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NK Model

Basic Setup

- 4 agents: i) representative household (RH), ii) continuum of monopolistically competitive firms, iii) a central bank, and iv) a fiscal authority.
- Cashless economy: money serves only as a unit of account.
- **Forward-looking households:** consumption and saving decisions depend on expected future real interest rate and expected future income.
- **Sticky prices (Calvo pricing):**
  - Each firm resets its price with probability $1 - \theta$ in each period.
  - $\theta \in [0, 1]$: degree of price stickiness. $\theta = 0 \implies$ fully flexible.
  - Firms that reset prices are *forward-looking*: they set prices based on expected future demand, wages, and prices.

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NK Model

NK IS Curve

- The **dynamic IS curve**:

$$\tilde{y}_t = \mathbb{E}_t(\tilde{y}_{t+1}) - \frac{1}{\sigma}\left[i_t - \mathbb{E}_t(\pi_{t+1}) - r_t^n\right]$$

- $\tilde{y}_t \equiv y_t - y_t^n$: output gap; r_t^n: natural real rate of interest.
- Output gap today depends on expected future output and the expected real interest rate.
- $\mathbb{E}_t(\tilde{y}_{t+1}) \uparrow \implies$ save less, consume more today $\implies \tilde{y}_t \uparrow$.
- $\mathbb{E}_t(r_{t+1}) \uparrow \implies$ save more, consume less today $\implies \tilde{y}_t \downarrow$.

NK Model

NK Phillips Curve

- The **NK Phillips curve**:

$$\pi_t = \beta \mathbb{E}_t(\pi_{t+1}) + \kappa \tilde{y}_t$$

- Inflation today depends on the output gap and expected future inflation.
- $\tilde{y}_t \uparrow \implies$ labour demand $\uparrow$, real wage $\uparrow$, real marginal cost $\uparrow \implies$ firms raise prices $\implies \pi_t \uparrow$.
- $\mathbb{E}_t(\pi_{t+1}) \uparrow \implies$ a firm resetting its price today sets a higher price to avoid its relative price eroding over time $\implies \pi_t \uparrow$.