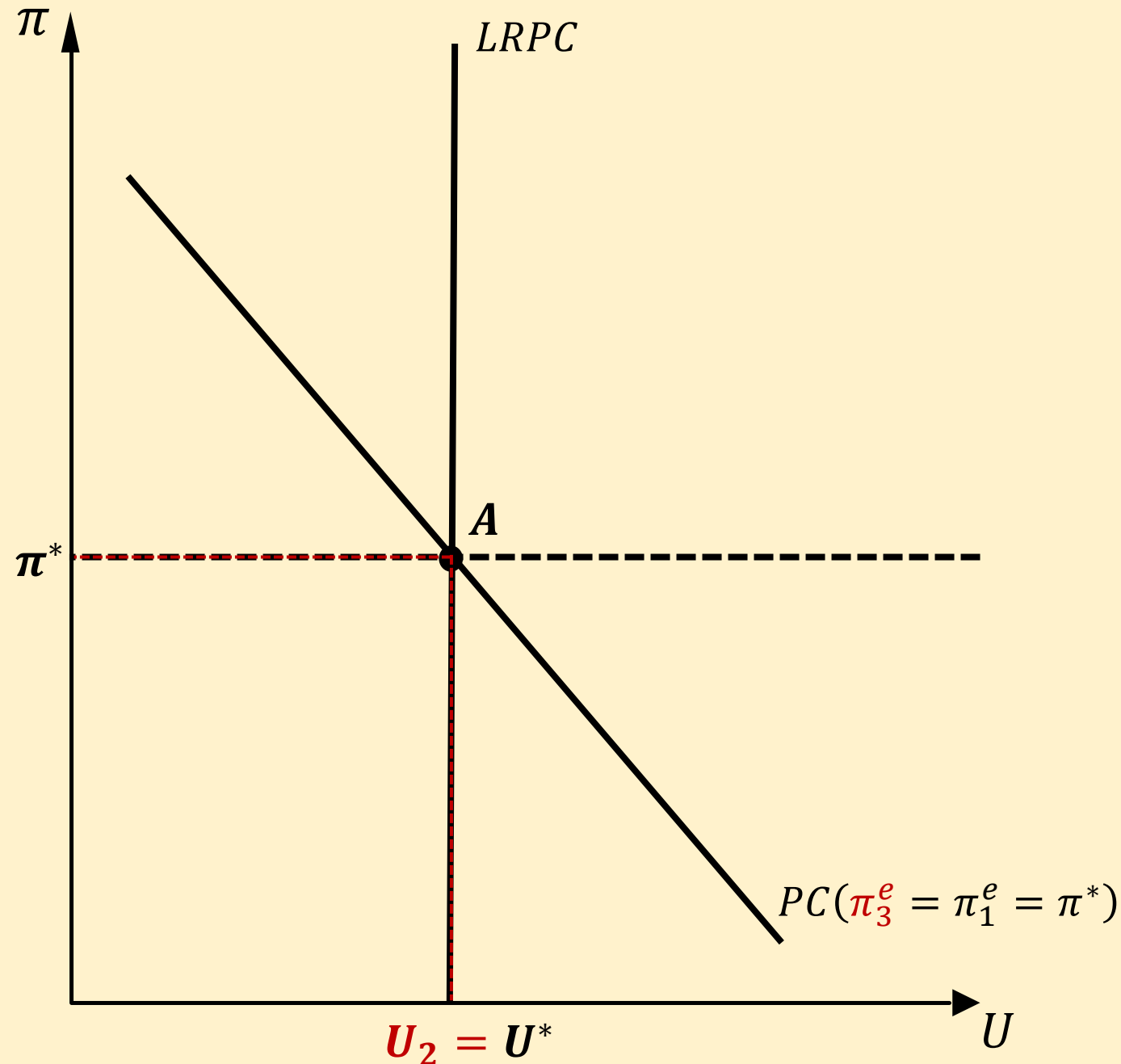
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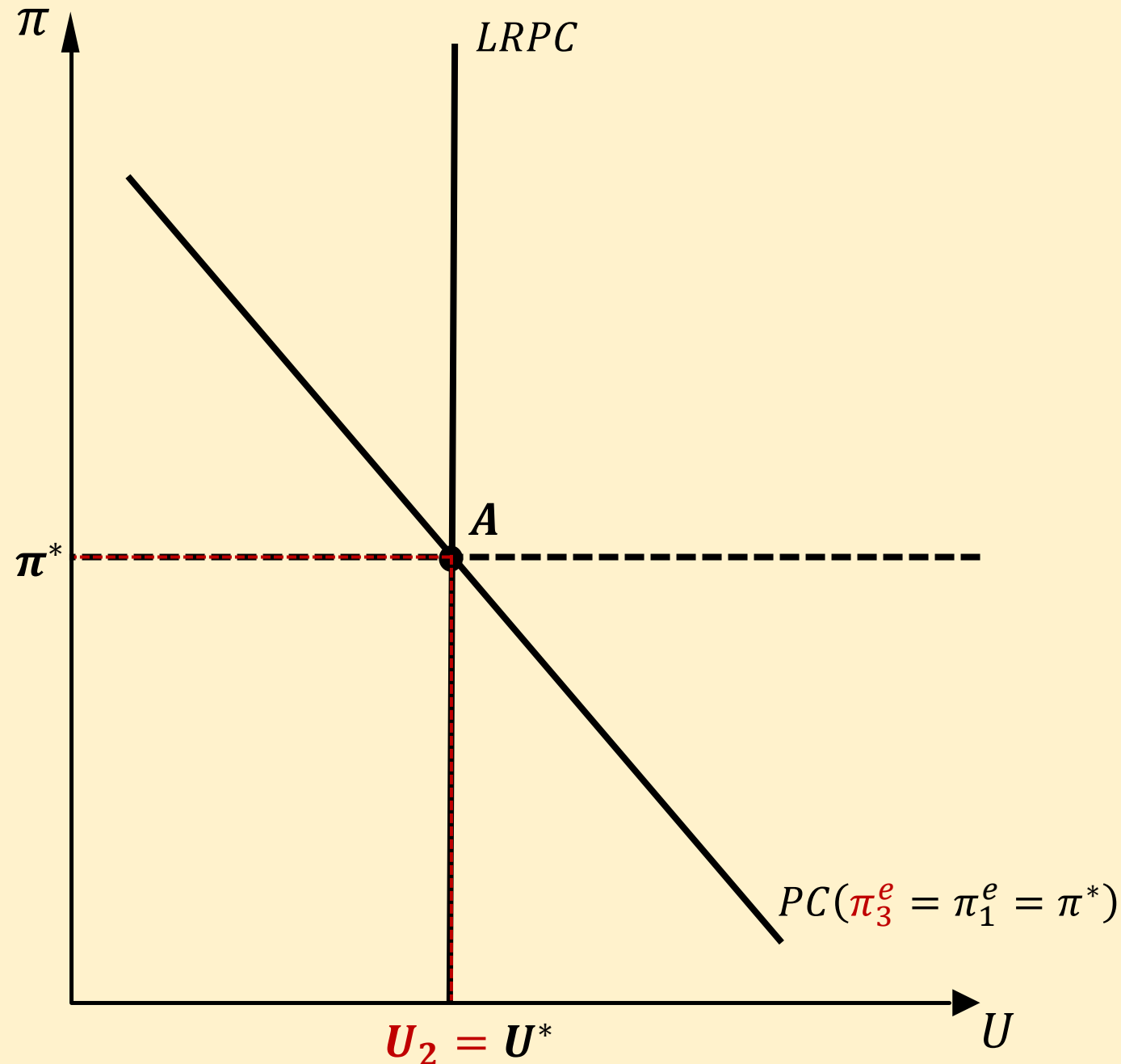
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Understanding the central bank's objectives

While this adjustment process may seem benign in the model, the question in practice has always been **about how long it will actually take to tame the expectation?**

- It is painful because it means the CB has to **keep i high as long as π^e has not fallen** to the desired target.

- If successful, however, there can be **a long-term gain**
(e.g., the two decades long of macro stability in the US known as the Great Moderation, which some attribute to the Fed Chairman Paul Volcker's tough policy on inflation)

Note this can be supplemented with other **unconventional tools such as forward guidance and asset purchase program**.

# Understanding the central bank's objectives
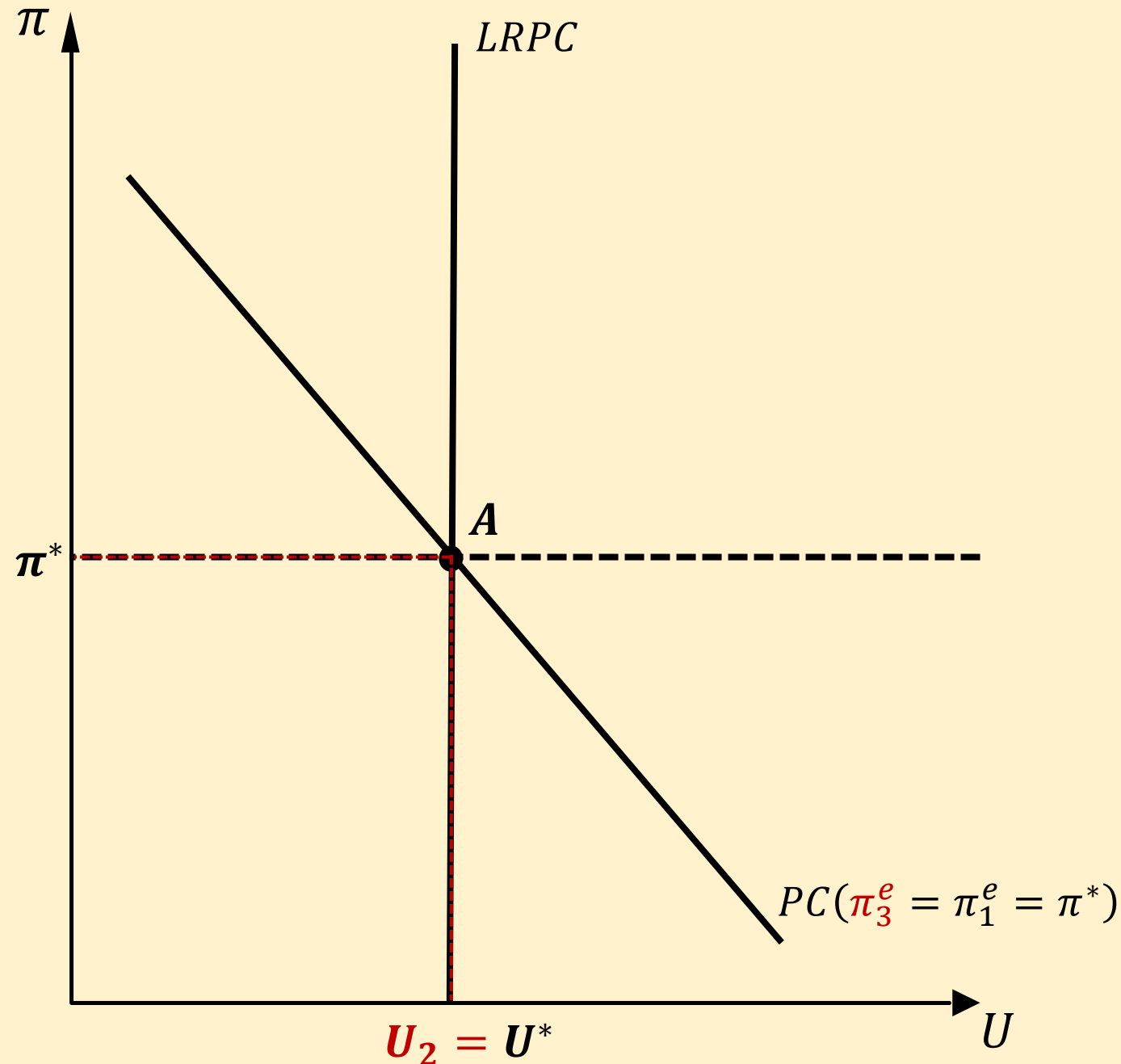
Another issue is related to the idea called **Hysteresis effects** which we have discussed.

When unemployment rises, it may cause more structural and frictional unemployment.

If firms close down, there is more likely to be disruption to the labour market. This could move the NAIRU and the natural rate of unemployment up, and result in undesirable employment outcome.

Understanding the central bank's objectives
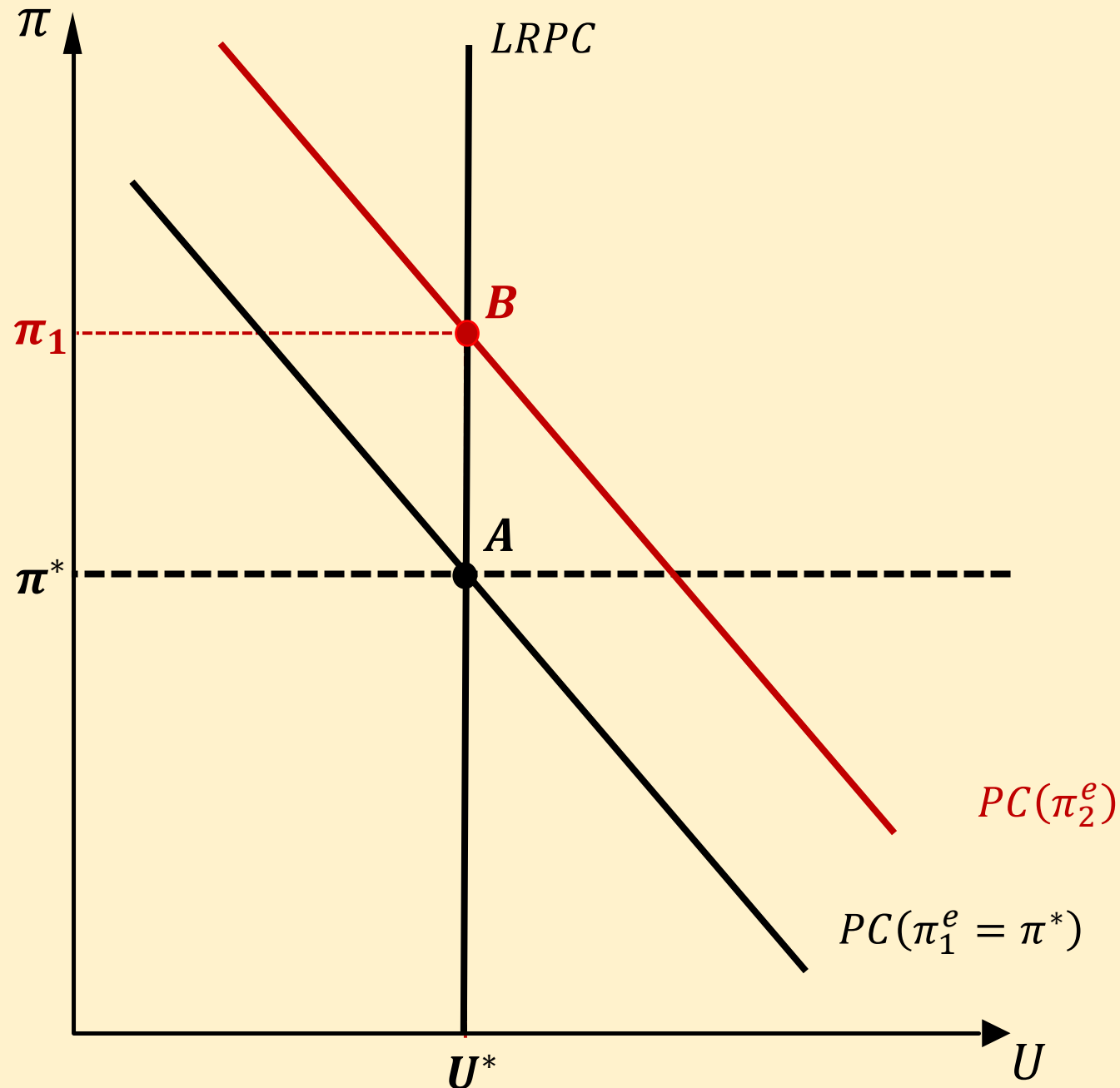
Suppose the central bank has two targets:
- **inflation target**
- **unemployment target**

This really complicates the story.

If the PC passes the NAIRU at point A, then life is good.

If the PC shifts upward as in our previous example, then the way the policy responds depends on the CB's preferences.

That is, it depends on the weight the CB assigns to each objective.

Suppose they place equal weights on inflation and unemployment targets.

# Understanding the central bank's objectives
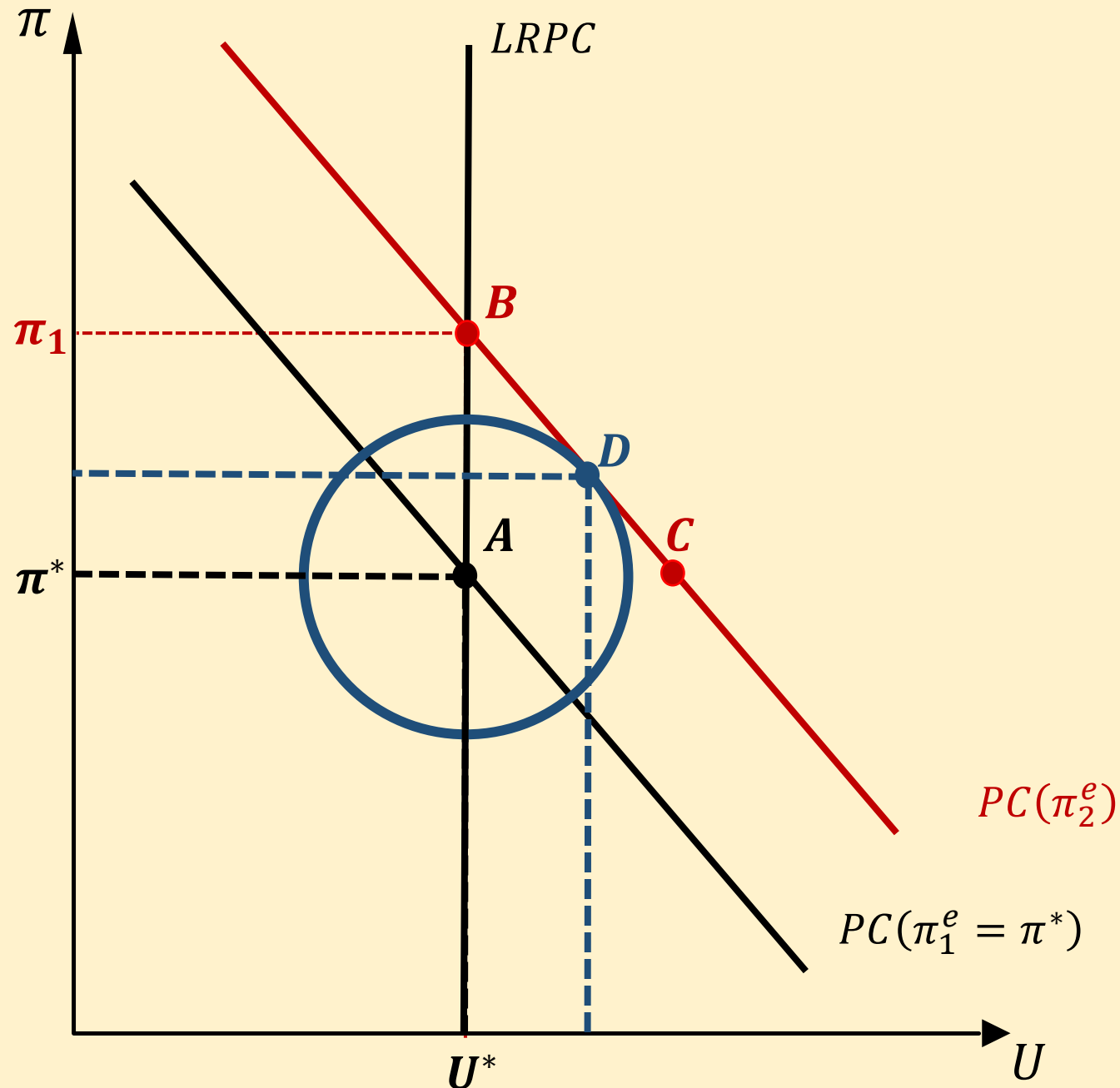
Suppose they place equal weights on inflation and unemployment targets.

If we talk about CB's preferences, we can assume the CB will **achieve some sort of utility from being as close as possible to its target.**

Consider the pair of targets (π^*, U^*) at point A. The blue circle's perimeter tells us the collection of points that are of the same distance to point A.

Then, given the new PC,
the desired policy response is at point D, NOT point C as was the case when CB only had the inflation target.

Understanding the central bank's objectives
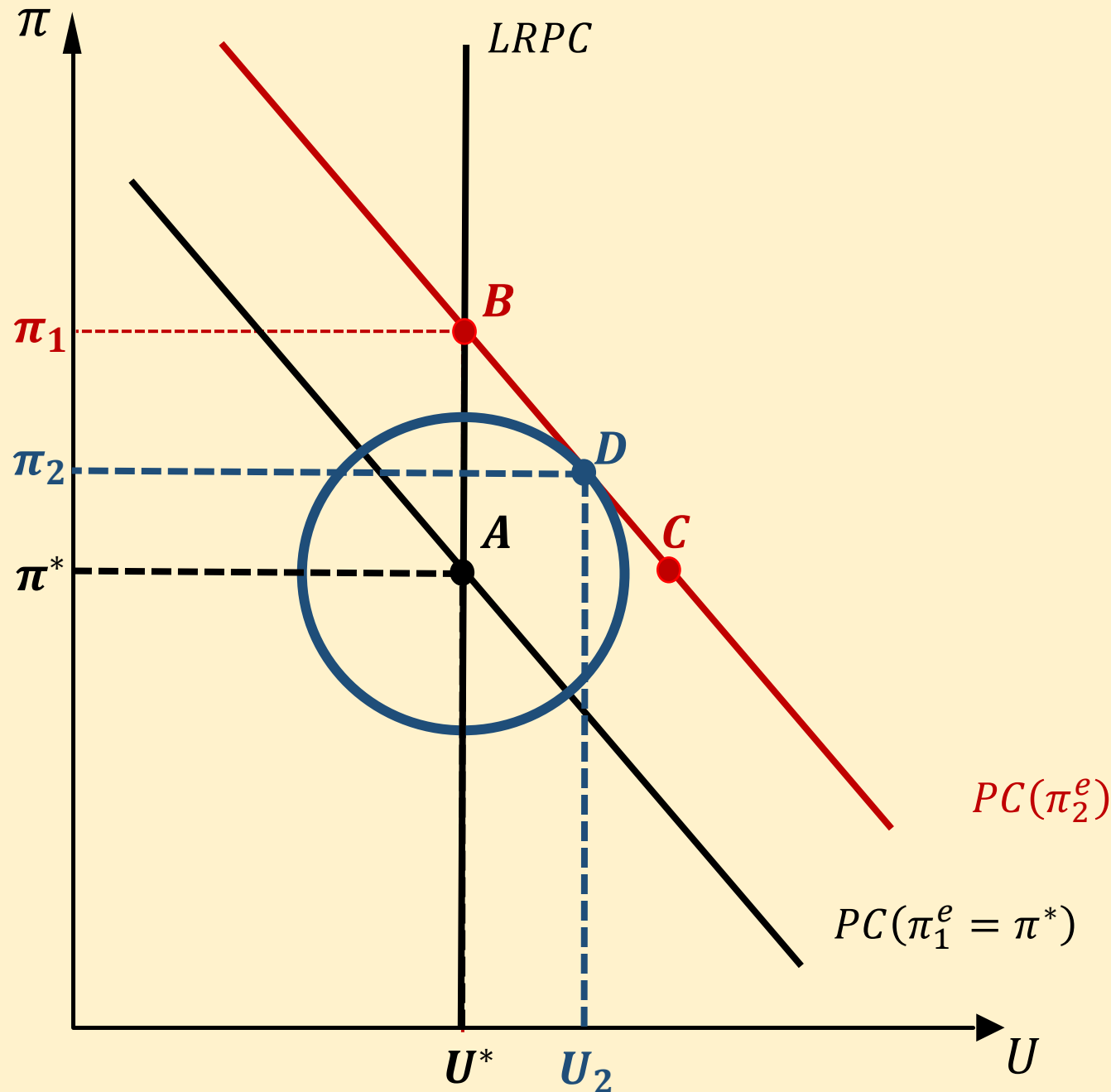
In a sense, there is a balance in the SR. The CB with an additional unemployment target at U^* no longer wants to go all the way to point C.

It needs to balance the inflation and employment outcome.

But, allowing the SR inflation to stay above π^* might result in higher inflation expectation than in the single target case.

It is unclear how this affects the adjustment time.

This might justify the use of additional monetary policy tools to lower π^e further so the economy can return to point A.
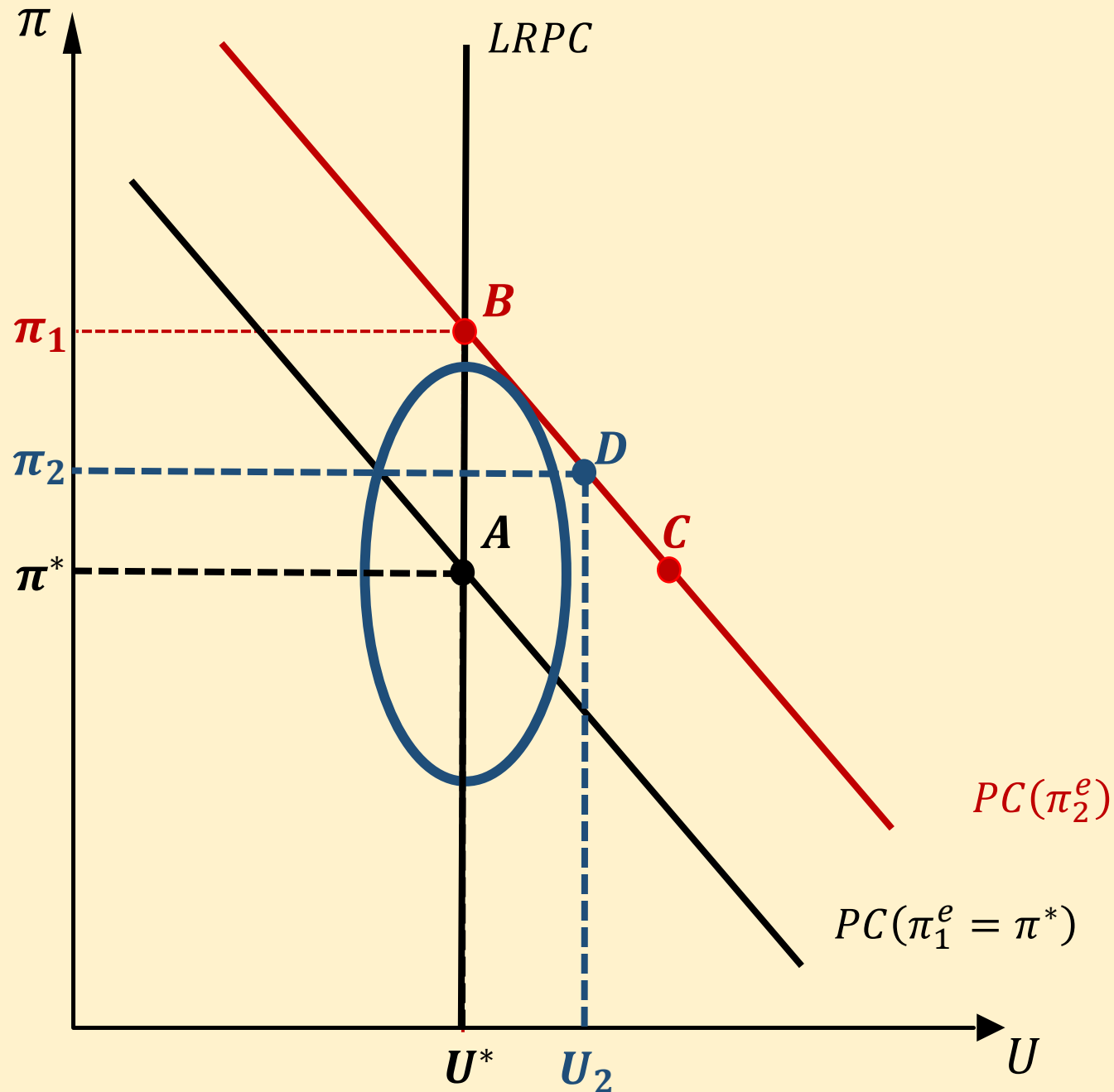
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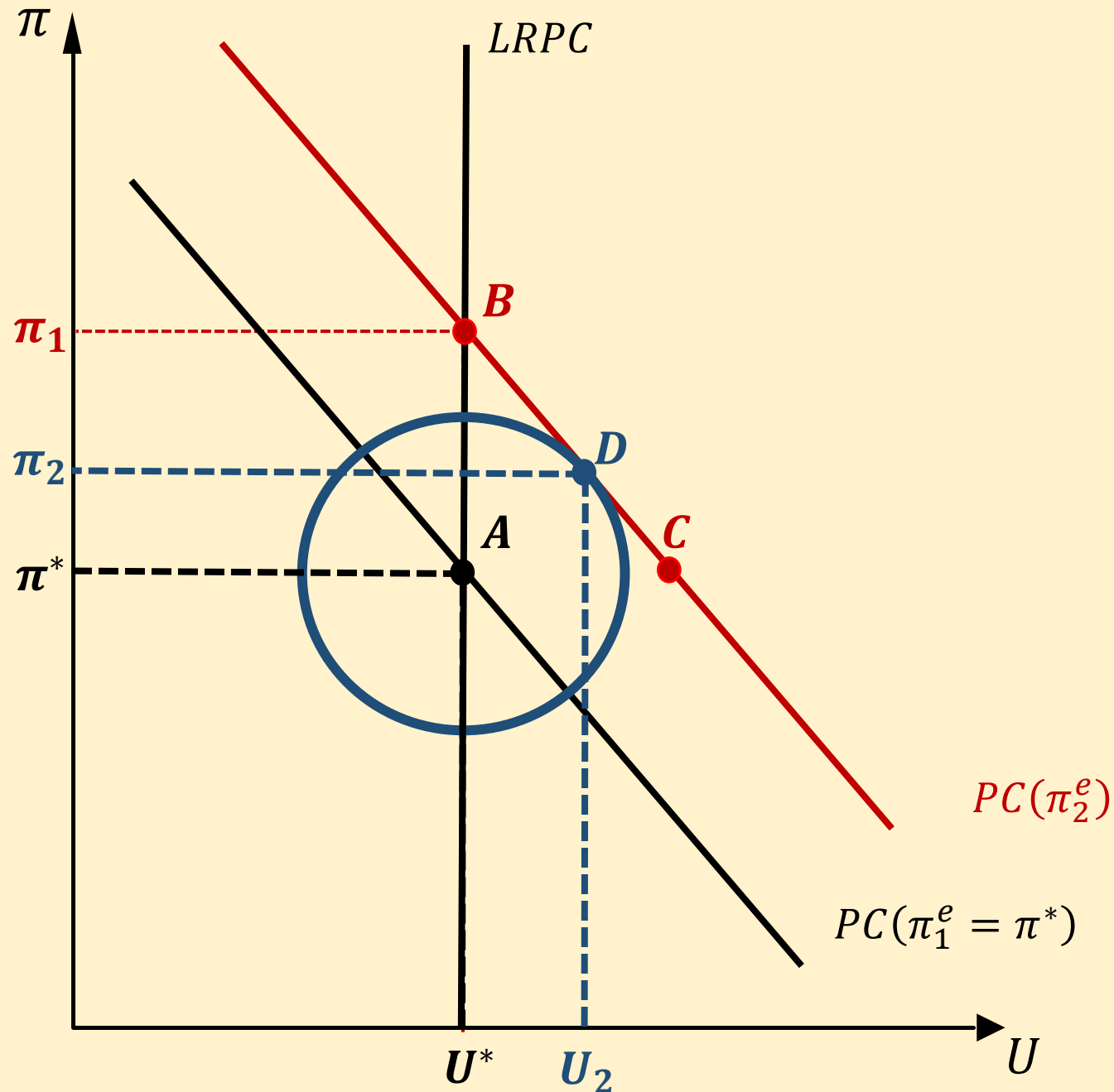
What if the CB is in a crisis mode and excessively fears unemployment?

This means it **places a greater weight on its unemployment target**, and is willing to accept a larger swing in inflation.

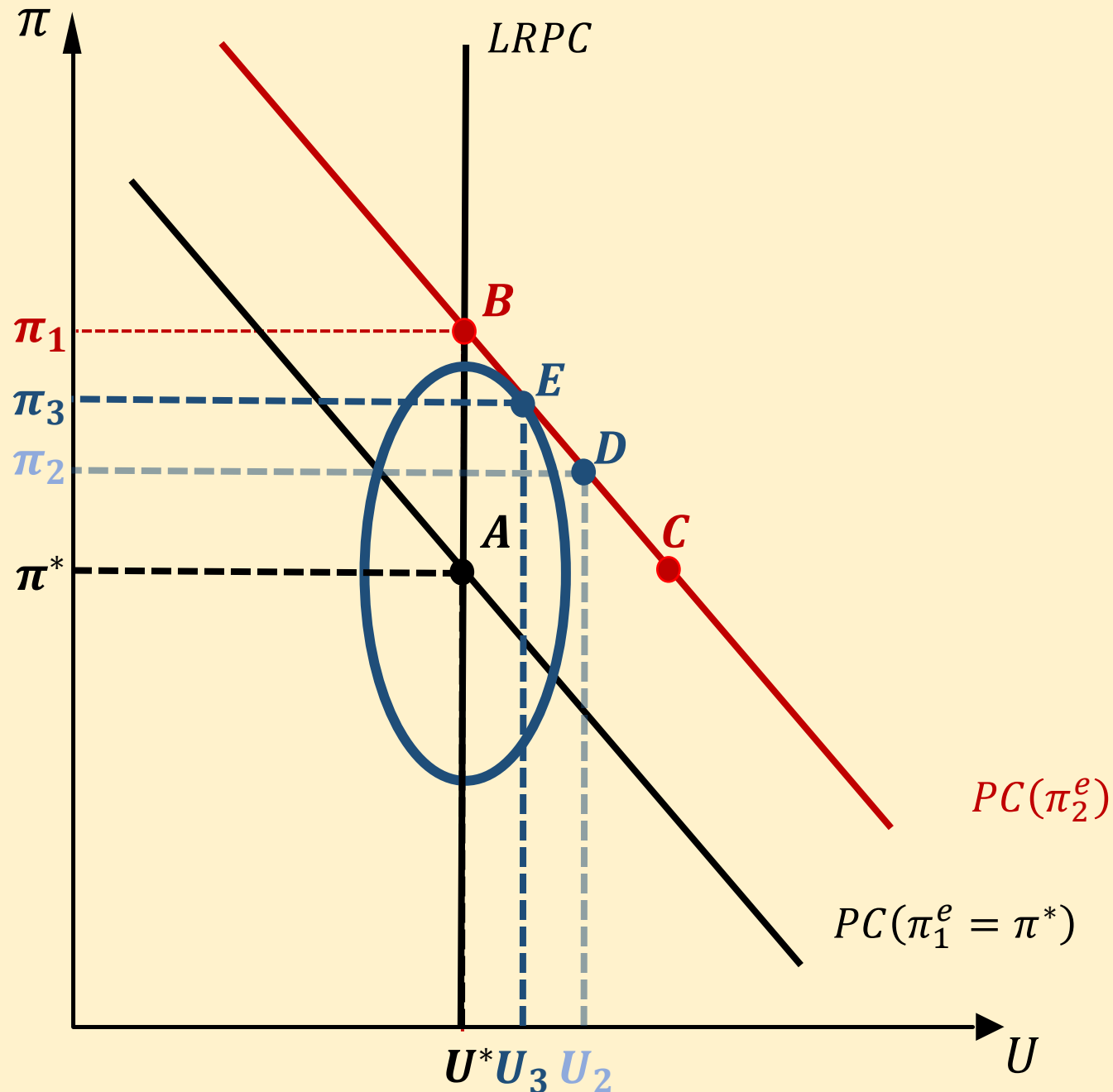# Understanding the central bank's objectives

What if the CB is in a crisis mode and excessively fears unemployment?

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Note how the circle turns into an oval shape. The central bank is now willing to accept higher inflation deviation $(\pi - \pi^*)$ to achieve lower deviation of unemployment $(U - U^*)$.

Point D is NO longer satisfactory.

Understanding the central bank's objectives

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Point D is NO longer satisfactory.
The CB instead moves its policy response to achieve point E in the short-run.
So, $\pi_3 > \pi_2$ and $U_3 < U_2$.

Might affect long-run adjustment, and also think Hysteresis effect.

The difficulty of having multiple objectives

- We have theoretically shown how having two targets: **inflation** (π^*) **and unemployment** (U^*), even with equal weights, can weaken the monetary policy effect on price stability.

- Certain scenarios could lead to different weights on different targets. E.g., fear created during the GFC could result in the CB prioritizing unemployment target (thus greater weight on U^*).

- Consider what would happen if the government mandated the CB to pursue additional goals, not to mention ones imprecisely defined (e.g., welfare and prosperity)?

  What are the possible costs and benefits?