INTERMEDIATE MACROECONOMICS

6 – INFLATION & THE PHILLIPS CURVE

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Share 3 take-aways from the reading (textbook Chapter 8)

8

The Phillips Curve, the Natural Rate of Unemployment, and Inflation

In 1958, A. W. Phillips drew a diagram plotting the inflation rate against the unemployment rate in the United Kingdom for each year from 1861 to 1957. He found clear evidence of an inverse relation between inflation and unemployment. When unemployment was low, inflation was high, and when unemployment was high, inflation was low, often even negative.

A. W. Phillips was a New Zealander who taught at the London School of Economics. He had been, among other things, a crocodile hunter in his youth. He also built a hydraulic machine to describe the behavior of the macro-economy. A working version

Two years later, two US economists, Paul Samuelson and Robert Solow, replicated Phillips's exercise for the United States, using data from 1900 to 1960. Figure 8-1 reproduces their findings using consumer price index (CPI) inflation as a measure of the inflation rate. Apart from the period of high unemployment during the 1930s (the years from 1931

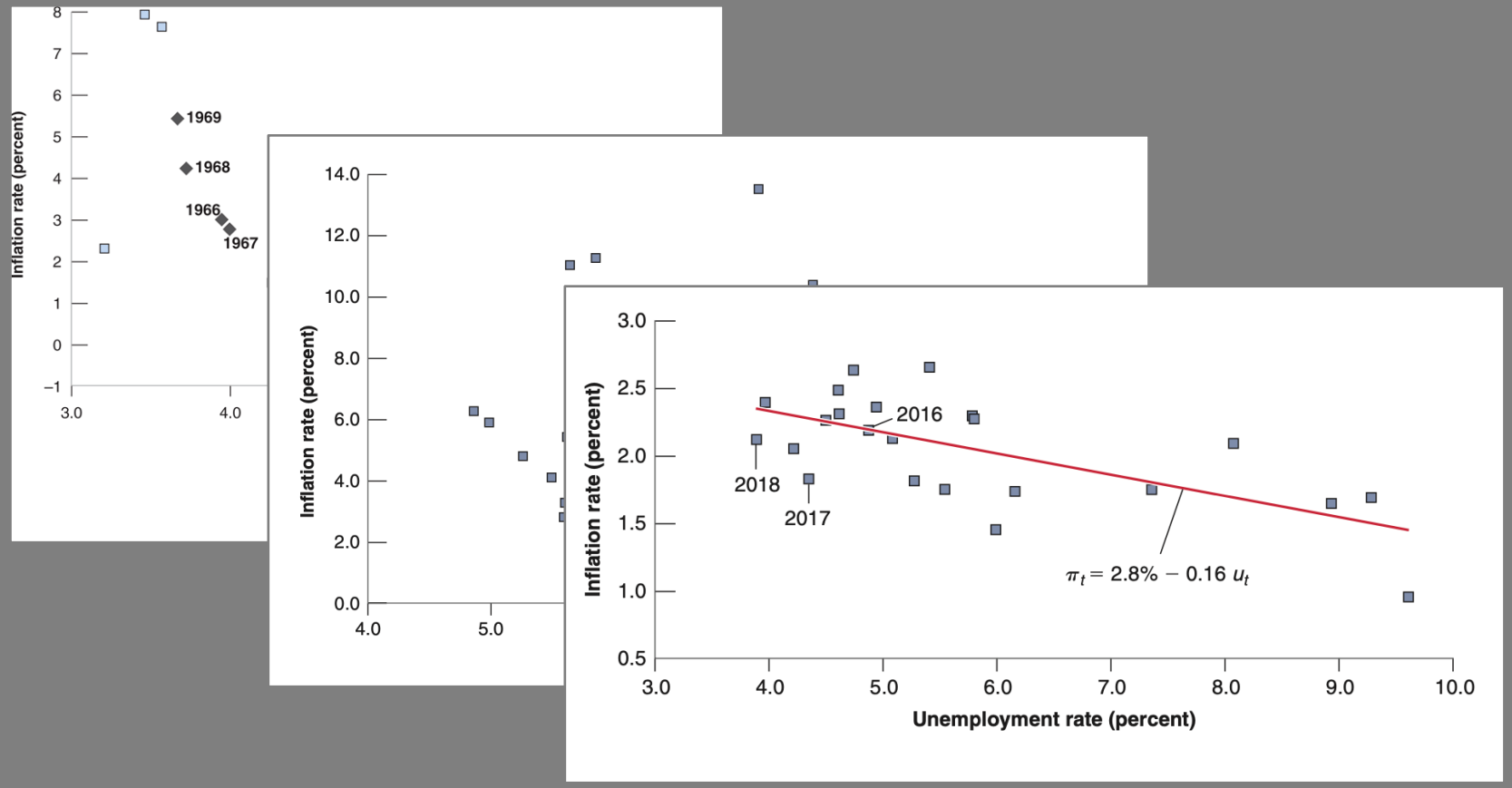
Section 6: The roadmap

1. The ever-changing Phillips curve.
2. Inflation, expected inflation & unemployment.
3. Explaining the mutations of the Phillips Curve
4. The Phillips Curve and the equilibrium unemployment rate.

Section 5: The take-aways

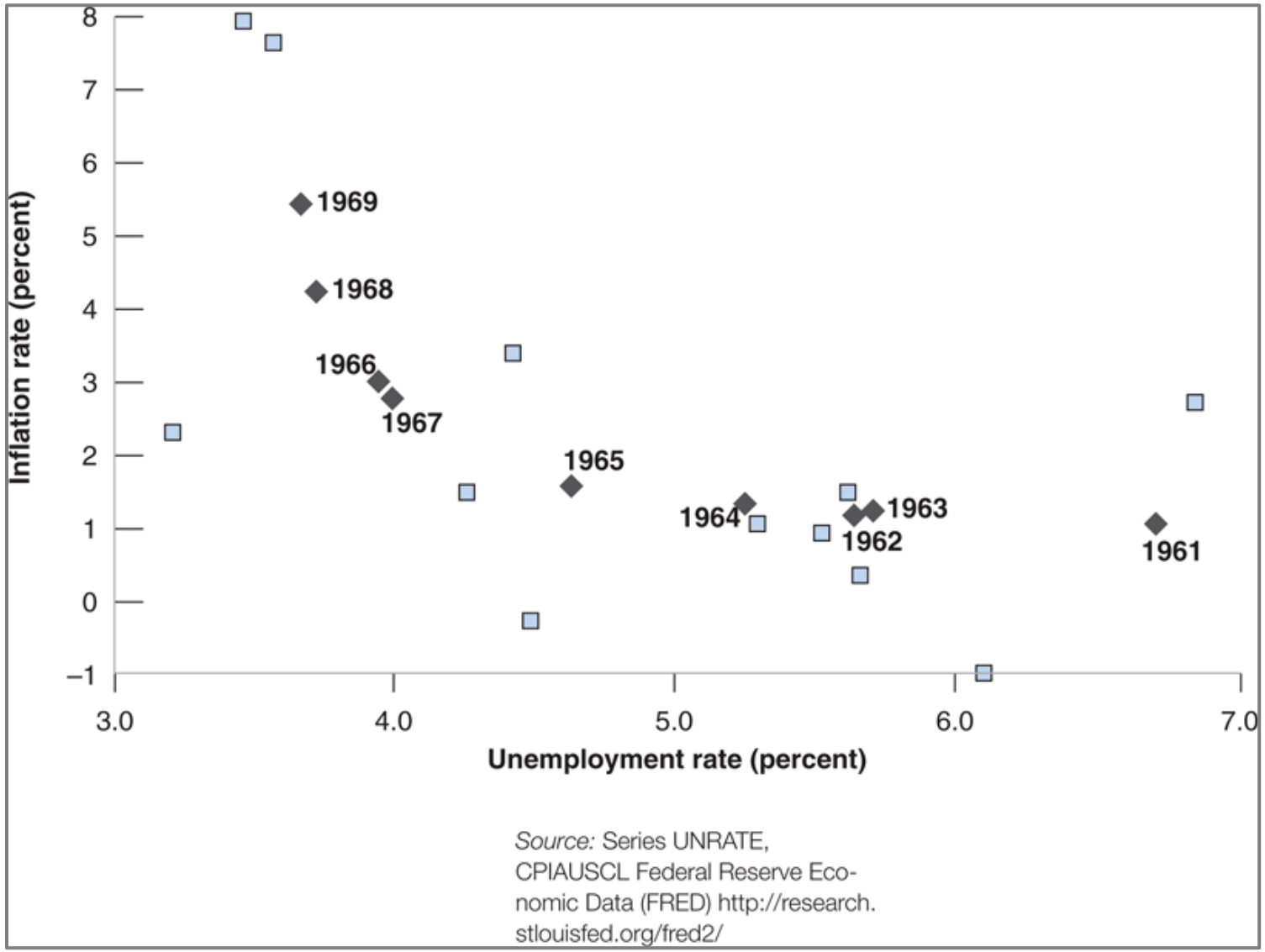
- Wage-setting & price-setting imply a relation between inflation, expected inflation, and unemployment.
- That's a Phillips Curve.
- The specific shape of the Phillips Curve depends on how expectations about inflation are formed.
- There is a connection between the Phillips Curve and the equilibrium rate of unemployment.

6.1 THE EVER-CHANGING PHILLIPS CURVE



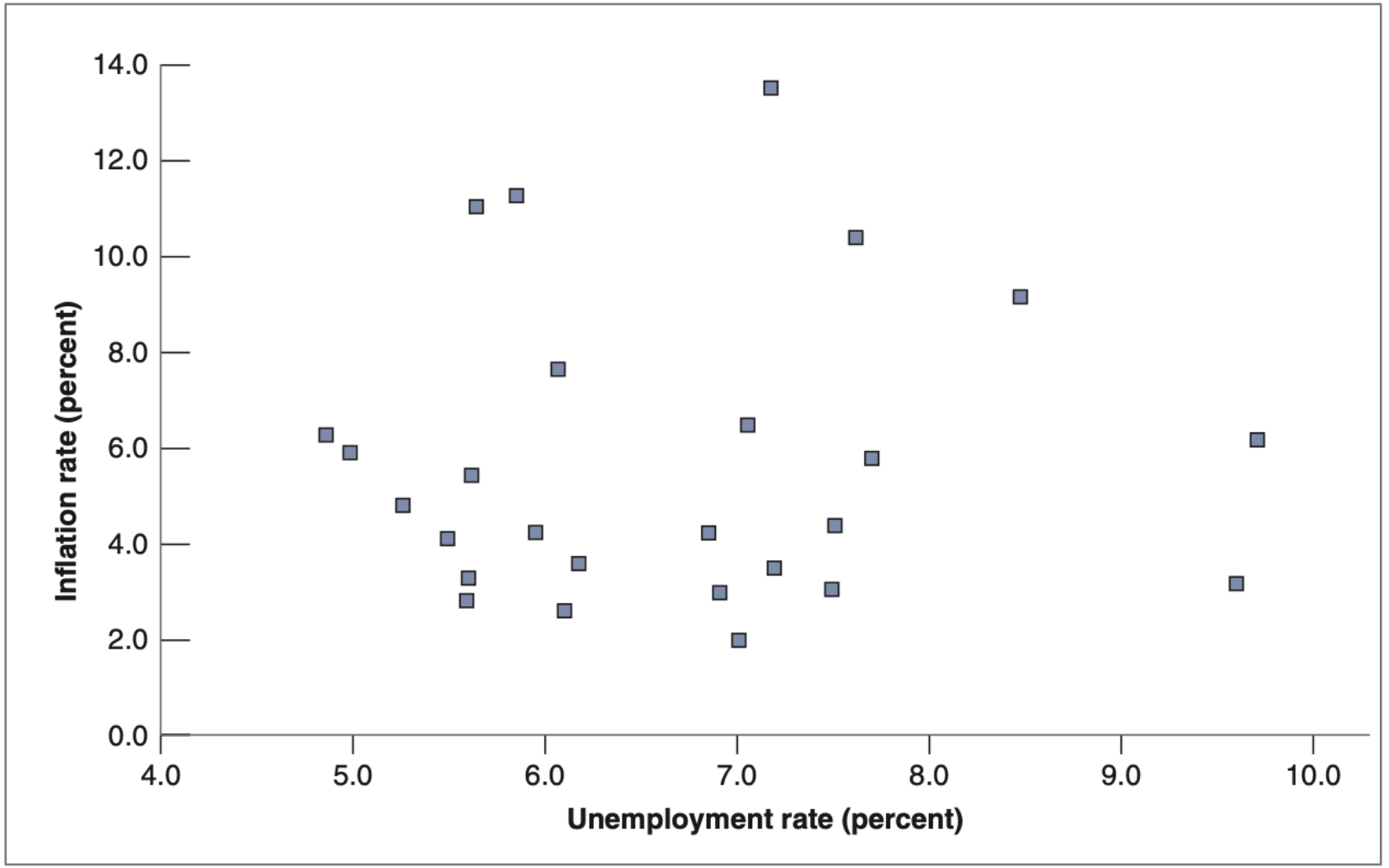
Inflation vs unemployment in the US, 1948-1969

The 'original' Phillips Curve



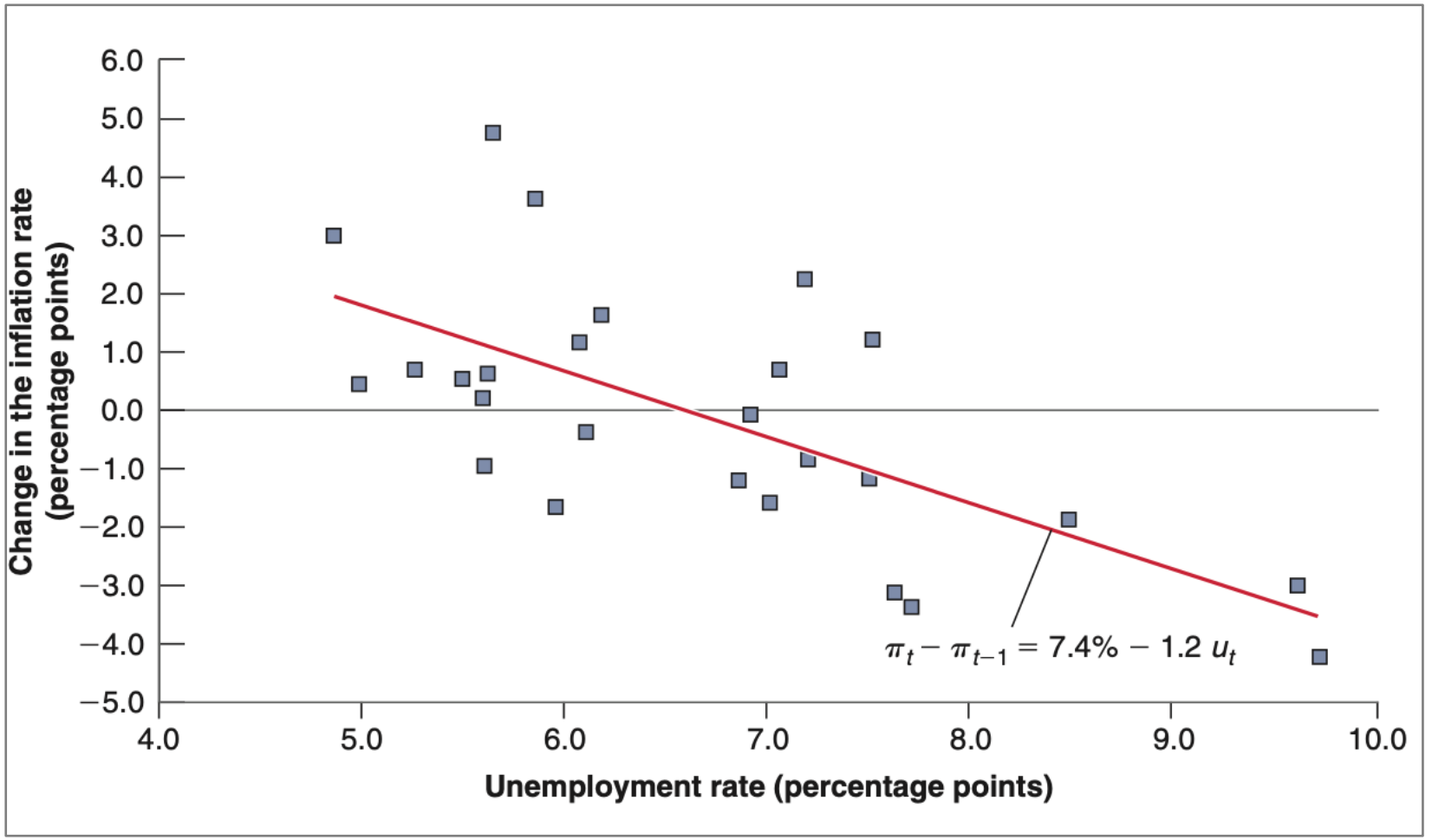
Inflation vs unemployment in the US, 1970-1995

Clicker question:
Is there a Phillips Curve here?
A. Yes
B. No
C. Not enough information to say



Change in inflation vs unemployment in the US, 1970-1995

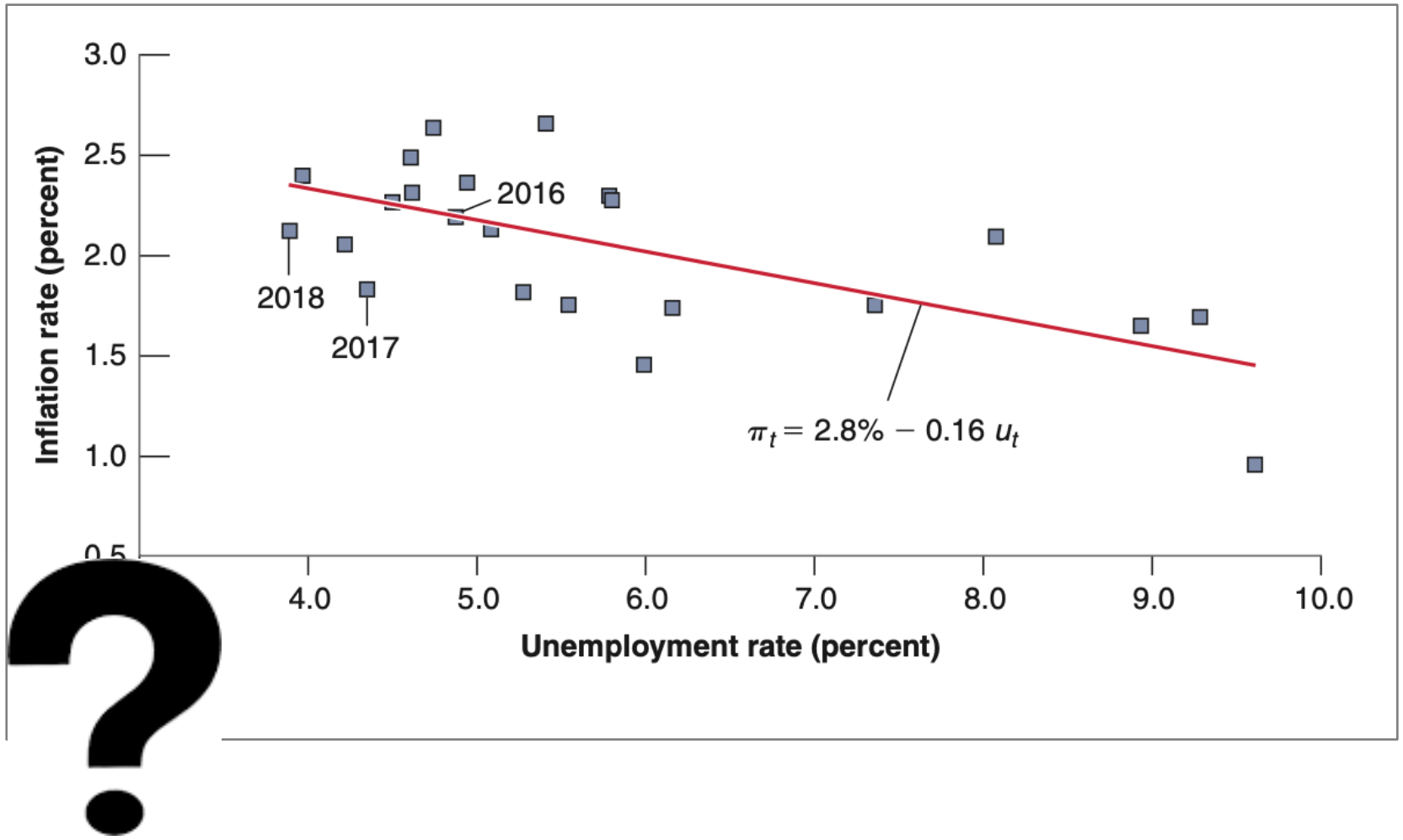
An 'accelerationist' Phillips Curve



New plot twist!

Inflation vs unemployment in the US, 1996-2018

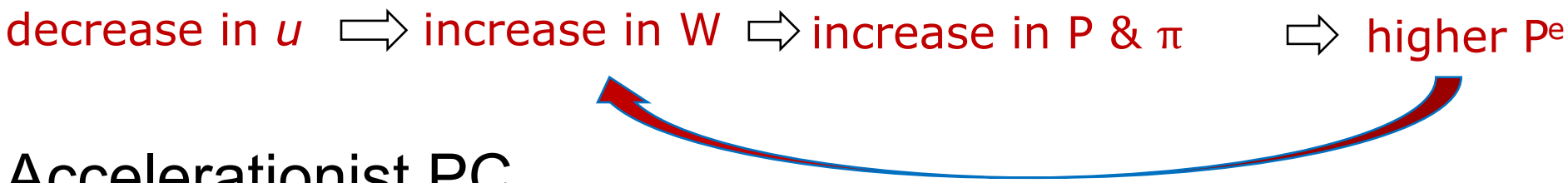
How do we make sense of all of this?



Explaining the Phillips Curve (PC): Key ideas

lower *u* ⇨ higher W ⇨ higher P & π

- If process stops here, we get the 'original' PC.
- *What if wage-setters update their inflation expectations based on observed inflation?*



- Accelerationist PC

6.2 INFLATION, EXPECTED INFLATION AND UNEMPLOYMENT

Wage setting & price setting

- Wage determination: $\frac{W}{P^e} = F(u, z)$
- Assume linear function: $F(u, z) = 1 - \alpha u + z$
- Nominal wage: $W = P^e(1 - \alpha u + z)$
- Price level: $P = (1 + m)W = P^e(1 + m)(1 - \alpha u + z)$

From the price level to the inflation rate

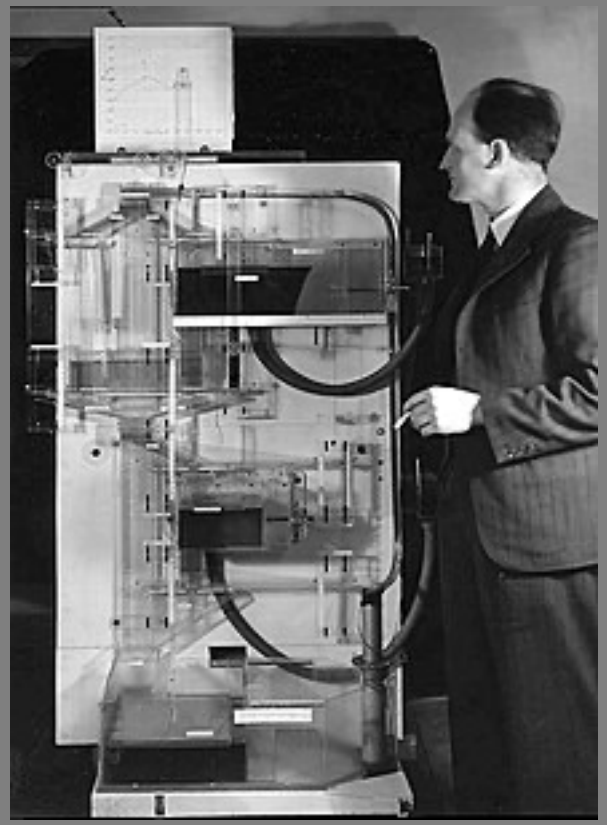
- Price level:

$$P = (1 + m)W = P^e(1 + m)(1 - \alpha u + z)$$

- Can be rewritten in terms of inflation:

$$\pi = \pi^e + (m + z) - \alpha u$$

6.3 EXPLAINING THE PHILLIPS CURVE AND ITS MUTATIONS



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Instructor: Daniele Girardi

‘Anchored’ expectations produce the original PC

- Assume “Anchored” expectations: $\pi^e = \overline{\pi}$
- Resulting Phillips Curve:

$$\pi_t = \bar{\pi} + (m + z) - \alpha u_t$$

  - π_t is a negative function of u_t
- ‘Original’ PC observed before 1970s and again since the 1990s.

Adaptive expectations produce the accelerationist PC

- Assume adaptive ('de-anchored') expectations: $\pi_t^e = \pi_{t-1}$
- Resulting Phillips Curve:

$$\pi_t = \pi_{t-1} + (m + z) - \alpha u_t$$

- Moving past inflation to the right side:

$$\pi_t - \pi_{t-1} = (m + z) - \alpha u_t$$

- 'Accelerationist' PC observed in the 1970s.

A general framework for the Phillips Curve

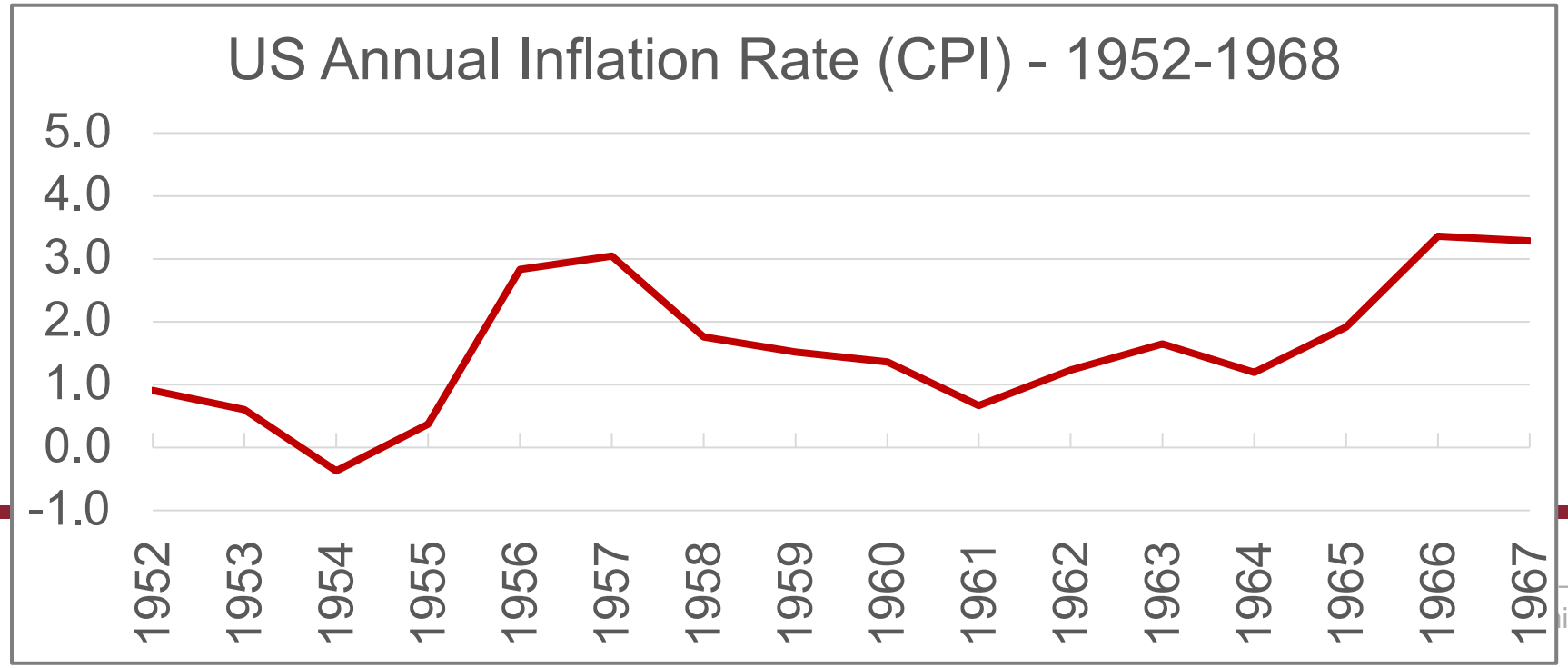
- Assume $\pi_t^e = (1-\theta)\bar{\pi} + \theta\pi_{t-1}$
  - *Expected inflation depends partly on a constant value and partly on observed past inflation.*
- Then the Phillips Curve is:

$$\pi_t = (1-\theta)\bar{\pi} + \theta\pi_{t-1} + (m+z) - \alpha u_t$$

  - $\theta = 0$ → fully anchored expectations, original PC.
  - $\theta = 1$ → fully adaptive expectations, accelerationist PC.
  - $0 < \theta < 1$ → π_t depends on both $\bar{\pi}$ & π_{t-1}

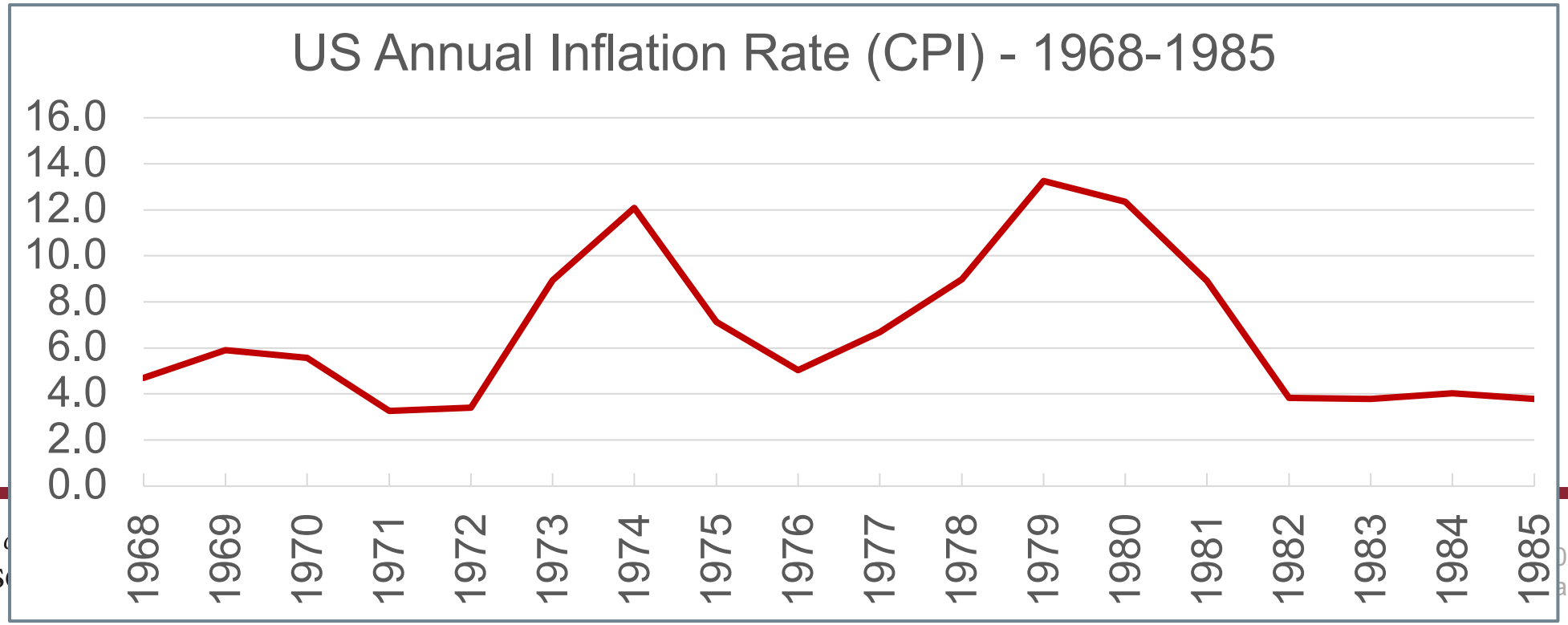
Inflation in the US: 1950s-1960s

- Quite low, quite stable and not very persistent.
  - Anchored expectations ($\pi_t^e = \bar{\pi}$) made sense.
  - Original Phillips Curve.



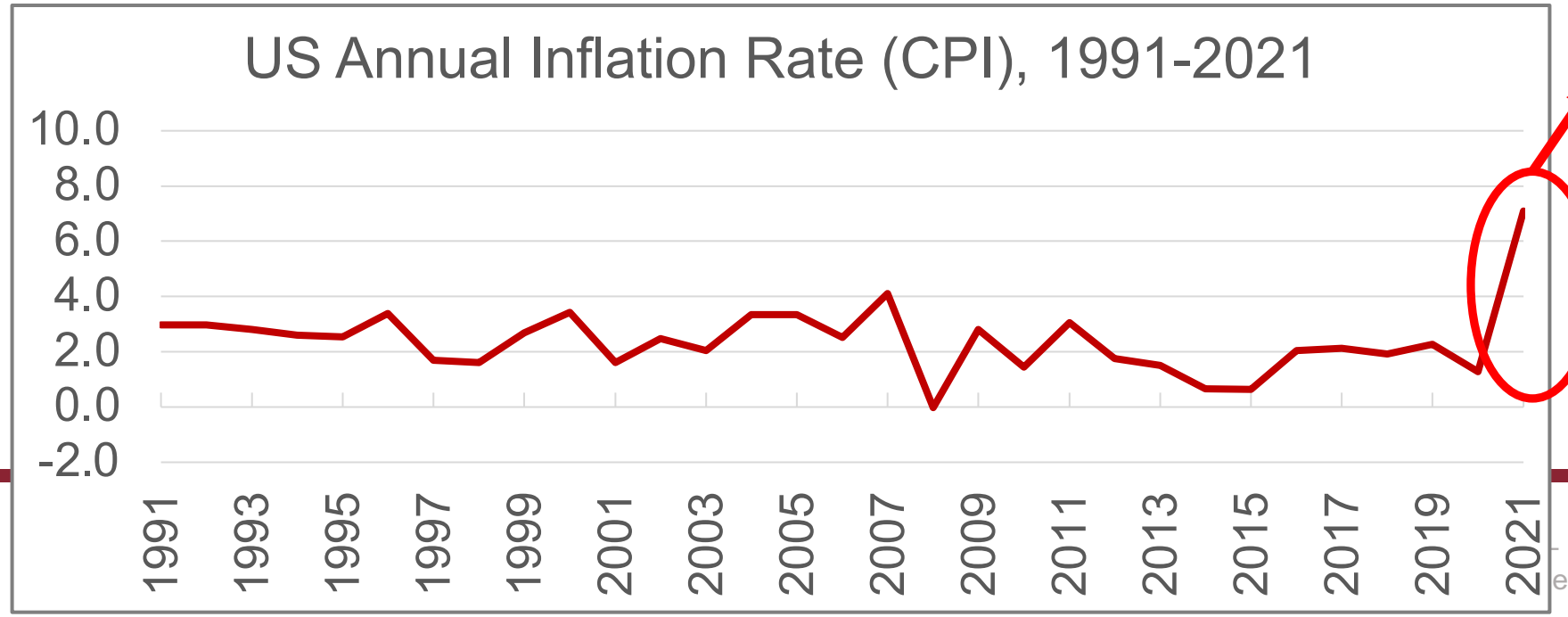
Inflation in the US: 1970s and early 1980s

- Oil shocks, strong wage growth.
- Inflation gets higher & becomes persistent.
  - De-anchoring of expectations: $\pi_t^e = \pi_{t-1}$.
  - Accelerationist Phillips Curve.



Inflation in the US: 1990s and 2000s

- 1980s: Change in Federal Reserve's monetary policy.
- Re-anchoring of expectations: people now believe the Fed will keep inflation low & stable at any cost.



Risks of de-anchoring today? Big & difficult question!

PREVIOUSLY ON ECON 204…

- Our wage- & price-setting equations imply a *Phillips Curve*:

$$\pi = \pi^e + (m + z) - \alpha u$$

- The specific type of PC depends on how π^e is determined:
  - Anchored expectations ($\pi_t^e = \bar{\pi}$) → original PC:

$$\pi_t = \bar{\pi} + (m + z) - \alpha u_t$$

  - Adaptive expectations ($\pi_t^e = \pi_{t-1}$) → accelerationist PC:

$$\pi_t - \pi_{t-1} = (m + z) - \alpha u_t$$

6.4 THE PHILLIPS CURVE AND THE EQUILIBRIUM UNEMPLOYMENT RATE

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The PC & the equilibrium unemployment rate

- *Phillips Curve*:

$$\pi - \pi^e = (m + z) - \alpha u$$

- Equilibrium unemployment: the one at which $\pi = \pi^e$

$$0 = (m + z) - \alpha u_n \rightarrow u_n = \frac{m + z}{\alpha}$$

- After some algebra (see textbook), can rewrite the PC as

$$\pi_t - \pi_t^e = -\alpha(u_t - u_n)$$