A trend-cycle decomposition with hysteresis

Javier G. Gomez-Pineda and Julián Roa-Rozo

Online Appendix
The trend-cycle decomposition in stationary form

The trend cycle decomposition can be run at quarterly and annual frequencies in codes available on the article website. In the codes the model is run in stationary form. The equations of the TCDH in stationary form are as follows:

$$\hat{y}_t = \alpha \hat{y}_{t-1} + \varepsilon_t^{\hat{y}}, \tag{1}$$

$$\bar{y}_t^{\Delta} = \gamma_t + 4\varepsilon_t^{\bar{y}}, \tag{2}$$

$$\gamma_t = \theta\gamma_{t-1} + (1-\theta)g + \varepsilon_t^{\gamma}, \tag{3}$$

$$y_t^{\Delta} = 4(\hat{y}_t - \hat{y}_{t-1}) + y_t^{\Delta}, \tag{4}$$

where $y_t^{\Delta} = 4(y_t - y_{t-1})$ and $\bar{y}_t^{\Delta} = 4(\bar{y}_t - \bar{y}_{t-1})$.

$$y_t^{C,\Delta} = \gamma_t^C, \tag{5}$$

$$\gamma_t^C = \theta\gamma_{t-1}^C + (1-\theta)g_t + \varepsilon_t^{\gamma^C}, \tag{6}$$

where $y_t^{C,\Delta} = 4(\bar{y}_t^C - \bar{y}_{t-1}^C)$.

$$y_t^{D,\Delta} = \gamma_t^D + 4\varepsilon_t^{\gamma^D}, \tag{7}$$

$$\gamma_t^D = 0, \tag{8}$$

where $\bar{y}_t^{D,\Delta} = 4(\bar{y}_t^D - \bar{y}_{t-1}^D)$.