The Misallocation Channel of Monetary Policy

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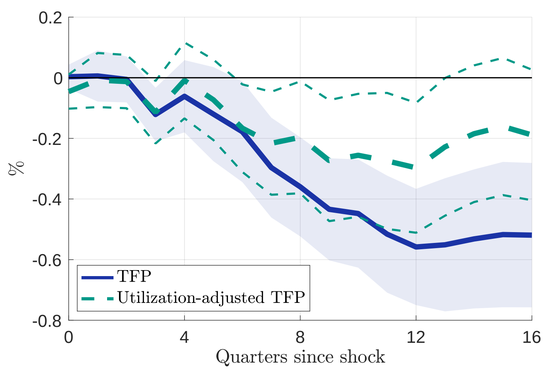
(1) Monetary policy shocks lower aggregate productivity

- We construct monetary policy shocks as the high-frequency change in the three-months federal funds future price around FOMC announcements

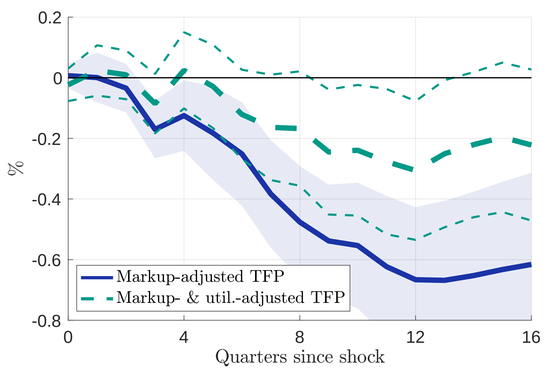
$$\varepsilon_\tau^{\text{MP}} = \text{f}_{\tau+20 \text{ min.}} - \text{f}_{\tau-10 \text{ min.}}$$

- Aggregate productivity: (utilization-adjusted) TFP from Fernald (2014); markup adjustment: Hall (1986) and De Loecker et al. (2018) markups; labor productivity: output per hour in the non-farm business sector

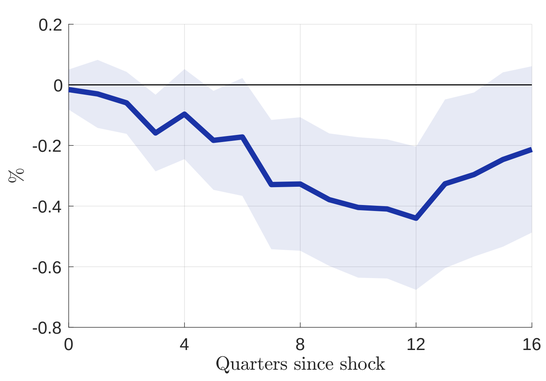
(a) TFP



(b) Markup-adjusted TFP



(c) Labor productivity



Notes: The plots show the responses of aggregate productivity to a 25 bp contractionary monetary policy shock based on

$$x_{t+h} - x_{t-1} = \alpha^h + \beta^h \varepsilon_t^{\text{MP}} + \gamma_0^h \varepsilon_{t-1}^{\text{MP}} + \gamma_1^h \Delta x_{t-1} + u_t^h.$$

The shaded and bordered areas show a one standard error band based on the Newey-West estimator.

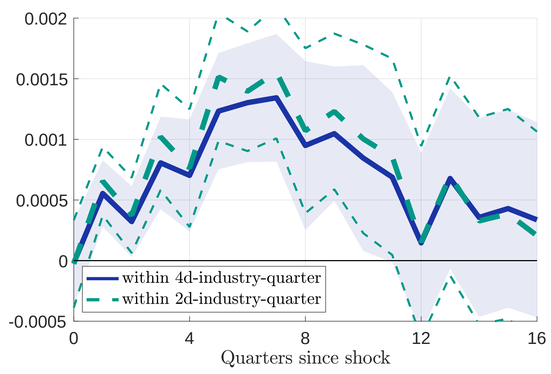
(2) Response of markup dispersion and firm-level heterogeneity

- Markup differences (μ_i) imply factor misallocation and lower aggregate TFP (*CES aggregation with elasticity η and monopolistic competition*)

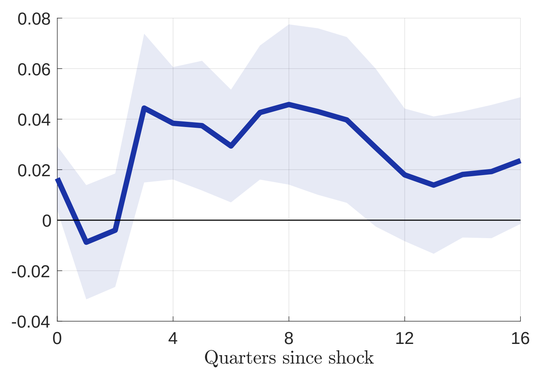
$$\text{TFP} \approx -\frac{\eta}{2}\text{Var}[\log \mu_i]$$

- We compute firm-level markups using Compustat balance sheet data and following the methodology of De Loecker et al. (2018)

(a) Markup dispersion within-industry



(b) Markup response larger for high-markup firms



- Assuming a demand elasticity of $\eta = 21$, the estimated misallocation response (over-)explains a decline in aggregate TFP of about 1.1%
- Firms with above-average long-run markups increase their markups by more than the industry average, see panel (b), which plots estimates of

$$x_{it+h} - x_{it-1} = \alpha_{hst} + \beta^h \varepsilon_t^{\text{MP}} \bar{x}_{it-1} + \Gamma' Z_{it-1} + u_{it}^h,$$

- Consistent with a positive correlation between price rigidity and markups, see mechanism in (3)

(3) A simple New Keynesian model

Model setup

- A single deviation from textbook NK model: heterogeneity in price rigidity (Carvalho 2006, Pasten et al. 2018, Baqaee Fahri 2018)
- Intermediate good producers with technology $Y_{i,t} = A_t N_{i,t}$ and demand $Y_{i,t} = Z_i \left(P_{i,t}/P_t\right)^{-\eta} Y_t$ set prices subject to reset probability $1 - \theta_1$ for half of firms and $1 - \theta_2$ for the other half
- Monetary policy: $i_t = \rho_r i_{t-1} + (1 - \rho_r)\left(\phi_\pi \pi_t + \phi_y y_t\right) + \nu_t$

Mechanism

- Precautionary price setting: low relative prices costlier than high relative prices; frictional price adjustment under uncertainty upward-biases prices (Fernandez-Villaverde et al. 2015, Basu Bundick 2017)
- Stickier firms (effectively) more uncertain when re-setting: higher markups
- Contractionary monetary policy shocks raise markups, but more so for firms with stickier prices; markup dispersion increases and aggregate TFP falls

Model solution and parametrization

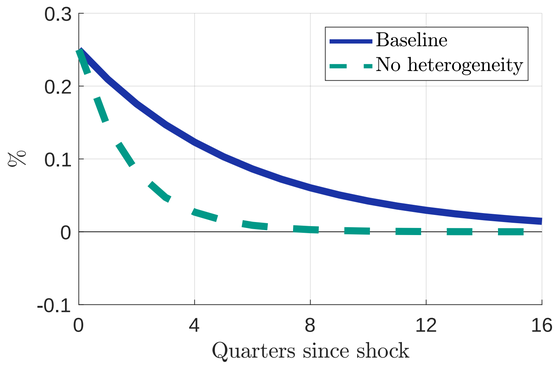
- Solve around the stochastic steady state to capture precautionary price setting
- We set $\theta_1 = 7/8$ and $\theta_2 = 0$, $\eta = 21$, $\beta = 0.99$, $\rho_r = 0.85$, $\varphi_\pi = 1.5$, $\varphi_y = 0.05$, preferences: $\log(C_t) - \frac{N_t^{1+\varphi}}{1+\varphi}$ with $\varphi = 1$
- Stochastic steady state: 1.6% higher markup for sticky-price firms

Next on the agenda

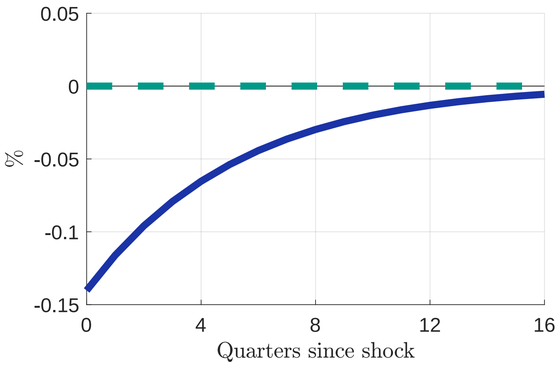
- Extend the model: capital, utilization, investment adjustment costs, habits
- Estimate the model

(4) Impulse responses in the model

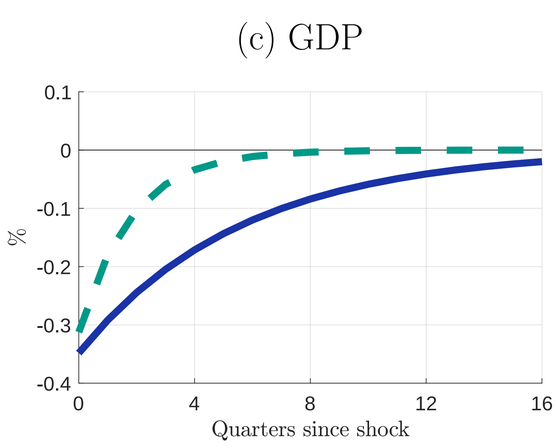
(a) Nominal rate



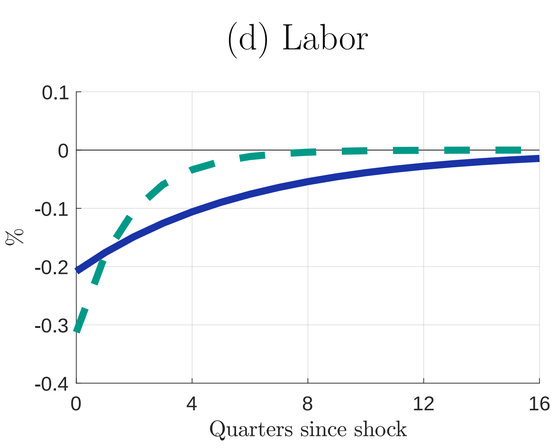
(b) TFP



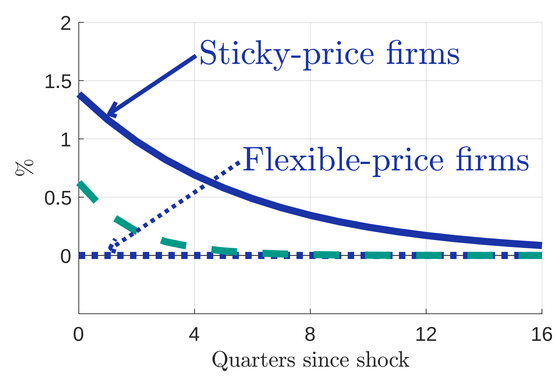
(c) GDP



(d) Labor



(e) Markups



(f) Inflation