Table 1: Parameter values

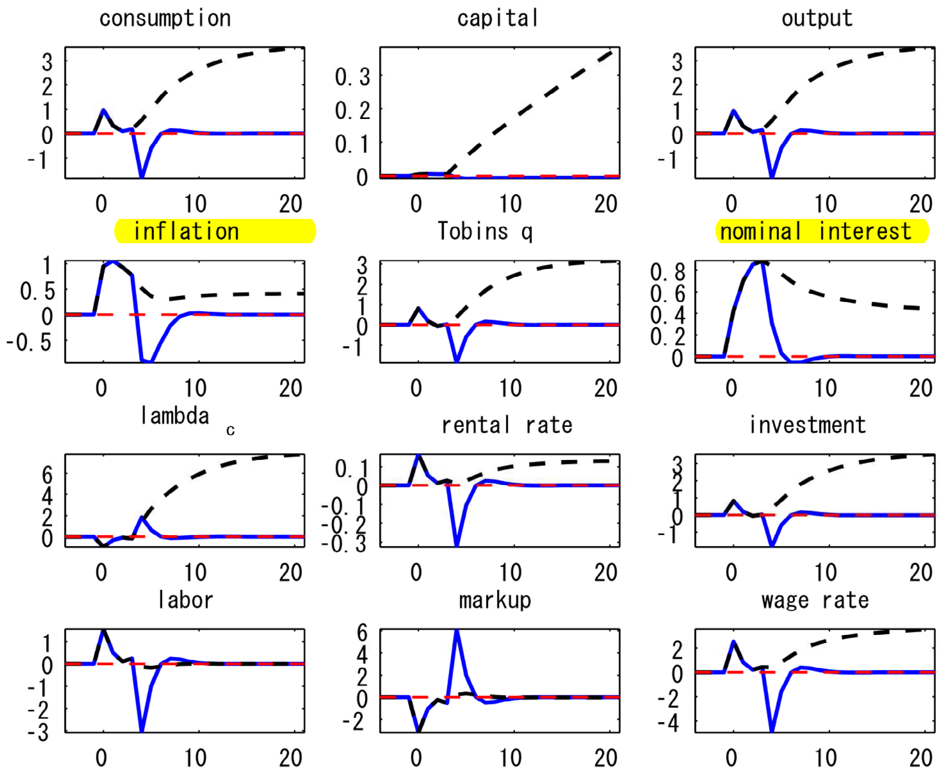
parameter	symbol	value
discount factor of households	β	$1.01358^{-0.25}$
weight of disutility of labor	γ	109.82
Frisch elasticity	σ_n	1
share of capital in production	α	0.4
price elasticity of investment to Tobin's q	σ_Φ	1.01
depreciation rate of capital	δ	0.025
persistence of technology growth	ρ_g	0.83
persistence of technology level	ρ_A	0.83
steady-state technology growth	g	0
steady-state technology level	A	1
probability of price change	$1-\kappa$	0.36
price indexation	η	0.84
steady-state gross inflation	π	1
steady-state markup	X	1.2
persistence of nominal interest rate	ρ_R	0.81
weight of inflation in Taylor rule	ρ_π	1.95
weight of output in Taylor rule	ρ_y	0.18
lag of news shock	p	4

change, $1-\kappa$, is 0.36 and the fraction of backward-pricing firms, η, is 0.84.[5] The steady-state gross inflation, π, is 1, and the steady-state markup, $X \equiv \theta/(\theta-1)$, is 1.2. The persistence of nominal interest rate, ρ_R, is 0.81. The weights of inflation and output gaps, ρ_π and ρ_y, in the Taylor rule are 1.95 and 0.18, respectively. The persistence of exogenous technologies, ρ_g and ρ_A, is 0.83. However, NDBCs are generated even if $\rho_g = 0$ and $\rho_A = 0$. The steady-state technology growth, g, is set to zero in order to see the effects of news shocks to abstract from the scaling effect, which does not change the properties of our model on NDBCs. The steady-state technology level, A, is normalized to one. The price elasticity of investment σ_Φ, is 1.01.[6] The values of $\bar{a}$ and $\bar{b}$ are determined as a solution of $\Phi(0) = 0$ and

[5] A standard calibrated value of $1-\kappa$ is 0.25 in the literature. The sticky price is the key to generate NDBCs in our model, but the degree of the stickiness is not important. Our model can generate NDBCs if $1-\kappa = 0.25$.

[6] To guarantee a positive value of $\bar{a}$, the value of σ_Φ should be greater than one. This is shown by the steady-state equilibrium conditions. Our result is robust to the value of σ_Φ. If σ_Φ is very close to one or if σ_Φ is large, like 1.5, NDBCs are generated.

Figure 1: NDBCs to growth news shock

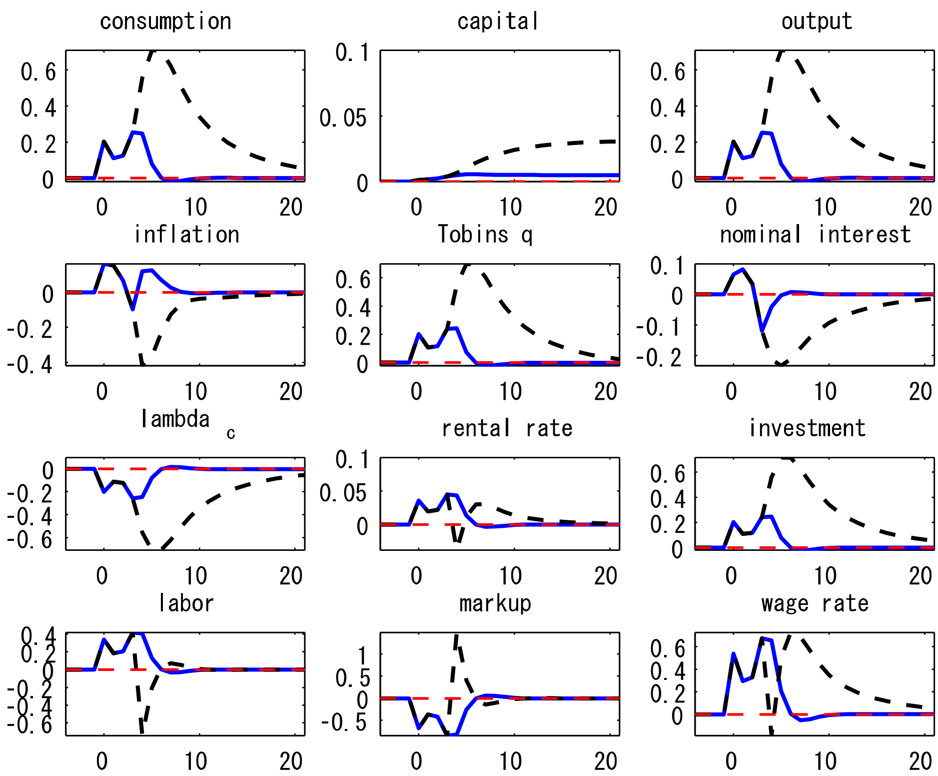


Notes: The dashed lines show cases where the news occurs at $t = 0$ and it materializes at $t = 4$. The solid lines show cases where the news occurs at $t = 0$ and turns out to be false at $t = 4$. The vertical axes are percentage deviations from the steady-state values (inflation, nominal interest rate, markup and rental rate are level deviations), and the horizontal ones are quarters.

and the decrease of markups. The decrease of markups increases inflation through the New Keynesian Phillips Curve. This is the mechanism why technology growth shock increase inflation. In the case of news shock, which implies future technology growth shock, inflation is expected to occur in the future by this mechanism.

The New Keynesian Phillips Curve (8) implies that future inflation results in the current inflation. While the current optimal price level also increases, price-setting firms cannot fully increase their prices because of nominal rigidities and it leads to the decrease of their markups. The decrease of markups induces the increase of aggregate demand and output and labor input increase. Finally, household income

Figure 3: NDBCs to level news shock



Notes: The dashed lines show cases where the news occurs at $t = 0$ and it materializes at $t = 4$. The solid lines show cases where the news occurs at $t = 0$ and turns out to be false at $t = 4$. The vertical axes are percentage deviations from the steady-state values (inflation, nominal interest rate, markup and rental rate are level deviations), and the horizontal ones are quarters.

This mechanism is easily verified by the intratemporal optimization condition:

$$\gamma c_t n_t^{\sigma_n} = \frac{1-\alpha}{X_t}\left[\frac{k_{t-1}}{n_t}\right]^{\alpha} A_t \zeta_t^{1-\alpha}. \tag{18}$$

In standard RBC models, an increase of consumption c_t from news about the future implies decreases of labor input n_t since markup X_t is constant over time and current capital stock k_{t-1} and current technologies A_t and ζ_t do not change. Thus, output and investment also decrease. However, in our model, comovements are made possible by the decrease of markup.

$$\hat{R}_t = \rho_R \hat{R}_{t-1} + (1-\rho_R)\left[\rho_\pi E_t \hat{\pi}_{t+1} + \rho_y \hat{y}_t\right] + \varepsilon_t^R + \nu_{t-p}^R,$$

given the evolution of technologies. Note that we ignore the costs of price dispersion since it is approximated to one in the neighborhood of the steady state. For detrending, we introduce the detrended variables

$$\tilde{G}_t \equiv \frac{G_t}{\zeta_t},$$

for $G = c, k, i, y, w$, and

$$\tilde{\lambda}_{c,t} \equiv \frac{\lambda_{c,t}}{\zeta_t^{-1}}.$$

The detrended equilibrium system is as follows.

$$\frac{1}{\tilde{c}_t} = \tilde{\lambda}_{c,t},$$

$$\gamma \tilde{c}_t n_t^{\sigma_n} = \tilde{w}_t,$$

$$q_t = \beta E_t\left[\frac{\tilde{\lambda}_{c,t+1}}{\tilde{\lambda}_{c,t}}(1+g_{t+1})^{-1}\left\{(1-\delta)q_{t+1} + r_{t+1} + q_{t+1}\left[\Phi\left(\frac{\tilde{i}_{t+1}}{\tilde{k}_t}(1+g_{t+1})\right) - \Phi'\left(\frac{\tilde{i}_{t+1}}{\tilde{k}_t}(1+g_{t+1})\right)\frac{\tilde{i}_{t+1}}{\tilde{k}_t}(1+g_{t+1})\right]\right\}\right],$$

$$1 = \beta E_t\left[\frac{1}{\pi_{t+1}} \cdot \frac{\tilde{\lambda}_{c,t+1}}{\tilde{\lambda}_{c,t}}(1+g_{t+1})^{-1} R_{t+1}\right],$$

$$\tilde{y}_t = A_t\left[\frac{\tilde{k}_{t-1}}{1+g_t}\right]^\alpha n_t^{1-\alpha},$$

$$\tilde{w}_t = \frac{1-\alpha}{X_t} \cdot \frac{\tilde{y}_t}{n_t},$$

$$r_t = \frac{\alpha}{X_t} \cdot \frac{\tilde{y}_t}{\tilde{k}_{t-1}}(1+g_t),$$

$$q_t = \left[\Phi'\left(\frac{\tilde{i}_t}{\tilde{k}_{t-1}}(1+g_t)\right)\right]^{-1},$$

$$\tilde{k}_t = \frac{1-\delta}{1+g_t}\tilde{k}_{t-1} + \Phi\left(\frac{\tilde{i}_t}{\tilde{k}_{t-1}}(1+g_t)\right)\frac{\tilde{k}_{t-1}}{1+g_t},$$

$$\hat{\pi}_t = \frac{\beta}{1+\eta\beta}E_t\left[\hat{\pi}_{t+1}\right] + \frac{\eta}{1+\eta\beta}\hat{\pi}_{t-1} - \frac{(1-\kappa)(1-\kappa\beta)}{\kappa(1+\eta\beta)}\hat{x}_t,$$

$$\tilde{c}_t + \tilde{i}_t = \tilde{y}_t,$$

$$\hat{R}_t = \rho_R \hat{R}_{t-1} + (1-\rho_R)\left[\rho_\pi E_t \hat{\pi}_{t+1} + \rho_y \hat{y}_t\right] + \varepsilon_t^R + \nu_{t-p}^R,$$