A Behavioral Heterogeneous Agent New Keynesian Model

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4. Advanced economies remained stable at the lower bound.
   [Debortoli et al. (2020), Cochrane (2018)]

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Heterogeneous household model with cognitive discounting

- accounts for facts 1-4 simultaneously

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- accounts for facts 1-4 simultaneously
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- novel amplification channel of supply shocks
    - inflation increase $\approx$ 2.5 times as strong
- pronounced trade-off for monetary policy: (not today)
    - traditional targets: price stability, aggregate efficiency
    - side effects: fiscal and distributional consequences of MP

Outline

1. **Model**
2. Monetary Policy
3. Amplification of Inflationary Supply Shocks

Model Overview

Households:

- incomplete markets and cognitive discounting

Firms:

- standard NK setup, monopolistic competition and nominal rigidities
  - $\longrightarrow$ standard NK Philips Curve ▸ Details

Government:

- fiscal policy: issues bonds, raises taxes ▸ Details
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- continuum of ex-ante identical, infinitely lived households
- optimization problem:

$$V_t\left(B_{i,t}, e_{i,t}\right) = \max_{C_{i,t}, N_{i,t}, B_{i,t+1}} \left\{ \frac{\left(C_{i,t}\right)^{1-\gamma}}{1-\gamma} - \frac{\left(N_{i,t}\right)^{1+\varphi}}{1+\varphi} + \beta \mathbb{E}_t^{BR} V_{t+1}\left(B_{i,t+1}, e_{i,t+1}\right) \right\}$$

subject to

$$C_{i,t} + \frac{B_{i,t+1}}{R_t} = B_{i,t} + W_t z(e_{i,t}) N_{i,t} + d_t(e_{i,t}) - \tau_t(e_{i,t}), \quad B_{i,t+1} \geqslant 0.$$

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- cognitive discounting of future responses to aggregate shocks

Behavioral Friction

Cognitive discounting (following Gabaix (2020)):

$$\mathbb{E}_t^{BR}\left[X_{t+1}\right] = \mathbb{E}_t^{BR}\left[\bar{X} + \tilde{X}_{t+1}\right]$$

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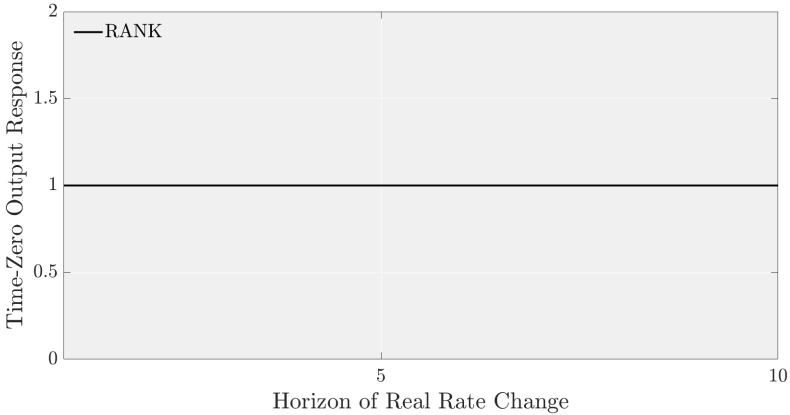
- Underreaction of household expectations in data: $\bar{m} \in [0.6, 0.85]$ Data

Outline

1. Model
2. **Monetary Policy:** What are the implications for **conventional MP** and for **forward guidance** shocks?
3. Amplification of Inflationary Supply Shocks

Monetary Policy in RANK



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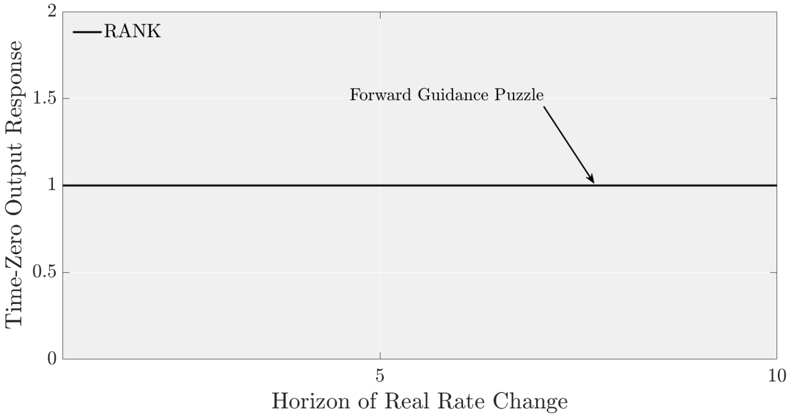
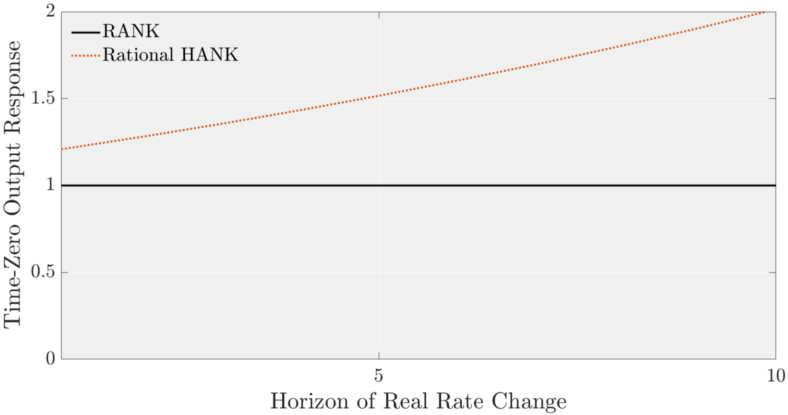


- RANK: FG puzzle

Monetary Policy in RANK

- RANK: FG puzzle and indirect effects negligible GE vs. PE

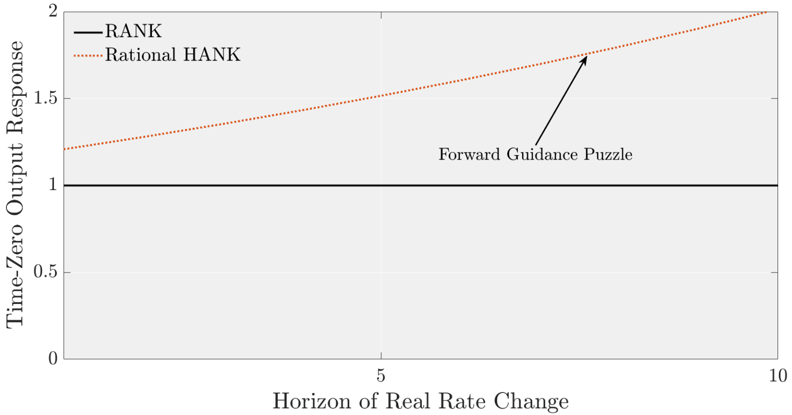
Monetary Policy in HANK



Monetary Policy in HANK

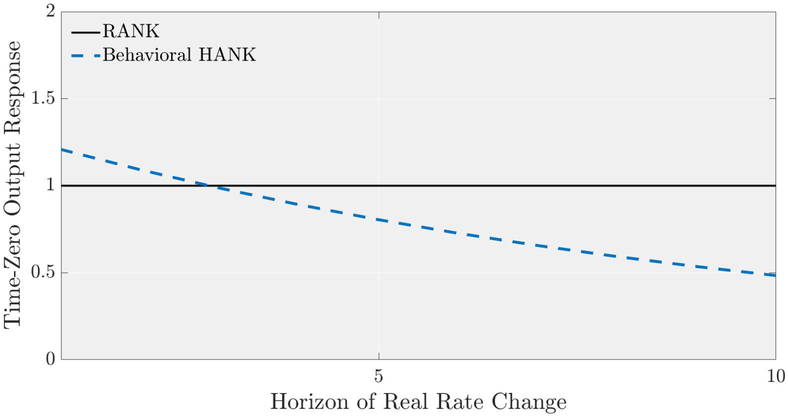
- HANK: indirect effects important

Monetary Policy in HANK



- HANK: indirect effects important but exacerbates FG puzzle ‣ GE vs. PE ‣ $\chi < 1$

Monetary Policy in behavioral HANK



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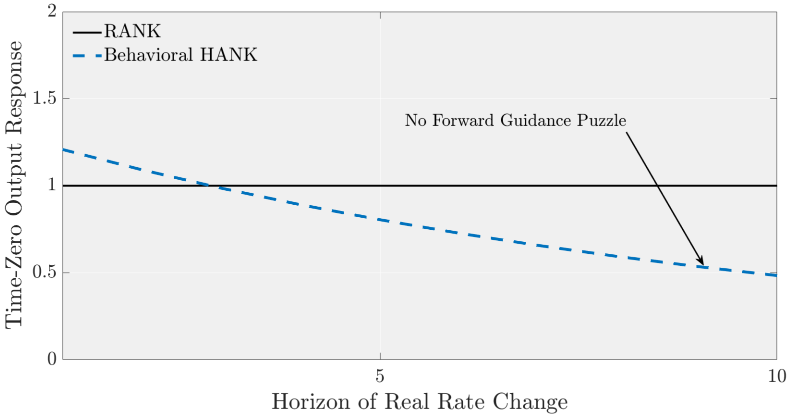

- Behavioral HANK: resolves FG puzzle

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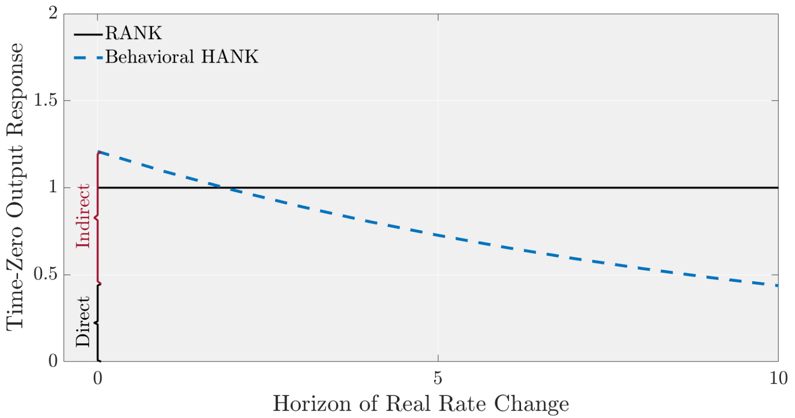


- Behavioral HANK: resolves FG puzzle and indirect effects important ▸ GE vs. PE
  ▸ full model ▸ IS equation

Extensions

Results hold with...

- ... heterogeneous $\bar{m}$ ▸ Details
- ... over- or underreaction with respect to idiosyncratic risk ▸ Details
- ... sticky wages instead of sticky prices ▸ Details
- ... more extreme calibration of unequal exposure ▸ Details

Outline

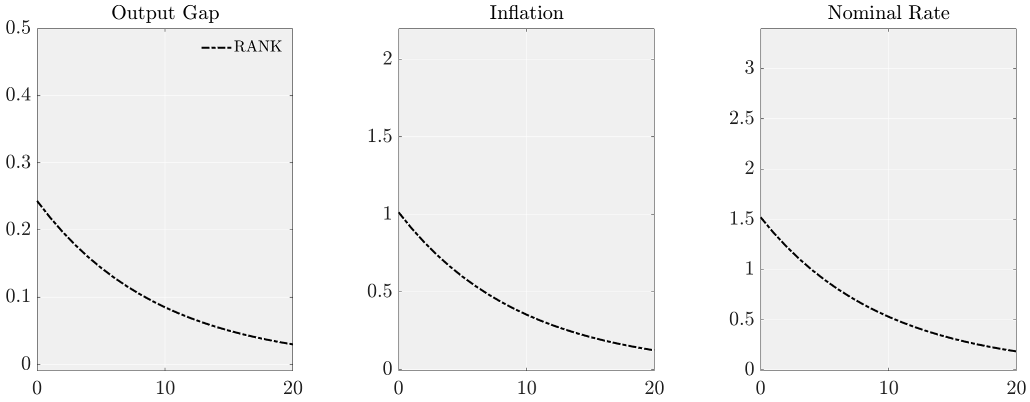
1. Model
2. Monetary Policy
3. **Amplification of Inflationary Supply Shocks**

Adverse Productivity Shock

Scenario:

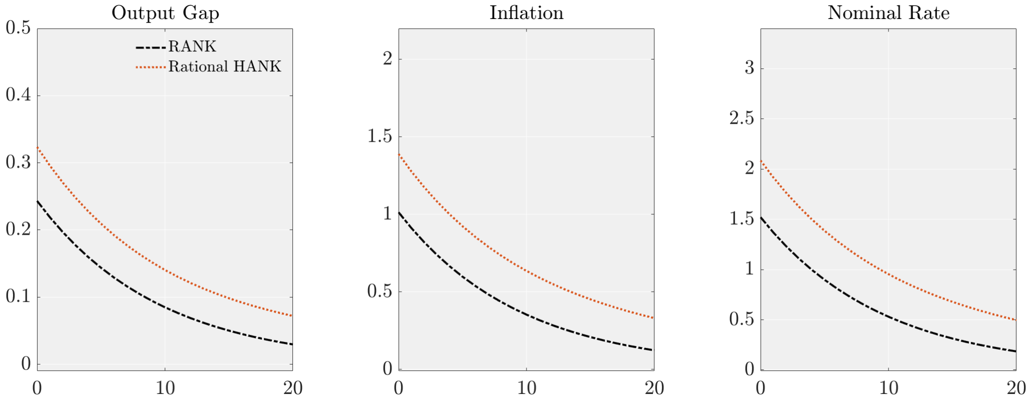
- *potential output* drops by 1% on impact, with $\rho = 0.9$
- monetary policy follows Taylor rule with $\phi_\pi = 1.5$

Negative Productivity Shock



▸ Procyclical HANK ▸ Other Variables

Amplification through Unequal Exposure



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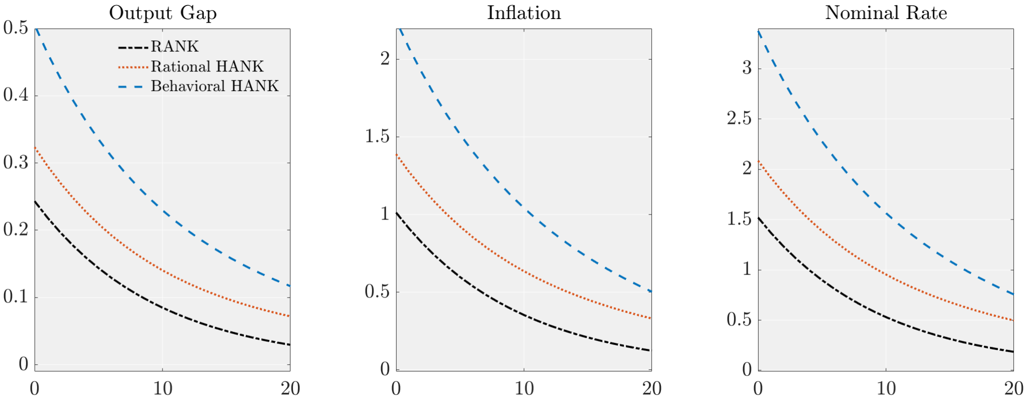
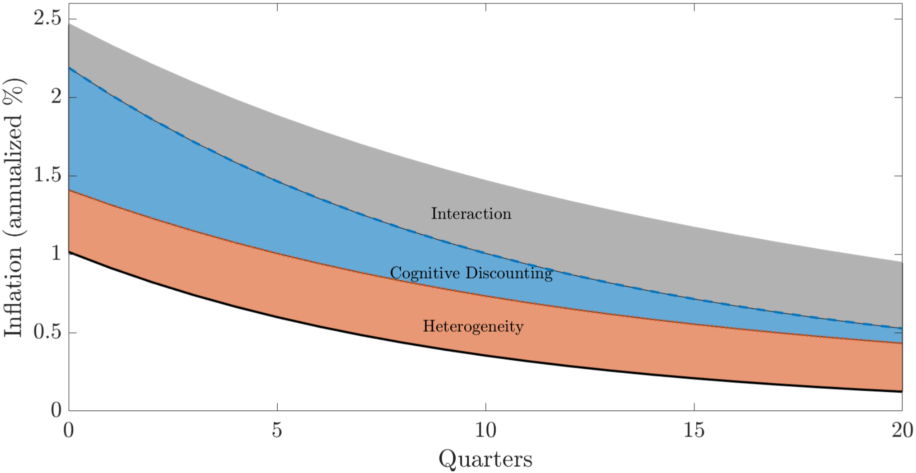
Further Amplification through Cognitive Discounting



▸ Procyclical HANK ▸ Other Variables ▸ Divine Coincidence

Decomposition of Inflation Response



Conclusion

Develop new framework: the behavioral HANK model:

- consistent with empirical facts about the transmission of monetary policy
- accounting for these facts matters: new amplification channel of inflationary supply shocks
- pronounced trade-off: price stability vs. fiscal and distributional consequences ▸ Details

Thank you!

Appendix

Euler Equation with Cognitive Discounting

Notation:

- $\bar{C}_{i,t} = C(e_{i,t}, B_{i,t}, \bar{Z})$: consumption in stationary equilibrium
- aggregate shock $Z_t \neq \bar{Z} \Rightarrow C_{i,t} = C(e_{i,t}, B_{i,t}, Z_t) \neq \bar{C}_{i,t}$

Euler:

$$\begin{aligned} C_{i,t}^{-\gamma} &\geqslant \beta R_t \mathbb{E}_t^{BR}\left[C_{i,t+1}^{-\gamma}\right] \\ &= \beta R_t \mathbb{E}_t^{BR}\left[\bar{C}_{i,t+1}^{-\gamma} + \left(C_{i,t+1}^{-\gamma} - \bar{C}_{i,t+1}^{-\gamma}\right)\right] \\ &= \beta R_t \mathbb{E}_t\left[\bar{C}_{i,t+1}^{-\gamma} + \bar{m}\left(C_{i,t+1}^{-\gamma} - \bar{C}_{i,t+1}^{-\gamma}\right)\right], \end{aligned}$$

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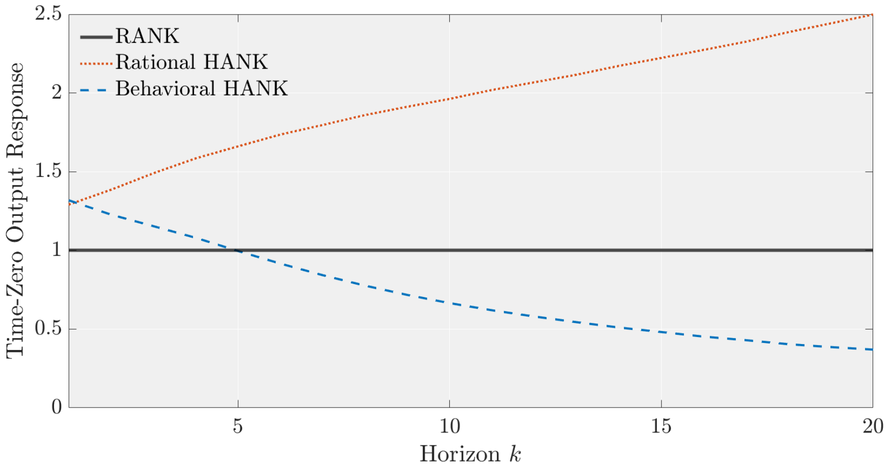
$\Rightarrow$ with limited heterogeneity and in linearized terms:

$$\hat{c}_t^U = s\bar{m}\mathbb{E}_t\left[\hat{c}_{t+1}^U\right] + (1-s)\bar{m}\mathbb{E}_t\left[\hat{c}_{t+1}^H\right] - \frac{1}{\gamma}\hat{r}_t.$$

back

Monetary Policy in quantitative behavioral HANK



back

Special calibration allows closed-form IS equation

Proposition 1

The aggregate IS equation is given by

$$\hat{y}_t = \psi_f \mathbb{E}_t \hat{y}_{t+1} - \psi_c \frac{1}{\gamma} \hat{r}_t,$$

where

$$\psi_f \equiv \bar{m} \left[1 + (\chi - 1) \frac{1-s}{1-\chi\lambda} \right] \quad \text{and} \quad \psi_c \equiv \frac{1-\lambda}{1-\chi\lambda}.$$

▸ back

Microfounding $\bar{m}$

Law of motion of (de-meaned) X_t: $X_{t+1} = \Gamma X_t + \varepsilon_{t+1}$
Household j receives a noisy signal of X_{t+1}, S^j_{t+1}, given by

$$S^j_{t+1} = \begin{cases} X_{t+1} & \text{with probability } p \\ X'_{t+1} & \text{with probability } 1-p \end{cases}$$

where X'_{t+1} is an i.i.d. draw from the unconditional distribution of X_{t+1}, which has an unconditional mean of zero.

Microfounding $\bar{m}$

Mental simulation of the future: the *average* expectation of X_{t+1} is:

$$\begin{aligned}\mathbb{E}\left[X^e_{t+1}(S_{t+1})|X_{t+1}\right] &= \mathbb{E}\left[p \cdot S_{t+1}|X_{t+1}\right] \\ &= p \cdot \mathbb{E}\left[S_{t+1}|X_{t+1}\right] \\ &= p^2 X_{t+1}.\end{aligned}$$

Defining $\bar{m} \equiv p^2$ and since $X_{t+1} = \Gamma X_t + \varepsilon_{t+1}$, we have that the perceived law of motion of X equals

$$X_{t+1} = \bar{m}\left(\Gamma X_t + \varepsilon_{t+1}\right). \tag{1}$$

The boundedly-rational expectation of X_{t+1} is then given by

$$\mathbb{E}^{BR}_t\left[X_{t+1}\right] = \bar{m}\mathbb{E}_t\left[X_{t+1}\right].$$

▸ back

Limited-Heterogeneity Setup: Optimality Conditions

Euler:

$$\left(C_t^U\right)^{-\gamma} \geqslant \beta \mathbb{E}_t^{BR}\left[R_t\left(s\left(C_{t+1}^U\right)^{-\gamma}+(1-s)\left(C_{t+1}^H\right)^{-\gamma}\right)\right],$$

where $R_t \equiv \frac{1+i_t}{1+\pi_{t+1}}$.

Labor-leisure:

$$\left(N_t^i\right)^{\varphi}=W_t\left(C_t^i\right)^{-\gamma}.$$

back

Decomposition: Direct vs. Indirect Effects

Consumption function:

$$\hat{c}_t = [1 - \beta(1 - \lambda\chi)]\,\hat{y}_t - \frac{(1-\lambda)\beta}{\gamma}\hat{r}_t + \beta\bar{m}\delta(1 - \lambda\chi)\mathbb{E}_t\hat{c}_{t+1}.$$

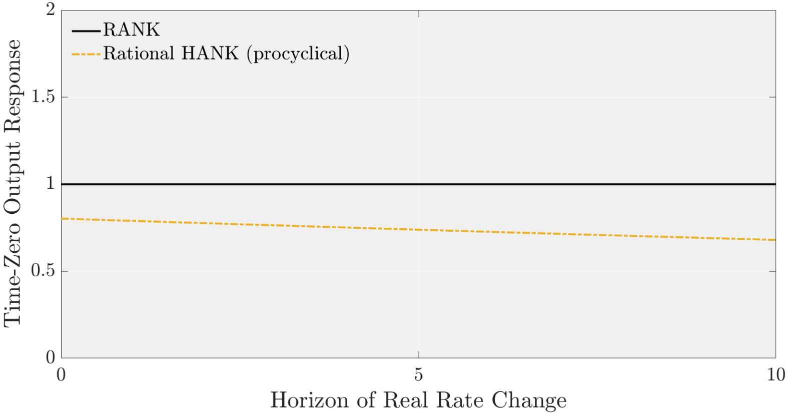
Indirect effects Ξ^{GE}: change in total consumption due to changes in total income for fixed real rates:

$$\Xi^{GE} = \frac{1 - \beta(1 - \lambda\chi)}{1 - \beta\bar{m}\delta\rho(1 - \lambda\chi)}.$$

$\Rightarrow$ about 63%, consistent with larger quantitative models (Kaplan et al. (2018))

▸ back

Procyclical Inequality



IS equation: $\widehat{y}_t = \psi_f \mathbb{E}_t \widehat{y}_{t+1} - \psi_c \frac{1}{\gamma} \widehat{r}_t$

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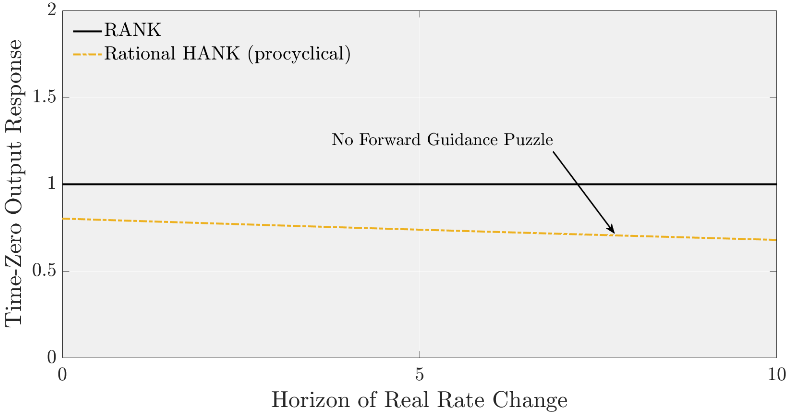

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- HANK ($\chi < 1$): $\psi_f < 1$: no FG puzzle

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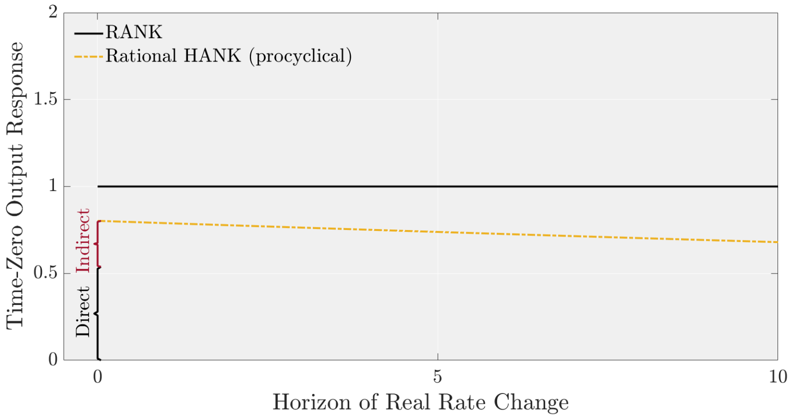

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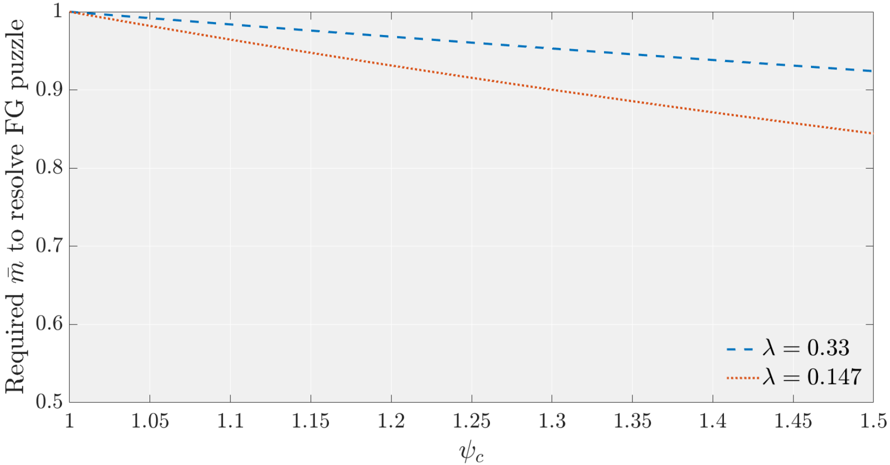
- HANK ($\chi < 1$): $\psi_f < 1$: no FG puzzle but $\psi_c < 1$: GE effects dampen response ‣ GE vs. PE
  - ‣ back

Calibration Full Model

Parameter	Description	Value
R	Steady State Real Rate (annualized)	2%
γ	Risk aversion	2
φ	Inverse of Frisch elasticity	2
μ	Markup	1.2
θ	Calvo Price Stickiness	0.15
ρ_e	Autocorrelation of idiosyncratic risk	0.966
σ_e^2	Variance of idiosyncratic risk	0.033
$\tau(e_{i,t})$	Tax shares	[0, 0, 1]
$d(e_{i,t})$	Dividend shares	$[0, \frac{0.4}{0.5}, \frac{0.6}{0.25}]$
$\frac{B^G}{4Y}$	Government Debt	0.5

▸ back ▸ Fiscal Policy

Robustness



▸ back

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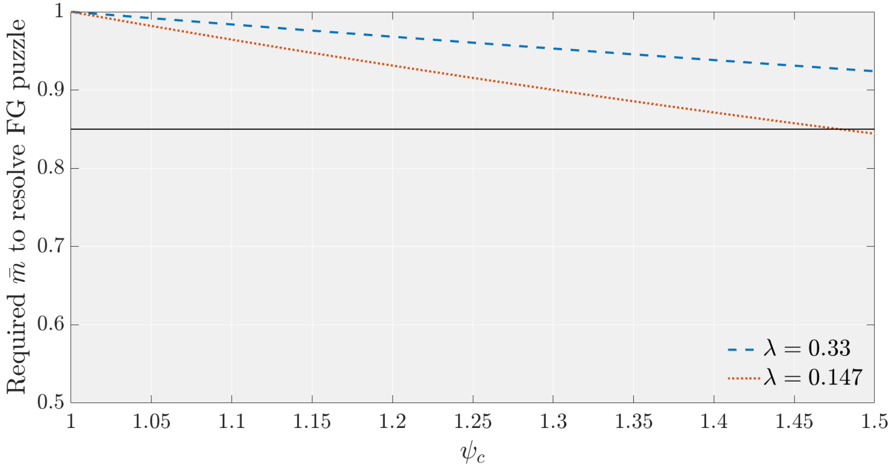
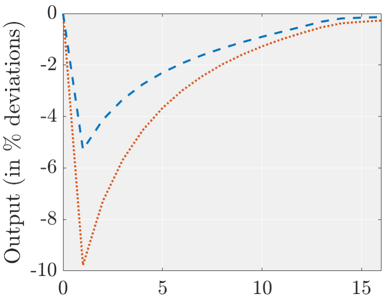
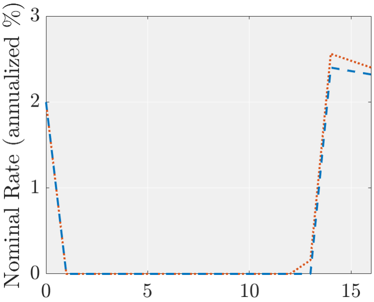


▸ back

ELB in Full Model





- Economy more stable at ELB in Behavioral HANK
- Differences across models increase with ELB length ▸ back

Fiscal Policy: Details

Debt rule:

$$T_t - \bar{T} = \vartheta \frac{B_{t+1} - \bar{B}}{\bar{B}}, \text{ with } \vartheta = 0.05$$

Household budget constraint:

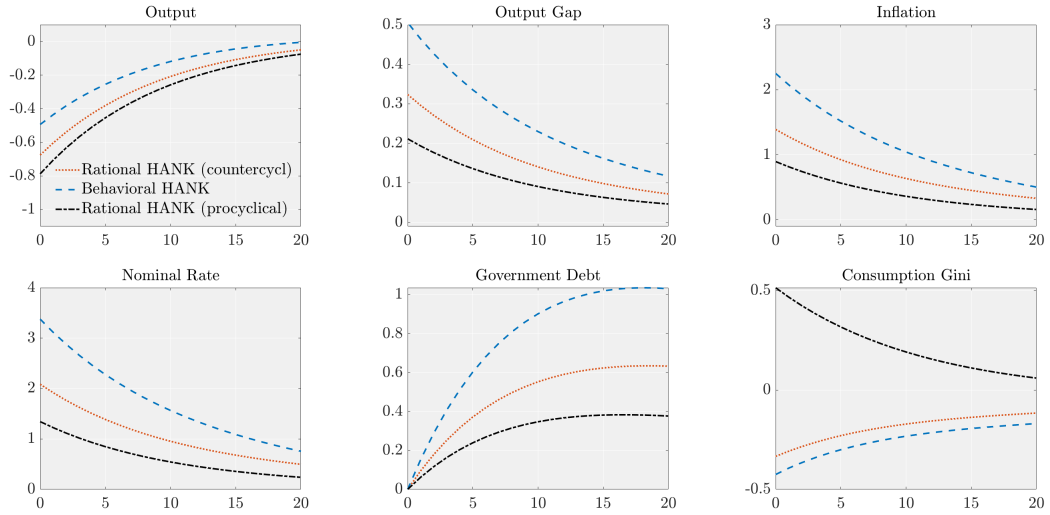
$$C_{i,t} + \frac{B_{i,t+1}}{R_t} = B_{i,t} + W_t e_{i,t} N_{i,t} + d_t(e_{i,t}) - \tau_t(e_{i,t}),$$

with

- progressive tax system: $\tau_t(e_{i,t}) = \frac{T_t}{0.25}$ if $e_{i,t} = e_{high}$ and 0 otherwise
- less-progressive taxes: $\tau_t(e_{i,t}) = e_{i,t} T_t$

▸ Model Overview ▸ back

Supply Shock: Procyclical Inequality



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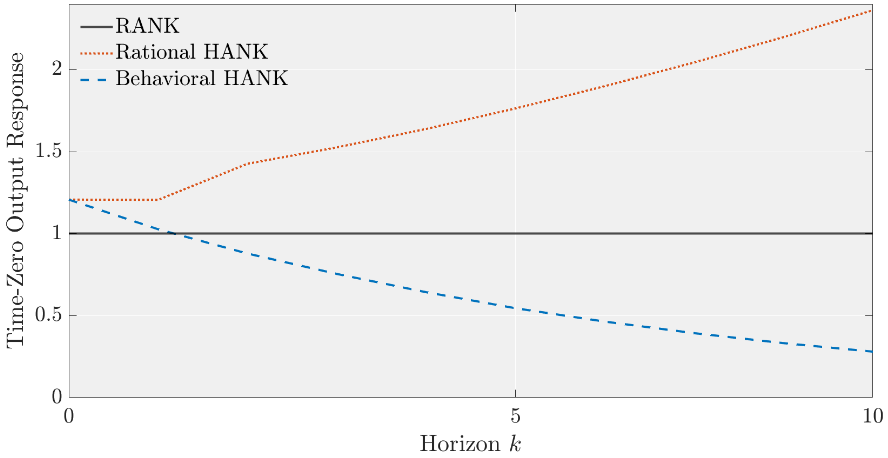
Sticky Wages



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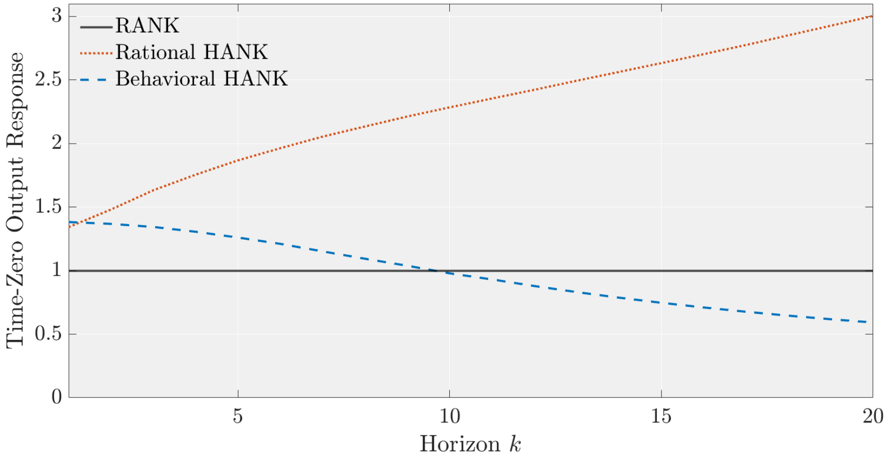
More Unequal Exposure



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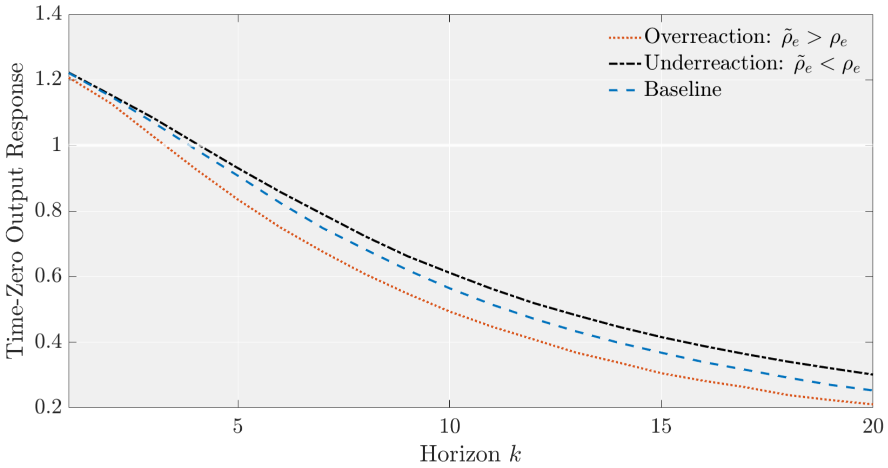
Over- or underreaction w.r.t. idiosyncratic risk



▸ back

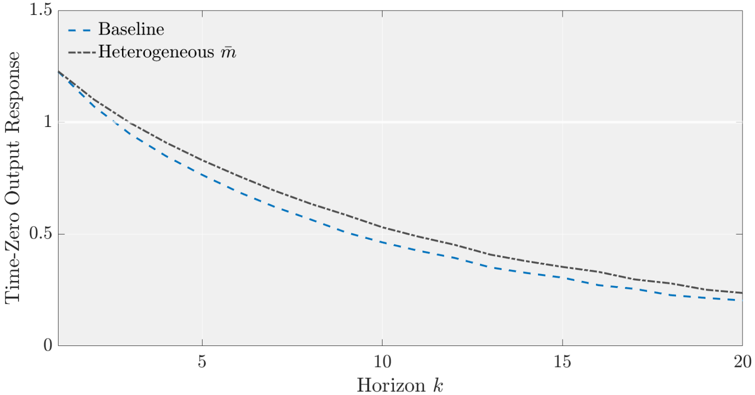
Robustness: Heterogeneous Cognitive Discounting

We show that in the data:

- households of all income groups underreact
- but households with higher income slightly less ▸ Heterogeneous $\bar{m}$ in the data

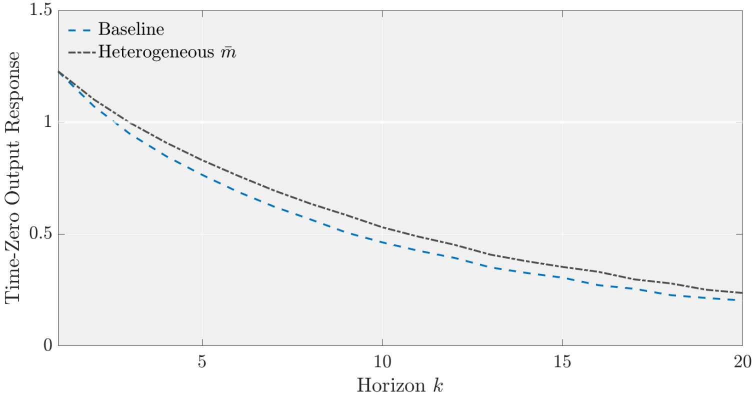
$\Rightarrow$ model: $\bar{m} \in [0.8, 0.9]$ increasing function of individual productivity

Heterogeneous $\bar{m}$: Monetary Policy



Forward guidance is slightly more effective, but FG puzzle still resolved

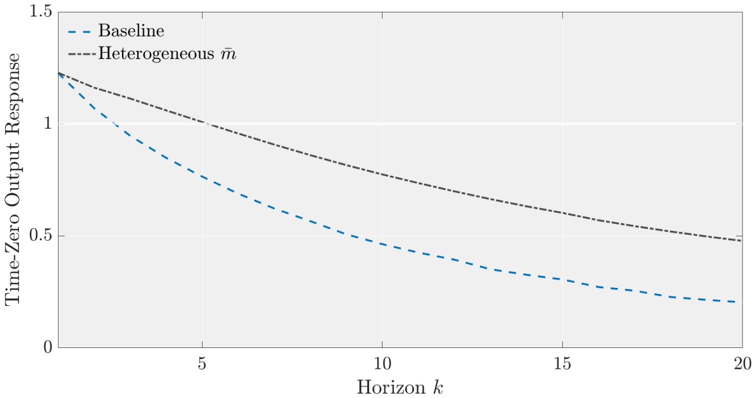
Heterogeneous $\bar{m}$: Monetary Policy



Forward guidance is slightly more effective, but FG puzzle still resolved

Also true if subset fully rational! ▸ subset fully rational ▸ back

Heterogeneous $\bar{m}$: Extreme Calibration



▸ back

Policy Implications with Heterogeneous $\bar{m}$

Heterogeneity in $\bar{m}$:

▸ Heterogeneous $\bar{m}$

- expectation channels are more powerful than with homogeneous $\bar{m}$

  $\Rightarrow$ trade-off is slightly smaller

- more productive households are less behavioral $\Rightarrow$ decrease consumption more in expectation of future tax increases

  $\Rightarrow$ more relevant with progressive taxes

- overall results are robust

▸ back

Estimating $\bar{m}$

Estimate $b^{e,CG}$ for different income groups $e \in \{L, M, H\}$ using Coibion and Gorodnichenko (2015)-regressions:

$$\underbrace{x_{t+4} - \mathbb{E}_t^{e,BR} x_{t+4}}_{\text{Forecast error}} = c^e + b^{e,CG} \underbrace{\left(\mathbb{E}_t^{e,BR} x_{t+4} - \mathbb{E}_{t-1}^{e,BR} x_{t+3} \right)}_{\text{Forecast revision}} + \epsilon_t^e, \tag{2}$$

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$b^{e,CG} > 0$: underreaction

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$b^{e,CG} > 0$: underreaction

$$\bar{m}^e = \left(\frac{1}{1 + b^{e,CG}}\right)^{1/4}$$

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$$\bar{m}^e = \left(\frac{1}{1 + b^{e,CG}}\right)^{1/4} \Rightarrow \bar{m}^e < 1 \text{ if } b^{e,CG} > 0 \tag{3}$$

Estimating $\bar{m}$

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$$\bar{m}^e = \left(\frac{1}{1 + b^{e,CG}}\right)^{1/4} \Rightarrow \bar{m}^e < 1 \text{ if } b^{e,CG} > 0 \tag{3}$$

Data: Survey of Consumers, University of Michigan, unemployment and inflation expectations, 1979Q4 - 2020Q1, FRED for actual unemployment and inflation

Estimating $\bar{m}$: Results

	Unemployment			ΔUnemployment		
	Bottom 25%	Middle 50%	Top 25%	Bottom 25%	Middle 50%	Top 25%
$\widehat{b}^{e,CG}$	1.22	1.10	0.90	1.87	1.49	0.82
s.e.	(0.264)	(0.282)	(0.247)	(0.721)	(0.648)	(0.430)
N	157	157	157	157	157	157

$\widehat{b}^{e,CG} > 0$: underreaction of all income groups (robust to IV, inflation exp., monthly data)

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$\widehat{b}^{e,CG} > 0$: underreaction of all income groups (robust to IV, inflation exp., monthly data)

Implied $\bar{m}$: 0.82, 0.83 and 0.85 for unemployment, 0.77, 0.8, 0.86 for unemployment changes (lower with IV or for inflation, as low as 0.57) ▸ Overview ▸ Behavioral setup

Amplification vs. Forward Guidance Puzzle

Proposition

In the behavioral HANK model, there is amplification of contemporaneous monetary policy relative to RANK if and only if

$$\psi_c > 1 \Leftrightarrow \chi > 1, \tag{4}$$

and the forward guidance puzzle is ruled out if

$$\psi_f + \frac{\kappa}{\gamma}\psi_c < 1. \tag{5}$$

Holds in behavioral HANK for $\bar{m} < 0.95$. Cannot hold simultaneously under rational expectations! ▸ back

Stability at ELB

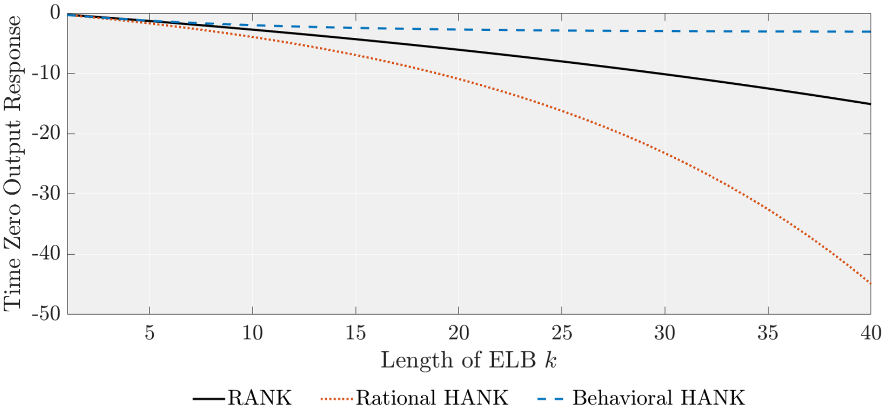
Consider natural rate shocks $\hat{r}_t^n$:

$$\hat{y}_t = \psi_f \mathbb{E}_t \hat{y}_{t+1} - \psi_c \left(\hat{i}_t - \mathbb{E}_t \pi_{t+1} - \hat{r}_t^n \right).$$

Negative natural rate shock brings economy to ELB for k periods. Output in at time 0 is then given by

$$\hat{y}_0 = -\frac{1}{\gamma} \psi_c \underbrace{\left(\hat{i}_{ELB} - \tilde{r}^n \right)}_{>0} \sum_{j=0}^{k} \left(\psi_f + \frac{\kappa}{\gamma} \psi_c \right)^j,$$

Stability at ELB, Continued



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Taylor Principle Revisited

Taylor rule:

$$i_t = \phi \pi_t + \varepsilon_t^{MP}$$

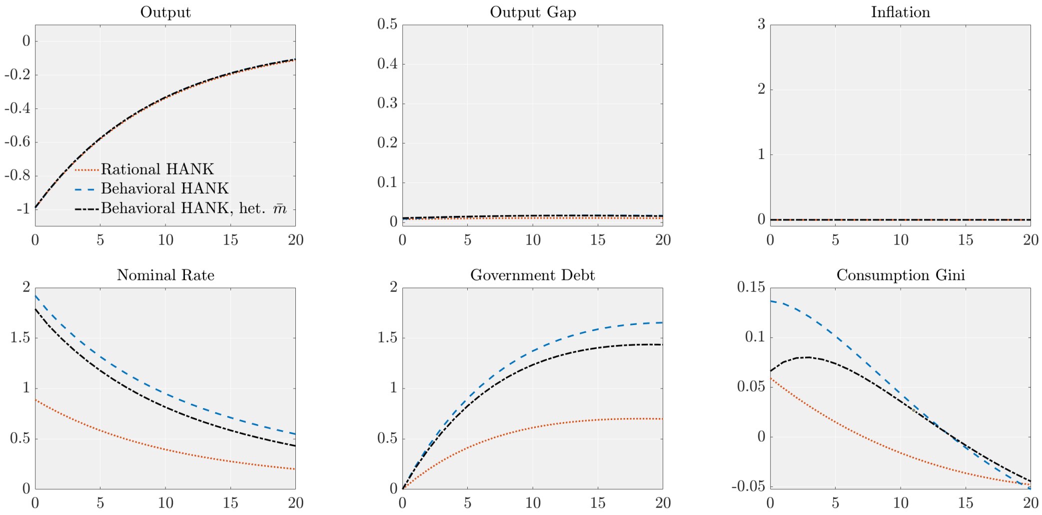
Condition for determinacy:

$$\phi > 1 + \frac{\psi_f - 1}{\frac{\kappa}{\gamma}\psi_c}$$

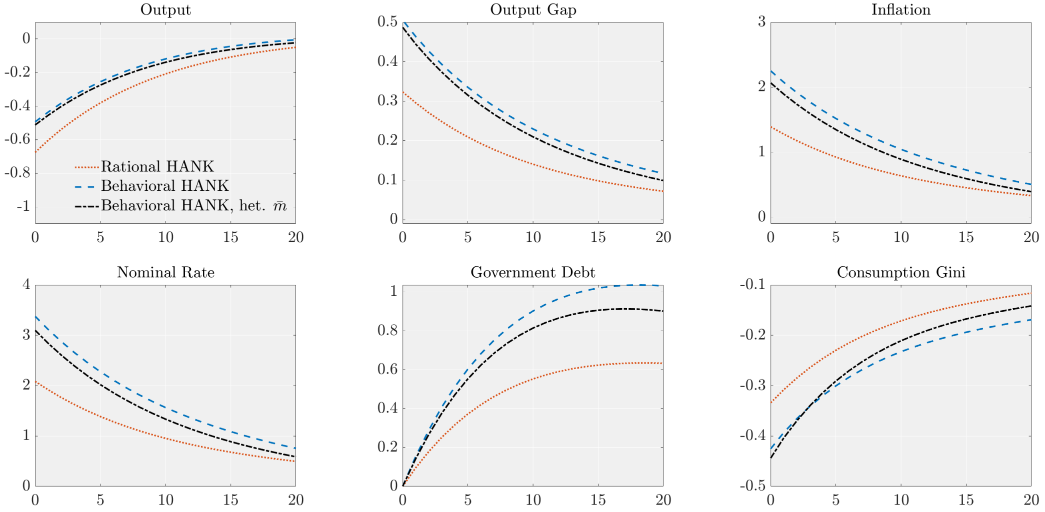
- RANK/TANK: $\bar{m} = \psi_f = 1$: $\phi > 1$
- THANK $\bar{m} = 1$, $\chi = 1.35$, $\psi_f > 1 : \phi > 2.4$
- Behavioral HANK:
  - $\chi = 1.35, \bar{m} = 0.85 : \phi > -4$ (determinacy under a peg)

back

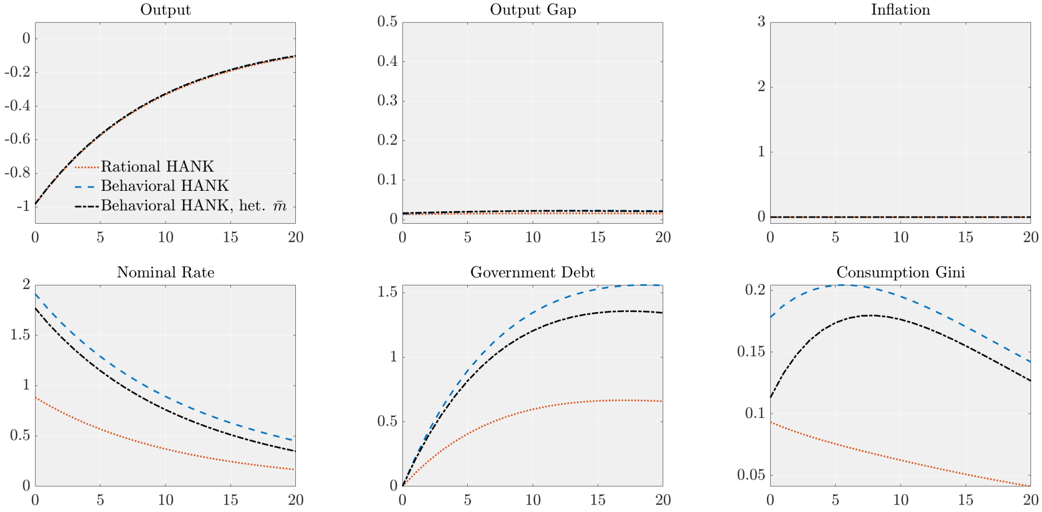
Negative Productivity Shock: Heterogeneous $\bar{m}$



Negative Productivity Shock - Taylor Rule: Heterogeneous $\bar{m}$

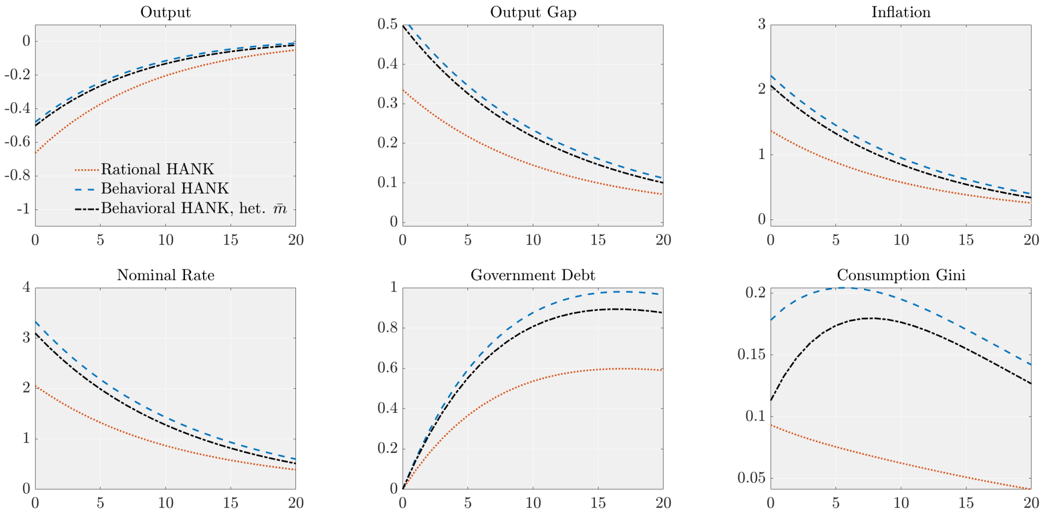


Negative Productivity Shock: Heterogeneous $\bar{m}$, “Flat” Taxes



Negative Prod. Shock - Taylor: Heterogeneous $\bar{m}$, “Flat” Taxes

back



back to conclusion

Introducing Sticky Wages

- Labor union allocates hours of households to firms and makes sure that *U* and *H* households work the same amount.
- Sticky wages: labor union faces Calvo friction $\Rightarrow$ wage Phillips Curve:

$$\pi_t^w = \beta \mathbb{E}_t \pi_{t+1}^w + \kappa_w \hat{\mu}_t^w$$

π_t^w: wage inflation, κ_w: slope, $\hat{\mu}_t^w$: wage markup, given by

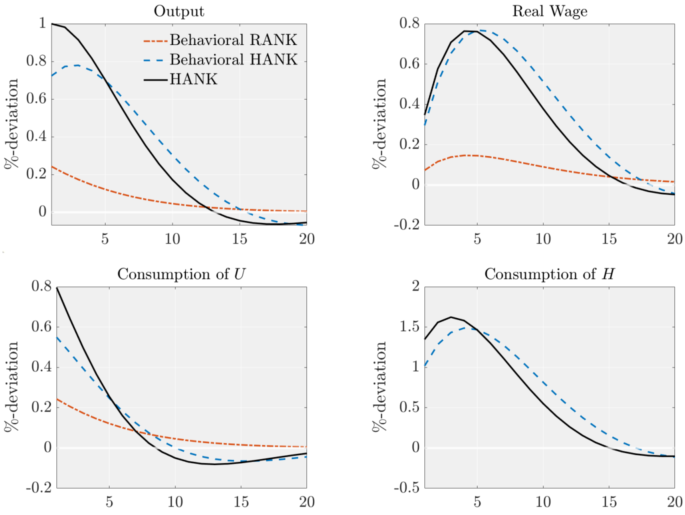
$$\hat{\mu}_t^w = \gamma \hat{c}_t + \varphi \hat{n}_t - \hat{w}_t.$$

- Interest-rate smoothing in Taylor rule (as in Auclert et al. (2020)):

$$\hat{i}_t = \rho_i \hat{i}_{t-1} + (1 - \rho_i)\phi \pi_t + \varepsilon_t^{MP}$$

$\Rightarrow$ How does the economy respond to an expansionary monetary policy shock?

Monetary Policy Shock



Why hump shapes?

Hump-shaped responses due to interaction of household heterogeneity, bounded rationality and sticky wages!

1. Calvo wage setting leads to hump-shape responses of real wage (in all models)
2. In HANK models, this causes hump-shape consumption of a subgroup of households
3. Cognitive discounting flattens consumption profile of unconstrained households:
   - impact response less strong because it dampens the FG component of persistent decline in interest rates
   - going forward, they learn that their idiosyncratic risk is still (or even more) relaxed

Forecast Error Dynamics

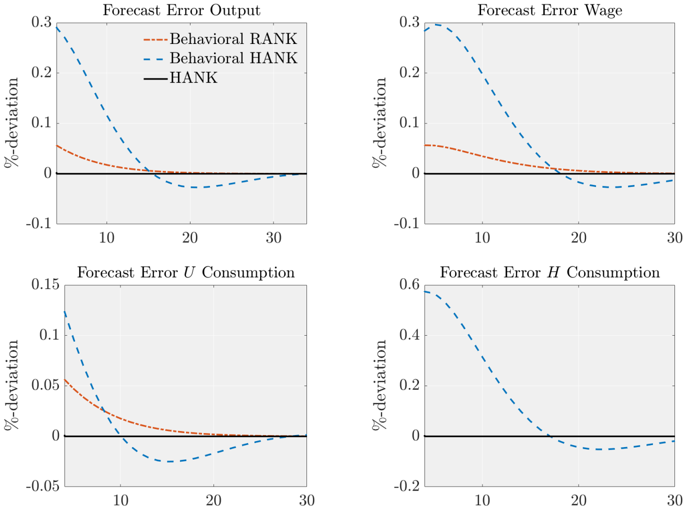
- 1-period ahead forecast error in period $t + h$ is defined as:

$$FE^{\widehat{x}}_{t+h+1|t+h} \equiv \widehat{x}_{t+h+1} - \bar{m}\mathbb{E}_{t+h}\left[\widehat{x}_{t+h+1}\right].$$

$\Rightarrow$ How do forecast errors evolve after shock?

- Full-info rational expectations: equal to zero in all periods *after* shock occurs
- Empirical evidence: persistent deviations from zero with initial underreaction, followed by delayed overshooting (Angeletos et al. (2021))

Forecast Error Dynamics ▸ back



iMPCs

Proposition

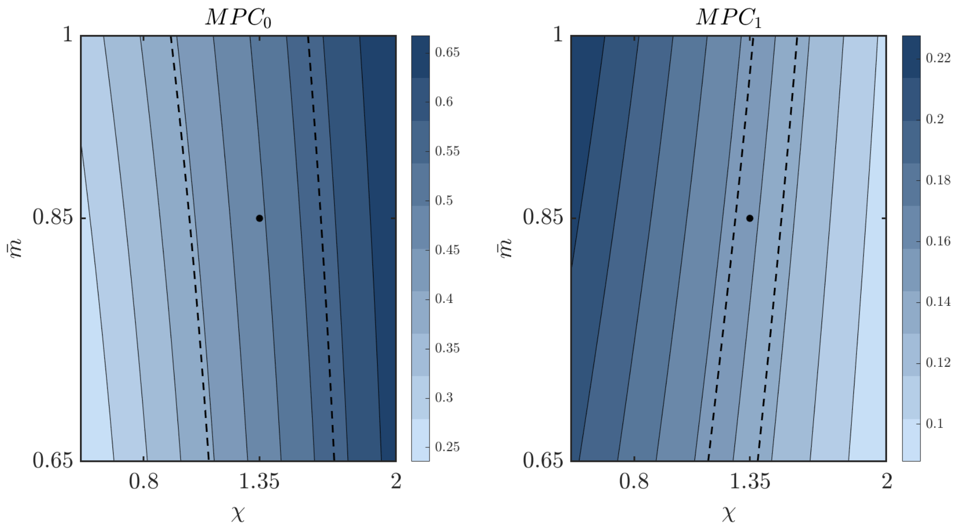
The intertemporal MPCs in the behavioral HANK model, i.e., the aggregate consumption response in period k to a one-time change in aggregate disposable income in period 0, are given by

$$MPC_0 \equiv \frac{d\hat{c}_0}{d\tilde{y}_0} = 1 - \frac{1-\lambda\chi}{s\bar{m}}\mu_2^{-1}$$

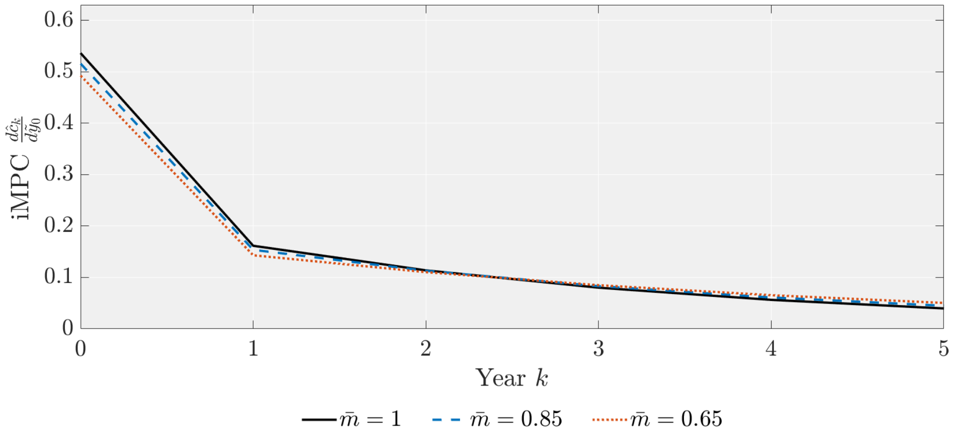
$$MPC_k \equiv \frac{d\hat{c}_k}{d\tilde{y}_0} = \frac{1-\lambda\chi}{s\bar{m}}\mu_2^{-1}\left(\beta^{-1}-\mu_1\right)\mu_1^{k-1}, \qquad \text{for } k>0,$$

where the parameters μ_1 and μ_2 depend on the underlying parameters, including $\bar{m}$ and χ.

iMPCs Results

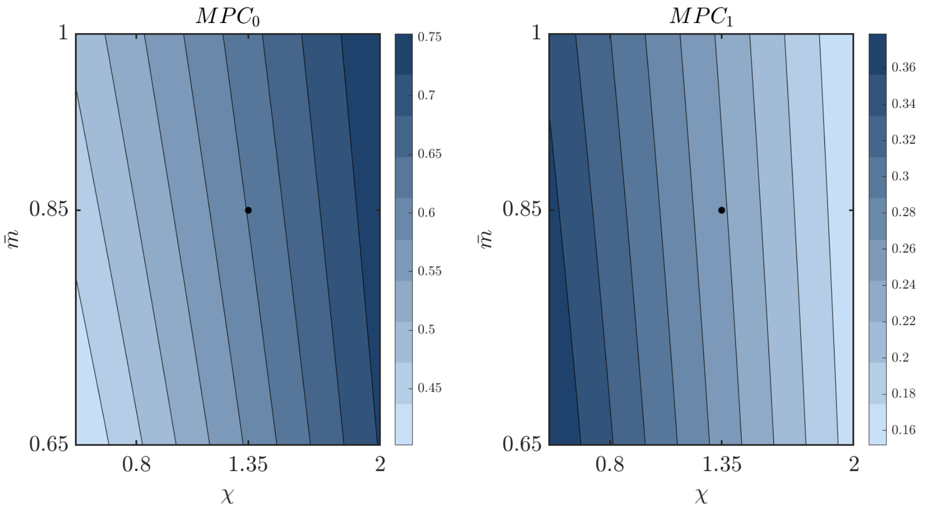


iMPCs for Longer Horizons



◂ back

iMPCs for higher idiosyncratic risk $1-s$



$\Rightarrow$ MPC_1 decreases with $\bar{m}$ if idiosyncratic risk is high enough

back

Firms

- aggregate basket of individual goods, $j \in [0,1]$, $C_t = (\int_0^1 C_t(j)^{(\epsilon-1)/\epsilon} dj)^{\epsilon/(\epsilon-1)}$; $\epsilon > 1$: elasticity of substition
- demand of each firm: $C_t(j) = (P_t(j)/P_t)^{-\epsilon}$ with $P_t(j)/P_t$ being the individual price relative to the aggregate price index $P_t^{1-\epsilon} = \int_0^1 P_t(j)^{1-\epsilon} dj$
- production technology: $Y_t(j) = N_t(j)$; real marginal cost: W_t.
- assuming standard NK optimal subsidy financed by a lump-sum tax on firms yields total profits $D_t = Y_t - W_t N_t$ which are zero in steady state
  $\Rightarrow$ full-insurance steady state
- Linearized Phillips Curve:

$$\pi_t = \kappa \widehat{y}_t + \beta \mathbb{E}_t \pi_{t+1}$$

back

Calibration Tractable Model

Parameter	Description	Value
γ	Risk Aversion	1
κ	Slope of NKPC	0.02
χ	Business-Cycle Exposure of H	1.35
λ	Share of H	0.33
s	Type-Switching Probability	$0.8^{1/4}$
β	Time Discount Factor	0.99
$\bar{m}$	Cognitive Discounting Parameter	0.85

▸ back

Fiscal Multipliers

The fiscal multiplier in the behavioral HANK model is given by

$$\frac{\partial \hat{y}_t}{\partial g_t} = 1 + \frac{1}{1-\nu\mu} \frac{\zeta}{1+\frac{1}{\gamma}\frac{1-\lambda}{1-\lambda\chi}\phi\kappa} \left[\frac{\chi-1}{1-\lambda\chi} [\lambda + \bar{m}\mu(1-s-\lambda)] - \kappa\frac{1}{\gamma}\frac{1-\lambda}{1-\lambda\chi}(\phi-\mu) \right],$$

where

$$\nu \equiv \frac{\bar{m}\delta + \frac{1}{\gamma}\kappa\frac{1-\lambda}{1-\lambda\chi}}{1+\frac{1}{\gamma}\frac{1-\lambda}{1-\lambda\chi}\phi\kappa}. \tag{6}$$

Fiscal Multiplier II

Consider case with completely sticky prices: $\kappa = 0$

$$\frac{\partial \widehat{y}_t}{\partial g_t} = 1 + \frac{\zeta}{1 - \bar{m}\delta\mu}\left[\frac{\chi - 1}{1 - \lambda\chi}\left[\lambda + \bar{m}\mu(1 - s - \lambda)\right]\right]$$

$\Rightarrow$ larger than 1 if and only if $\chi > 1$!

back

Backward-Looking Anchor

Backward-looking anchor $X_t^d = X_{t-1}$ yields:

$$\mathbb{E}_t^{BR}\left[\hat{x}_{t+1}\right] = (1-\bar{m})\hat{x}_{t-1} + \bar{m}\mathbb{E}_t\hat{x}_{t+1}$$

Backward-looking behavioral IS equation (with myopia and anchoring):

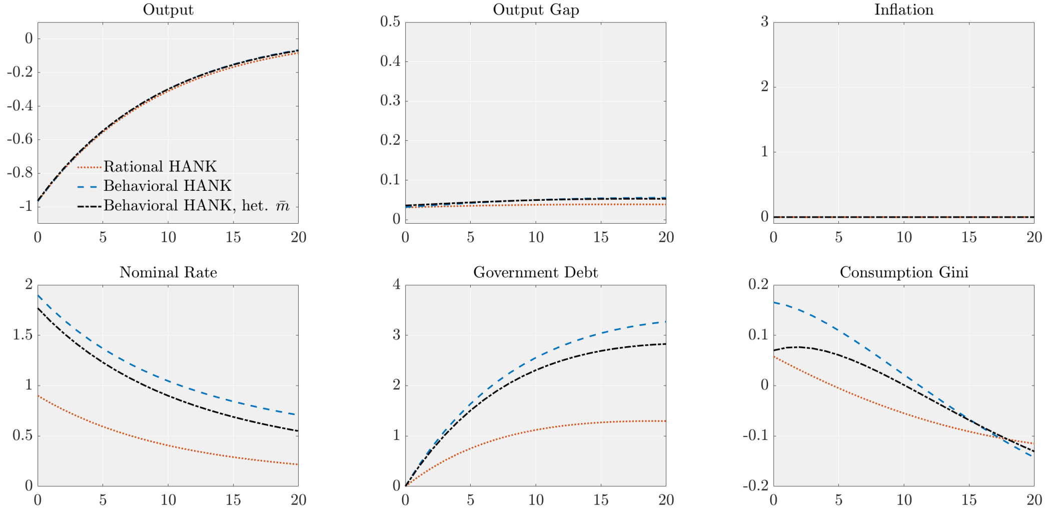
$$\hat{y}_t = \underbrace{\bar{m}\delta}_{=\psi_f}\mathbb{E}_t\hat{y}_{t+1} - \psi_c\frac{1}{\gamma}\left(\hat{i}_t - \mathbb{E}_t\pi_{t+1}\right) + (1-\bar{m})\delta\hat{y}_{t-1}.$$

$\Rightarrow$ reduced-form equivalence with models of incomplete information and learning

Angeletos and Huo (2021), Gallegos (2021)

▸ back

High Initial Debt



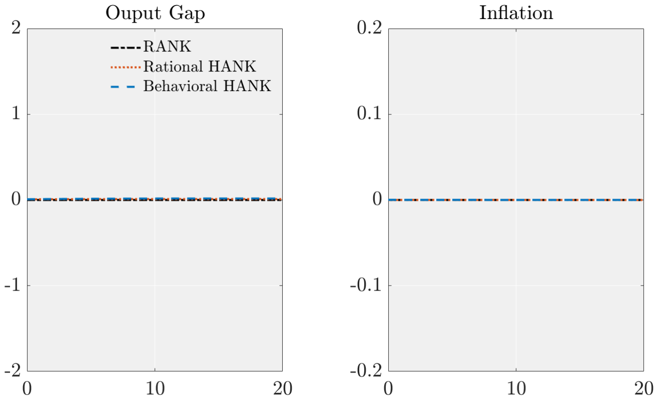
▸ back

Adverse Productivity Shock II

Scenario:

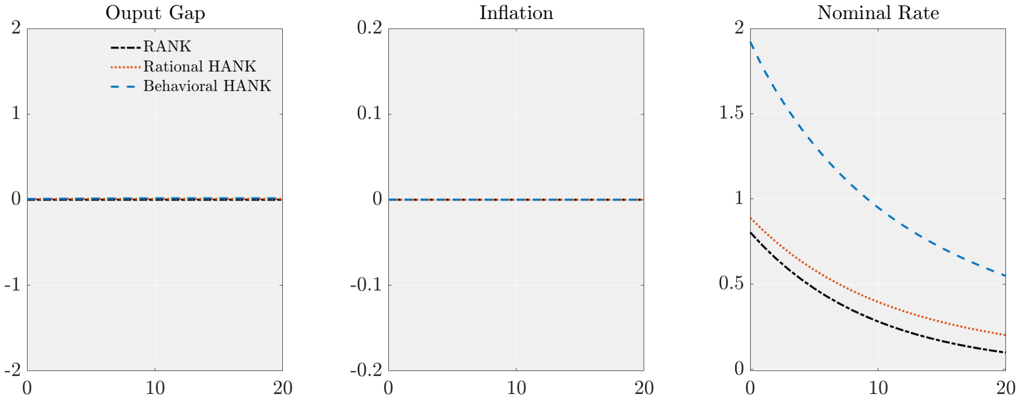
- *potential output* drops by 1% on impact, with $\rho = 0.9$
- **Now: monetary policy fully stabilizes inflation**

Divine Coincidence



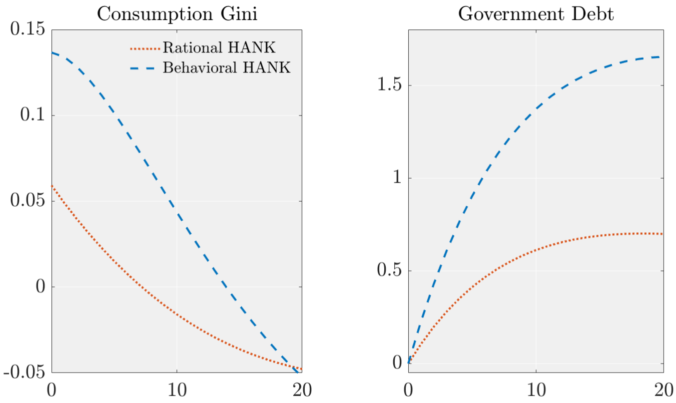
▸ Procyclical HANK ▸ Other Variables

Divine Coincidence But Stronger Monetary Policy Response Needed



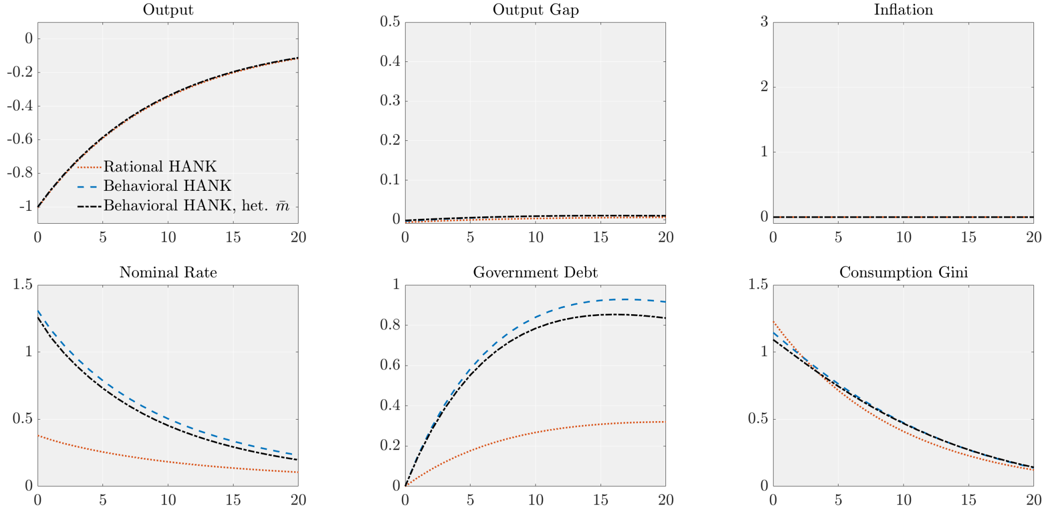
▸ Procyclical HANK ▸ Other Variables

Distributional and Fiscal Consequences



▸ Procyclical HANK ▸ Other Variables ▸ Back to Taylor Rule ▸ Conclusion

Cost-Push Shock



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