

## FROM AGGREGATE SUPPLY TO THE PHILLIPS CURVE

$$P = P^e(1+\mu)F(u,z)$$

$$\text{Assume } F(u,z) = 1 - \alpha u + z$$

$$\text{Then } P = P^e (1+\mu)(1 - \alpha u + z)$$

$$\text{But } P/P_{-1} = 1 + (P-P_{-1})/P_{-1} = 1+\pi \text{ (inflation rate)}$$

$$\text{So } 1+\pi = (1+\pi^e)(1+\mu)(1 - \alpha u + z)$$

Or

$$\frac{1+\pi}{(1+\pi^e)(1+\mu)} = 1 - \alpha u + z$$

Assume  $\pi$ ,  $\pi^e$ ,  $\mu$  all small. Then the LHS becomes

$$1 + \pi - \pi^e - \mu$$

So

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

## THE NATURAL RATE HYPOTHESIS

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

But in the long run  $\pi^e = \pi$

So in the long run

$$0 = (\mu+z) - \alpha u, \text{ implying } u_n = (\mu+z)/\alpha$$

Alternate way to write Phillips curve:

$$\pi = \pi^e - \alpha(u - u_n)$$

Question: In the short run, what determines expectations?

Crude hypothesis: Expected inflation based on recent past, e.g.

$$\pi^e = \pi_{-1}$$

Then

$$\pi = \pi_{-1} - \alpha(u - u_n)$$

Or

$$\pi - \pi_{-1} = -\alpha(u - u_n)$$

So  $u_n$  is unemployment at which inflation neither accelerates nor decelerates: the Non-Accelerating-Inflation Rate of Unemployment or NAIRU