A canonical New Keynesian model (Rotemberg)

Household From the inter-temporal and intra-temporal optimality conditions of the household the following equations are obtained:

$$\frac{1}{1+i} = \mathbb{E}\beta \left(\frac{\xi'}{\xi}\right) \left(\frac{c'}{c}\right)^{-\sigma} \frac{1}{1+\pi'}$$
$$n = \left(\frac{w}{\eta c^{\sigma}}\right)^{\chi}$$

where c is consumption; i is nominal interest rate; π is the inflation rate. n is labor supply, and w is real wage. Apostrophe indicates future allocation. ξ is a preference shock that follows a standard log AR(1) process. The resource constraint is as follows:

$$c = Y - \frac{\psi}{2}(\pi - \overline{\pi})^2 Y$$

Firms From the pricing decision and the CES aggregator, we obtain the following standard conditions:

$$\epsilon - 1 = \epsilon mc - \psi(1+\pi)(\pi - \overline{\pi}) + \beta\psi\mathbb{E}\left(\frac{c}{c'}\right)^{\sigma}(1+\pi')(\pi' - \overline{\pi})\frac{Y'}{Y}$$

Monetary policy The Taylor rule is as follows

$$1 + i = (1+i_{-1})^{\rho_i}\left[(1+\bar{r})(1+\pi)\left(\frac{1+\pi}{1+\overline{\pi}}\right)^{\phi_\pi}\left(\frac{Y}{Y^f}\right)^{\phi_Y} e^{\epsilon^{MP}}\right]^{1-\rho_i}$$

The natural output Y^f is defined as follows:

$$Y^f := \left(\frac{\epsilon - 1}{\eta\epsilon}\right)^{\frac{\chi}{1+\sigma\chi}} A^{\frac{1+\chi}{1+\sigma\chi}}$$

The monetary policy shock ϵ^{MP} follows a standard log AR(1) process.

Equilibrium conditions In equilibrium, the following conditions hold:

$$mc = \frac{w}{A}$$
$$Y = AN$$

Aggregate TFP A follows a standard log AR(1) process.