$$\lambda_t = \mathbb{E}_t\, \beta \Lambda_{t,t+1} \left[Q_{t+1}(1-\delta) + v_{t+1} \pi^k_{t+1} - \Psi(v_{t+1}) \right]$$

$$\Lambda_{t,t+1} = \frac{\lambda_{t+1}}{\lambda_t}, \quad \Psi(v_{t+1}) = \frac{\bar{\pi}^k}{\psi}\left(e^{\psi(v_{t+1}-1)}\right)$$

$$\bar{Q}(1+\hat{Q}_t) = \mathbb{E}_t\, \beta(1+\lambda_{t+1}-\lambda_t) \Big[\bar{Q}(1+\hat{Q}_{t+1})(1-\delta) + \bar{v}\bar{\pi}^k(1+\hat{v}_{t+1}+\hat{\pi}^k_{t+1}) - \frac{\bar{\pi}^k}{\psi}\left(e^{\psi(v_{t+1}-1)}\right) \Big]$$

$$\hookrightarrow \hat{Q}_t = -(\hat{R}_t - \hat{\pi}_{t+1}) + \frac{1-\delta}{1-\delta+\bar{\pi}^k}\mathbb{E}_t(\hat{Q}_{t+1}) + \frac{\bar{\pi}^k}{1-\delta+\bar{\pi}^k}\mathbb{E}_t\,\hat{\pi}^k_{t+1} \quad (30)$$