2 Appendix: Sources of Cost Push Shocks

Variations in desired price markups.

Assume that the elasticity of substitution among goods varies over time, according to some stationary stochastic process $\{\epsilon_t\}$. Let the associated desired markup be given by $\mu_t \equiv \frac{\epsilon_t}{\epsilon_t - 1}$ .One can show that the log-linearized price setting rule is then given by:

$$\begin{aligned} p_t^* &= (1-\beta\theta)\sum_{k=1}^{\infty}(\beta\theta)^k E_t\{\mu_{t+k} + mc_{t+k} + p_{t+k}\} \\ &= (1-\beta\theta)\sum_{k=1}^{\infty}(\beta\theta)^k E_t\{\widetilde{mc}_{t+k} + p_{t+k}\} \end{aligned}$$

where $\widetilde{mc}_t \equiv mc_t + \mu_t$. The resulting inflation equation then becomes

$$\begin{aligned} \pi_t &= \beta E_t\{\pi_{t+1}\} + \lambda\ \widetilde{mc}_t \\ &= \beta E_t\{\pi_{t+1}\} + \lambda\ \widehat{mc}_t + \lambda(\mu_t - \mu) \\ &= \beta E_t\{\pi_{t+1}\} + \kappa\ (y_t - \overline{y}_t) + \lambda(\mu_t - \mu) \end{aligned}$$

where $\overline{y}_t$ denotes the equilibrium level of output under a constant price markup μ.

Exogenous Variations in Wage Markups

In that case we still have $\pi_t = \beta E_t\{\pi_{t+1}\} + \lambda\ \widehat{mc}_t$, though now

$$\begin{aligned} mc_t &= w_t - a_t \\ &= \mu_t^w + mrs_t - a_t \\ &= \mu_t^w + (\sigma + \varphi)y_t - (1+\varphi)a_t \end{aligned}$$

thus implying

$$\widehat{mc}_t = (\sigma + \varphi)(y_t - \overline{y}_t) + (\mu_t^w - \mu^w)$$

where $\overline{y}_t$ denotes the equilibrium level of output under a constant price and wage markup.