FROM AGGREGATE SUPPLY TO THE PHILLIPS CURVE

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

Assume \( F(u,z) = 1 - \alpha u + z \)

Then \( P = P^e (1+\mu)(1 - \alpha u + z) \)

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

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