Inflation, Inequality, and the Business Cycle

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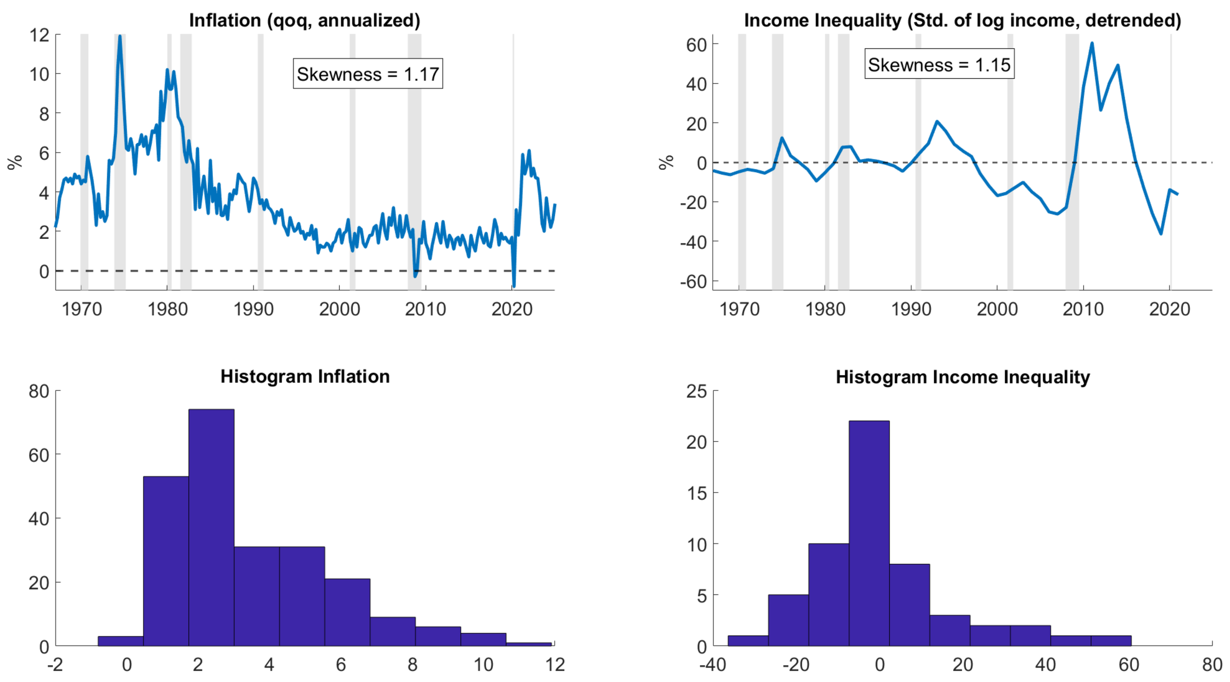
Motivation

Distributions of inflation and income inequality **positively skewed**

Inflation and standard deviation of log income in the U.S.



Standard linearized New Keynesian models have difficulties to explain these data features

Our paper introduces a **nonlinear Phillips curve** with state-dependent slope into a standard HANK model **to account for data**

Model

Starting point: Nonlinear HANK model as in e.g. Auclert et al. (2024)

Extension: Nonlinear Phillips curve with state-dependent slope

Households:

$$\max \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{c_{i,t}^{1-\sigma}}{1-\sigma} - \varphi \frac{n_{i,t}^{1+\nu}}{1+\nu} \right)$$

$$\text{s.t.} \quad c_{i,t} + a_{i,t} \leq (1-\tau_t)\underbrace{(w_t n_{i,t} e_{i,t} + d_{i,t} e_{i,t})}_{\text{Labor+Dividend Income}} + \underbrace{(1+r_t)a_{i,t-1}}_{\text{Asset Income}}$$

$$a_{i,t} \geq \underline{a}$$

→ Dividends distributed in proportion to household's productivity $e_{i,t}$

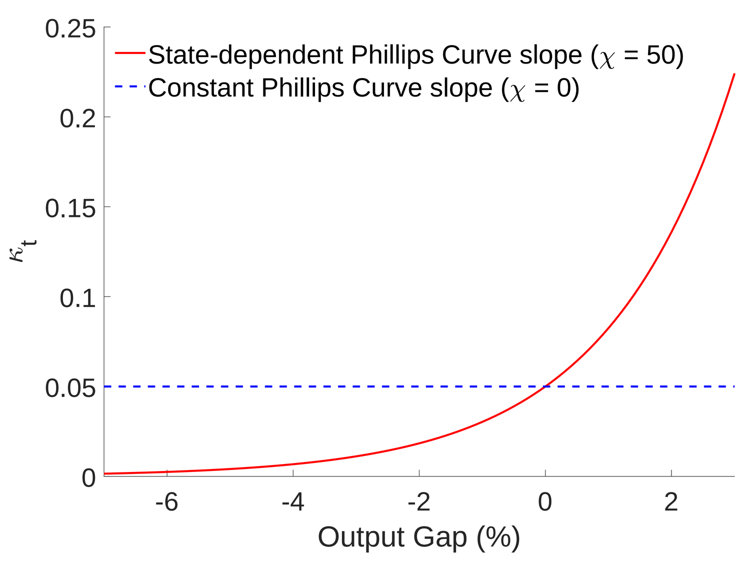
Countercyclical inequality and income risk:

$$n_{i,t} = n_t \frac{e_{i,t}^{\zeta_n ln(n_t/n)}}{\mathbb{E}\left[e_i^{1+\zeta_n ln(n_t/n)}\right]}, \ \zeta_n < 0 \qquad d_{i,t} = d_t \frac{e_{i,t}^{\zeta_d ln(d_t/d)}}{\mathbb{E}\left[e_i^{1+\zeta_d ln(d_t/d)}\right]}, \ \zeta_d < 0$$

Nonlinear (Wage) Phillips Curve (Rotemberg adjustment costs):

$$\pi_t^w(1+\pi_t^w) = \kappa_t n_t \left(\varphi n_t^{\nu} - \frac{\varepsilon - 1}{\varepsilon} w_t c_t^{-\sigma} \right) + \beta \mathbb{E}_t\left[\pi_{t+1}^w(1+\pi_{t+1}^w)\right] + \epsilon_t,$$

$$\kappa_t = \kappa e^{\chi(y_t - \bar{y})}, \quad \chi \geq 0: \text{curvature parameter}$$



Firms:

- Standard flexible price and monopolistic competition setup
- Production linear in labor; profits redistributed to households

Taylor rule:

$$\frac{1+i_t}{1+i} = \left(\frac{1+\pi_t}{1+\pi}\right)^{\phi_\pi} \left(\frac{y_t}{\tilde{y}_t}\right)^{\phi_y} e^{\gamma_t}$$

Shocks:

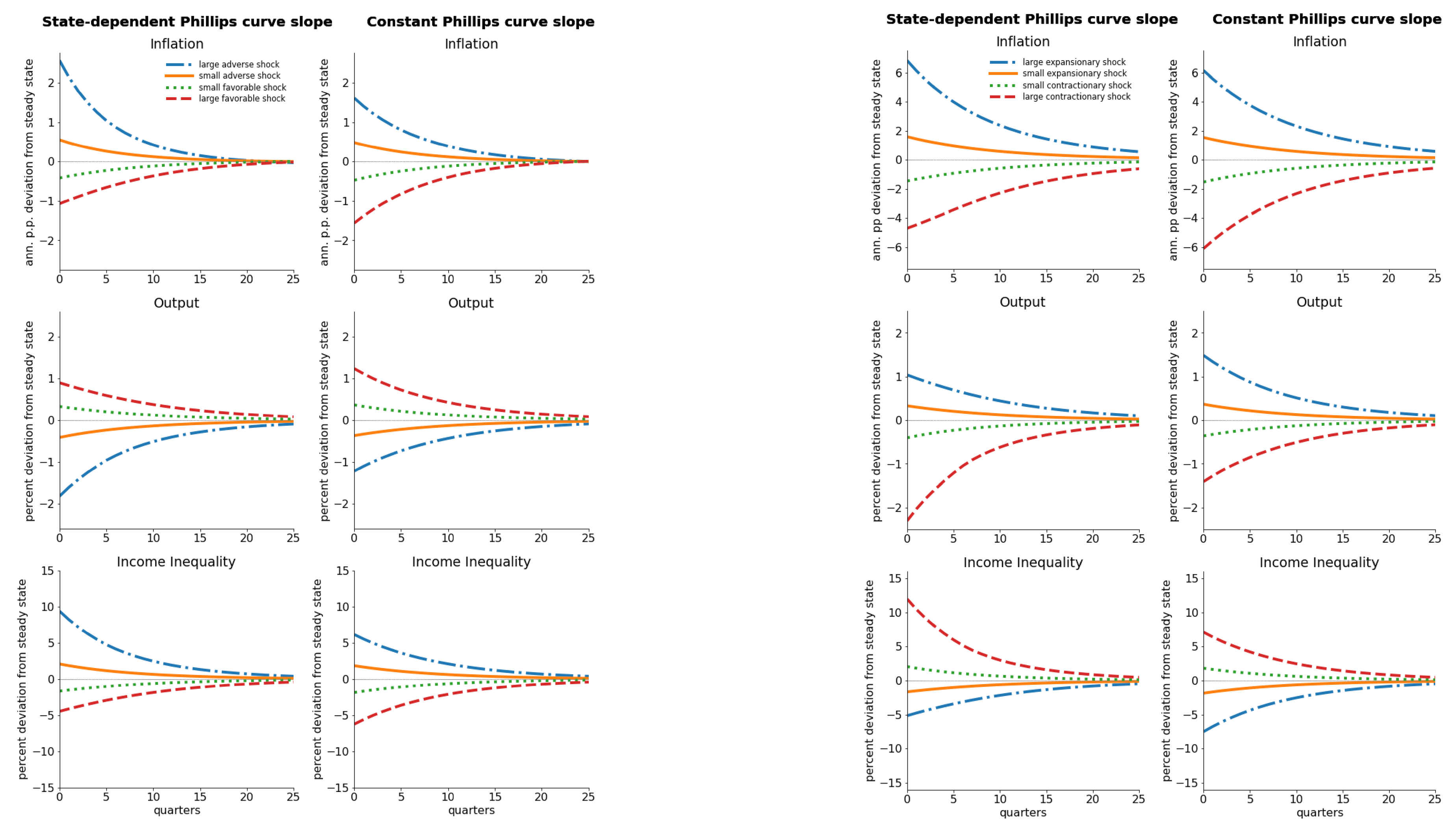
Demand shock $\quad \gamma_t = \rho_\gamma \gamma_{t-1} + \epsilon_t^{\gamma},$

Cost-push shock $\quad \varepsilon_t = \rho_\epsilon \varepsilon_{t-1} + \epsilon_t^{\varepsilon}$

Download our paper:

Impulse Responses

Cost-Push Shocks — Demand Shocks



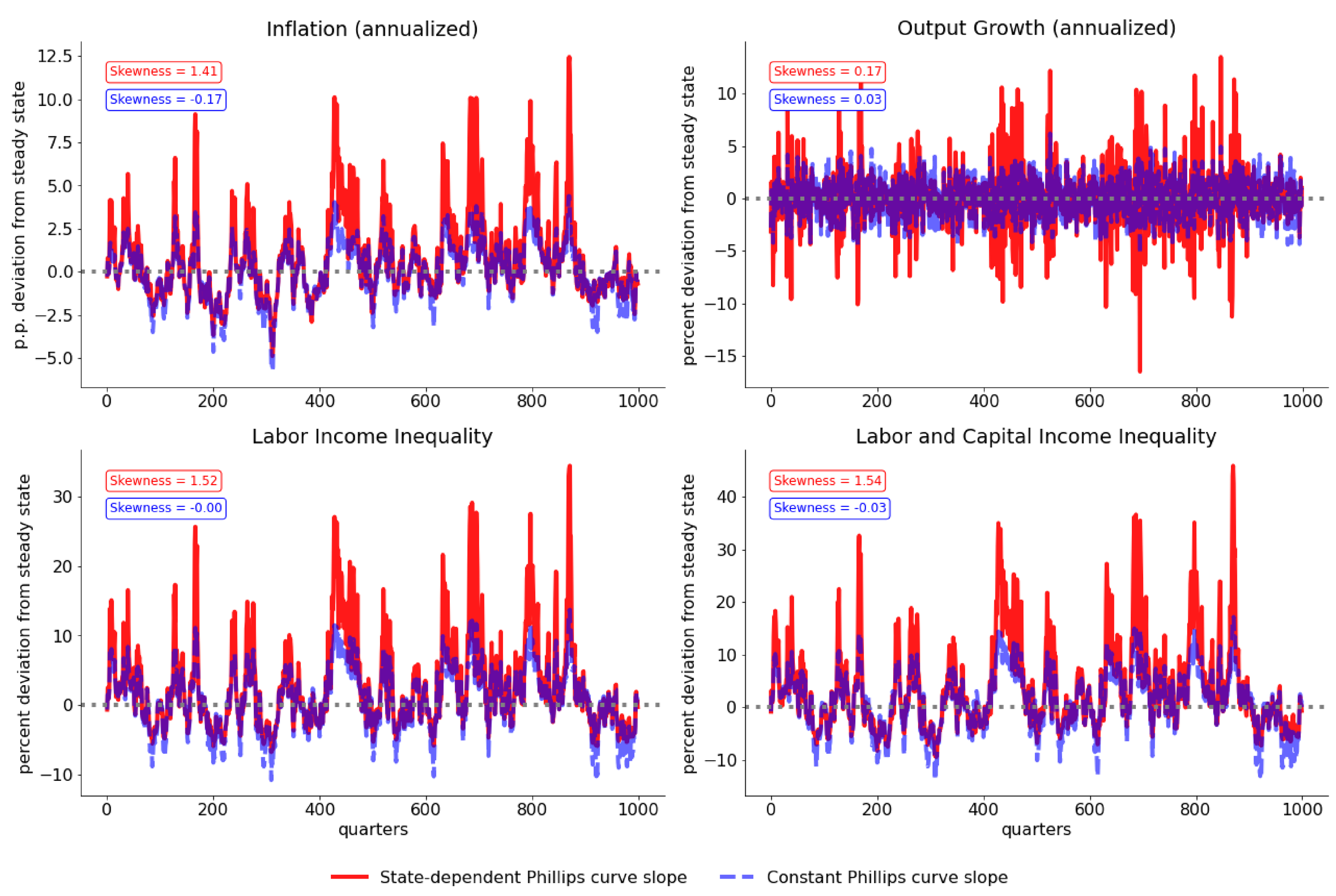
→ Symmetric shocks produce skewed impulse responses of inflation and inequality

Simulation Results

Calibrate model to match moments of inflation, GDP growth and income inequality in U.S. data (1967 - 2019)

	State-dep. slope model ($\chi = 50$)	Constant slope model ($\chi = 0$)	Data	95% data range	
Standard deviation π_t	2.31	1.51	2.29	2.00	2.55
Skewness π_t	**1.41**	-0.17	1.23	0.93	1.53
Autocorrelation π_t	0.89	0.92	0.92	0.89	0.94
Standard deviation Δy_t	3.09	1.89	3.14	2.71	3.58
Skewness Δy_t	0.17	0.03	-0.26	-0.93	0.49
Autocorrelation Δy_t	-0.02	-0.01	0.30	0.15	0.45
Correlation π_t, Δy_t	-0.23	-0.19	-0.06	-0.25	0.14
Labor Income Inequality					
Mean	0.92	0.92	0.92	0.88	0.95
Skewness	**1.52**	0.00	0.85	0.32	1.34
Standard Deviation	0.06	0.04	0.07	0.05	0.08
Labor and Capital Income Inequality					
Mean	0.94	0.94	1.07	0.99	1.15
Skewness	**1.54**	-0.03	1.15	0.40	1.77
Standard Deviation	0.08	0.06	0.18	0.13	0.23

Simulation of nonlinear HANK model for 1000 periods with demand and cost push shocks



Key Take-aways

→ Our model accounts **jointly** for the **positive skewness** of inflation and inequality observed in the data

→ Over the business cycle inflation and income inequality **increase more strongly than they decrease**

→ A model with a **constant Phillips Curve slope cannot account** for these features in the data