A RANK with a durable good

$$\left.\begin{aligned}
\frac{1-\alpha}{C_t} &= \beta E_t\left\{\frac{v_{C,t+1}+D_{C,t+1}}{v_{C,t}}\frac{1-\alpha}{C_{t+1}}\right\}\\
\frac{1-\alpha}{C_t} &= \beta E_t\left\{\frac{v_{K,t+1}+D_{K,t+1}}{v_{K,t}}\frac{1-\alpha}{C_{t+1}}\right\}\\
\frac{1-\alpha}{C_t} &= \beta E_t\left\{\frac{1+i_t}{1+\pi_{t+1}}\frac{1-\alpha}{C_{t+1}}\right\}\\
q_t\frac{1-\alpha}{C_t} &= \beta E_t\left\{(1-\delta)(q_{t+1})\frac{1-\alpha}{C_{t+1}}+\frac{\alpha}{K_{t+1}}\right\}
\end{aligned}\right\} Household\ side$$

$$\left.\begin{aligned}
C_t &= W_{r,t}N_t - Z_{t+1} + \frac{1+i_{t-1}}{1+\pi_t}B_t - v_{C,t}(\omega_{C,t+1}-\omega_{C,t}) + \omega_{C,t}D_{C,t} +\\
&\quad -q_t[K_{t+1}-(1-\delta)K_t] + \omega_{K,t}D_{K,t} - v_{K,t}(\omega_{K,t+1}-\omega_{K,t})
\end{aligned}\right\} BC$$

$$\left.\nu(N_t)^{\varphi} = \frac{1-\alpha}{C_t}W_{r,t}\right\} Labor\ supply$$

$$\left.\begin{aligned}
\pi_{C,t}(1-\pi_{C,t}) &= \frac{\epsilon_C-1}{\psi}\left[\frac{\epsilon_C}{\epsilon_C-1}W_{r,t}-(1+\tau_C^S)\right]\\
D_{C,t} &= \left((1+\tau_C^S)Y_t - W_{r,t}N_{C,t} - \frac{\psi}{2}\pi_{C,t}^2Y_t - \tau_C^SY_t\right)\\
Y_t &= N_{C,t}\\
q_t &= \frac{\epsilon_K}{(\epsilon_K-1)(1+\tau_K^S)}W_{r,t}\\
q_tD_{K,t} &= q_tX_t^S - W_{r,t}N_{K,t}\\
X_t^S &= N_{K,t}
\end{aligned}\right\} Firms\ side$$

$$\left.\begin{aligned}
(1-\tfrac{\psi}{2}\pi_t^2)Y_t &= C_t\\
X_t^D &= X_t^S\\
\omega_{C,t+1} &= \omega_{C,t} = 1\\
\omega_{K,t+1} &= \omega_{K,t} = 1\\
N_t &= N_{C,t}+N_{K,t}
\end{aligned}\right\} Market\ equilibria$$

$$\left.\begin{aligned}
B_{t+1} &= Z_{t+1}\\
Z_{t+1} &= 0
\end{aligned}\right\} Money\ Balances$$

$$\left.1+i_t = \beta_t^{-1}\left(\frac{1+\pi_{C,t}}{1+\bar{\pi}}\right)^{\phi} i_t^*\right\} Monetary\ policy$$

$$\left.K_{t+1} = (1-\delta)K_t + X_t^S\right\} Durable\ good's\ evolution$$

$$\left.log(i_t^*) = i_0^* + \rho log(i_{t-1}^*) + \epsilon_t\right\} AR(1)\ process\ for\ monetary\ shock$$

Endogenous Variables: $\{C_t, K_{t+1}, Z_{t+1}, B_t, \omega_{C,t+1}, \omega_{K,t+1}, N_t, N_{C,t}, N_{K,t}, W_{r,t}, v_{C,t}, v_{K,t}, q_t, \pi_{C,t}, D_{C,t}, D_{K,t}, Y_t, i_t, X_t^D, X_t^S, i_t^*\}$.

Exogenous Variable: $\{\epsilon_t\}$, $\epsilon_t \sim \mathcal{N}(0, \sigma_\epsilon^2)$.

B List of variables and parameters

$C_t \equiv$ consumption by representative (rep) agent;

$Z_{t+1} \equiv$ liquidity held at the end of period t by rep agent;

$\omega_{C,t+1} \equiv$ end of period t shares of firms producing ndg detained by rep agent (in fixed supply);

$\omega_{K,t+1} \equiv$ end of period t shares of firms producing dg detained by rep agent (in fixed supply);

$N_t \equiv$ labor supply by rep agent;

$N_{C,t} \equiv$ labor demand by firms producing ndg;

$N_{K,t} \equiv$ labor demand by firms producing dg;

$W_{r,t} \equiv$ real wage in terms of price of ndg;

$v_{C,t} \equiv$ price of a single firm share producing ndg;

$v_{K,t} \equiv$ price of a single firm share producing dg;

$q_t \equiv$ relative price of dg $\frac{P_{K,t}}{P_{C,t}}$;

$\pi_{C,t} \equiv$ net inflation for ndg $\frac{P_{C,t}-P_{C,t-1}}{P_{C,t-1}}$;

$D_{C,t} \equiv$ dividends by firms producing ndg;

$D_{K,t} \equiv$ dividends by firms producing dg;

$Y_t \equiv$ total product of ndg;

$i_t \equiv$ nominal interest rate;

$X_t^D \equiv$ demand of new dg;

$X_t^S \equiv$ supply of new dg;

$i_t^* \equiv$ exogenous AR(1) process for the interest rate shock;

$\beta = 0.98 \equiv$ Utility Discount factor;

$\phi = 1.5 \equiv$ Monetary policy response to inflation parameter;

$\epsilon_C = 11 \equiv$ Elasticity of substitution for non-durable good;

$\epsilon_k = 7.6667 \equiv$ Elasticity of substitution for durable good;

$\psi = 125 \equiv$ Cost of inflation;

$\tau_C^S = \frac{1}{\epsilon_C - 1} \equiv$ Subsidy rate and tax rate on production of non-durable good (forcing pricing at MC);

$\tau_K^S = \frac{1}{\epsilon_K - 1} \equiv$ Subsidy rate and tax rate on production of durable good (forcing pricing at MC);

$\sigma_\epsilon = 1 \equiv$ Variance of shock to interest rate;

$\rho = 0.9 \equiv$ AR(1) coefficient on last period monetary shock;

$\varphi = 1 \equiv$ Inverse Frisch Elasticity;

$i_0^* = 0 \equiv$ Null constant in AR(1) process for monetary shock;

$\alpha = 0.4896 \equiv$ Weight of consumption of ndgs in consumption basket;

$\delta = 0 \equiv$ Depreciation;

C Steady state values

The steady state is computed at zero inflation (for the price of the non-durable good). It is assumed that the representative agent works $\frac{1}{3}$ of his total time endowment. Variables with a bar on top denote steady state values.

$\bar{\pi}_C = 0;$

$\bar{N} = \frac{1}{3};$

$\bar{i} = \frac{1}{\beta} - 1;$

$\bar{W}_r = \frac{\epsilon_C - 1}{\epsilon_C}(1 + \tau_C^S);$

$\bar{C} = \frac{3^{\varphi}(1-\alpha)}{\nu}\bar{W}_r;$

$\bar{Y} = \bar{C};$

$\bar{N}_C = \bar{Y};$

$\bar{D}_C = \bar{Y} - \bar{W}_r\bar{N}_C;$

$\omega_C = 1;$

$\omega_K = 1;$

$\bar{B} = 0;$

$\bar{Z} = 0;$

$\bar{N}_k = \frac{1}{3} - \bar{N}_C;$

$\bar{q} = \frac{\epsilon_K}{(\epsilon_K - 1)(1+\tau_K^S)}\bar{W}_r;$

$\bar{v}_C = \frac{\bar{D}_C}{1-\beta};$

$\bar{K} = \frac{\beta\alpha\bar{C}}{\bar{q}(1-\alpha)[1-\beta(1-\delta)]};$

$\bar{X}^S = \delta\bar{K};$

$\bar{C}^D = \bar{X}^S;$

$\bar{D}_K = (\bar{q} - \bar{W}_r)\bar{N}_K \ \bar{v}_K = \frac{\bar{D}_K}{1-\beta};$

Parameter ν is calibrated ex-post. Its value is as follows (expressed as a function of other parameters):

$\nu = \frac{3^{\varphi+1}\epsilon_C\delta\beta\alpha(\epsilon_K-1)(1+\tau_K^S)+3^{\varphi+1}\epsilon_K(1-\alpha)(\epsilon_C-1)(1+\tau_C^S)[1-\beta(1-\delta)]}{\epsilon_C\epsilon_K[1-\beta(1-\delta)]}$