

# **Fiscal-Monetary Interactions in the 2020's: Some Insights from HANK Models**

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# Outline

## 1. Relevant **features** of HANK models

“HANK Models: What Are They? And What Have We Learned?” Kaplan (2024)

## 2. Old and new **lessons** about fiscal-monetary interactions

- **Fiscal stimulus**: effects of funded and unfunded transfers
- **Monetary policy**: effects of interest rates on inflation

“Implications of Fiscal-Monetary Interaction from HANK Models” Kaplan (2025)

## 3. Quantitative **effects** of large policy responses of the 2020's

“How Does Monetary and Fiscal Policy Shape Macroeconomic Dynamics in the Face of Large Shocks?” Kaplan and Miyahara (2025)

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## 1. HANK Models

## 2. Lessons About Fiscal and Monetary Policy

Fiscal Stimulus

Interest Rate Changes

## 3. Fiscal Stimulus and Interest Rate Policy in the 2020s

# Three Differences Between RANK and HANK

## 1. Heterogeneous marginal propensities to consume (MPC)

- Precautionary savings motive  $\Rightarrow$  concave consumption policy function
- Liquid wealth main determinant of MPCs  $\Rightarrow$  overwhelming empirical evidence

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## 3. Upward sloping steady-state asset supply curve

- **RANK**: perfectly elastic supply curve  $r^* = \rho$
- **HANK**: upward sloping curve  $\mathbf{a}(r)$ :  $\lim_{r \rightarrow \rho} \mathbf{a}(r) = \infty$
- Asset market clearing condition:  $\mathbf{a}(r) = \mathbf{b}(\cdot) \Rightarrow$  endogenous natural rate  $r^* < \rho$

# An Important Premise: Positive Government Debt

- **Government budget constraint:** full consequences of brought to bare on the economy

$$\dot{b}_t = r_t b_t - s_t$$

- In reality  $b > 0$ :  $\begin{cases} \text{households do have positive wealth} \\ \text{governments do issue positive amounts of debt} \end{cases}$

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- A useful integral restriction

$$\frac{b_0}{b_\infty} = \int_{t=0}^{\infty} \omega(t) e^{-\int_{j=0}^t (\hat{i}_j - \hat{\pi}_j) dj} e^{\hat{s}_t} dt$$

- $\hat{\pi}_t$ : inflation deviations
- $\hat{i}_t$ : nominal rate deviations
- $\hat{s}_t$ : log surplus deviations
- $\omega(t) = r^* e^{-r^* t}$ : weighting function



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- A useful integral restriction, for small deviations:

$$\log \frac{b_0}{b_\infty} = \int_{t=0}^{\infty} \omega(t) (\hat{\pi}_t - \hat{i}_t + \hat{s}_t) dt$$

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# Fiscal Stimulus Payments in RANK

- Issue new nominal debt  $\Delta B^*$ , transfer lump-sum to households, no change in nominal rate
- **RANK funded fiscal stimulus**
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- **RANK unfunded fiscal stimulus**
  - **Flex prices:** one-time jump in price level to  $P_0 = (1 + \Delta)P^*$ , no change in real rate or inflation:

$$\frac{B^*}{P^*} = \frac{\bar{s}}{\rho} = \frac{B^* (1 + \Delta)}{P_0}$$

- **Sticky prices:** temporary inflationary boom, cumulative price level increase  $P_\infty \approx (1 + \Delta)P^*$

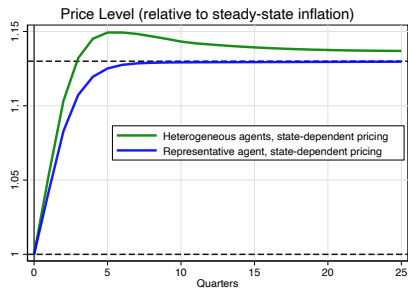
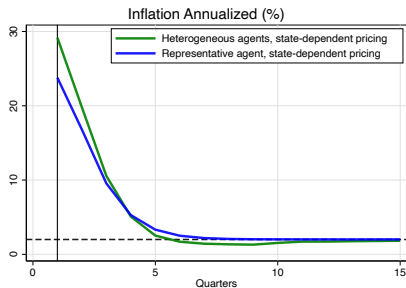
$$\log(1 + \Delta) \approx \underbrace{\int_{t=0}^{\infty} \omega(t) \hat{\pi}_t dt}_{\text{since inflation and } \omega(t) \text{ both declining}} \approx \int_{t=0}^{\infty} \hat{\pi}_t dt \approx \log \frac{P_\infty}{P_0}$$

# Unfunded Stimulus Payments are More Inflationary in HANK

- **HANK: unfunded fiscal stimulus**  $\Rightarrow$  real redistribution
- MPC heterogeneity  $\Rightarrow$  spending pressure  $\Rightarrow$  more inflation, lower real rate

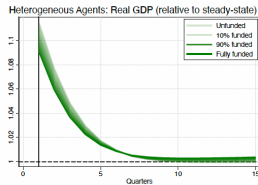
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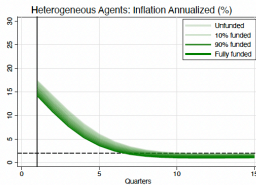


- **Corollary 1**: more targeted stimulus leads to higher inflation
- **Corollary 2**: pure redistribution without new debt issuance is inflationary

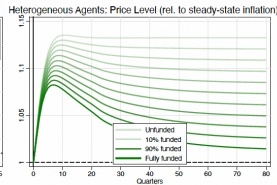
# Even Fully Funded Stimulus is Inflationary in HANK



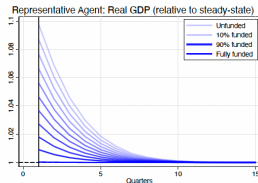
(a) GDP, Heterogeneous Agents



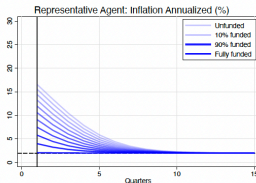
(b) Inflation, Heterogeneous Agents



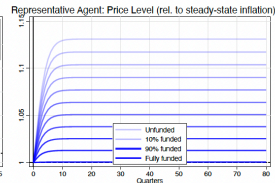
(c) Price level, Heterogeneous Agents



(d) GDP, Representative Agent



(e) Inflation, Representative Agent



(f) Price level, Representative agent

- Ricardian non-equivalence: inflationary boom from funded stimulus
- Fully-funded temporary stimulus permanently increases price level



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# Monetary Policy Leaves Fiscal Footprints

- **Passive fiscal rule:** surplus stabilizes real debt via **lump sum taxes**

$$s_t = \bar{s} + \phi(b_t - b^*), \quad \phi > r^*$$

Implement  $b^*$  as steady-state by setting  $\bar{s}$  so that  $b^* = \mathbf{a}(\frac{\bar{s}}{b^*})$

- Temporary **rate hike:** debt increases above  $b^*$ , leading to **larger surplus**
  - **RANK:** larger surplus has no consequence (**Ricardian equivalence**)
  - **HANK:** timing and distribution of higher transfers or lower taxes matters

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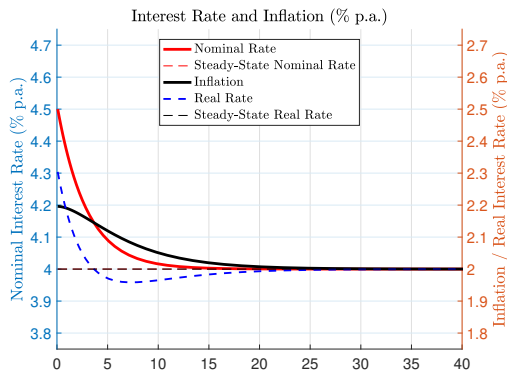
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- Temporary **rate hike:** debt increases above  $b^*$ , leading to larger surplus
  - **RANK:** larger surplus has no consequence (**Ricardian equivalence**)
  - **HANK:** timing and distribution of higher transfers or lower taxes matters
- Importance of fiscal footprints depends on:  $\left\{ \begin{array}{l} \text{size of government debt} \\ \text{duration of government balance sheet} \end{array} \right.$

# Raising Nominal Rates Without a Fiscal Contraction Raises Inflation



- **HANK**: IRF to unexpected temporary 50 bp increase in nominal rate, no change in primary surplus
- **RANK**: same dynamics provided  $b > 0$ : extremely robust feature of NK model
- Inflation rises    • Real rate initially rises then falls below steady state    • Output also rises

# Raising Nominal Rates Without a Fiscal Contraction Raises Inflation

- Economy returns to same real steady-state:  $b_{\infty} = b_0 > 0$  and no change in surplus  $\hat{s}_t = 0$

$$0 = \int_{t=0}^{\infty} \omega(t)(\hat{i}_t - \hat{\pi}_t)dt$$

⇒ weighted average of real rate deviations is zero

- Temporary increase in  $i_t$  requires discounted cumulative  $\pi_t$  to be positive ⇒ price level increases
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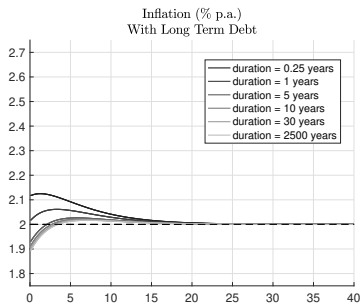
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## What goes wrong with standard NK intuition?

- **Passive fiscal policy**: typical experiment includes a future fiscal contraction  $\hat{s}_t \uparrow$
- Higher surpluses is what lowers inflation, not higher nominal rates

# With Long-term Debt, Raising Rates can Temporarily Lower Inflation



- IRF with long-term debt: inflation can fall on impact but rises more later on ('stepping on a rake')
- **Flex price RA** with exponential debt maturity structure:  $\Rightarrow \frac{Q_0^\delta B_0^\delta}{P_0} = \frac{\bar{s}}{\rho}$ 
  - Higher nominal rate  $i_t \uparrow$ : debt price falls  $Q_0^\delta$ , so price level falls on impact
  - Higher inflation takes over  $\pi_t = i_t - \rho$ , and eventually price level ends up higher than otherwise

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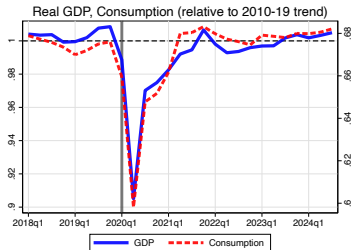
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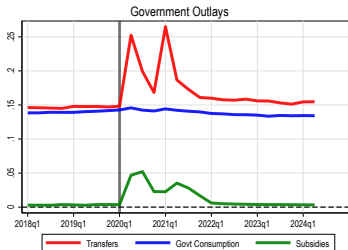
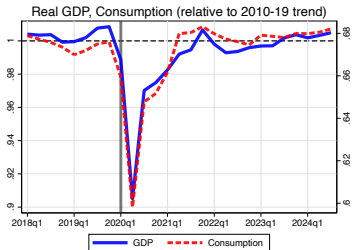
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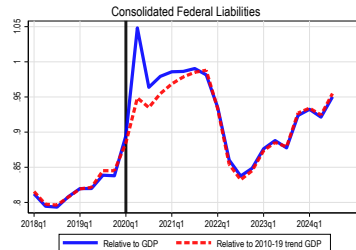
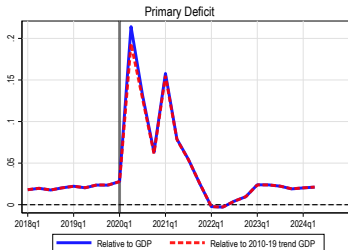
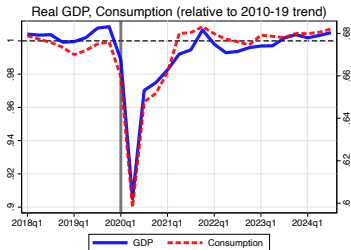
# Big Shocks, Big Policy Responses



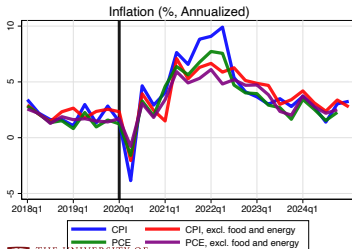
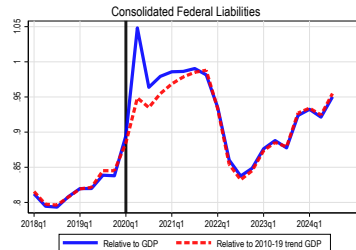
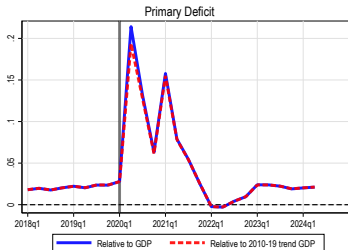
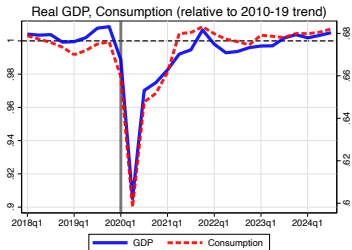
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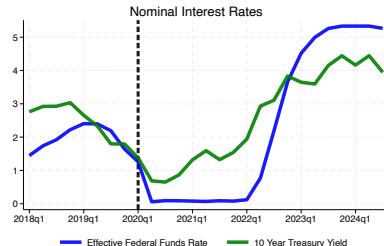
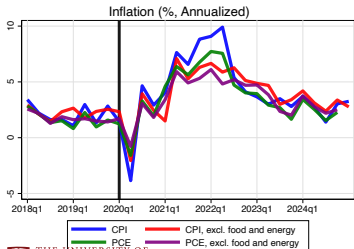
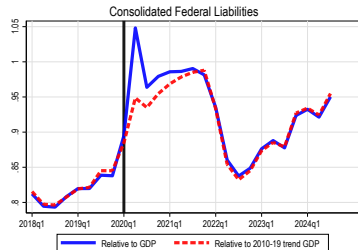
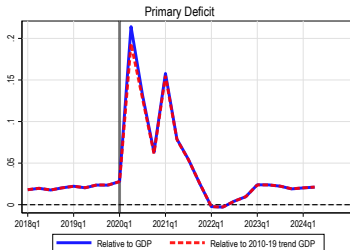
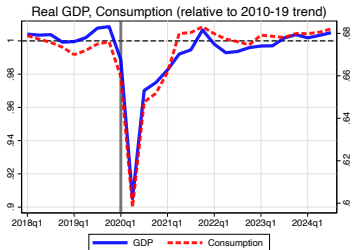
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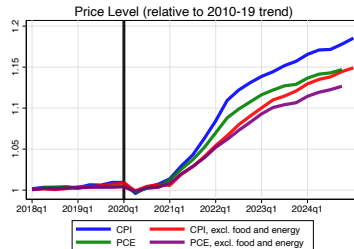
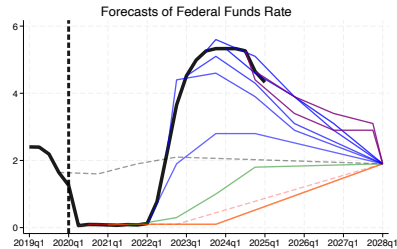
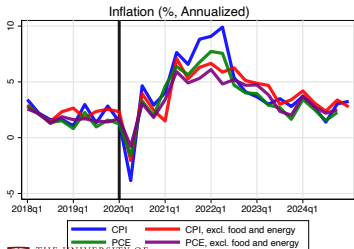
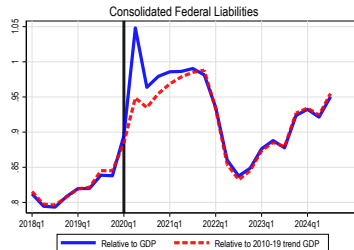
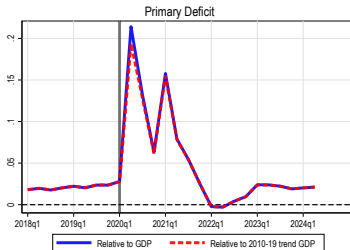
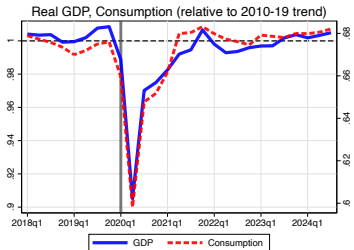
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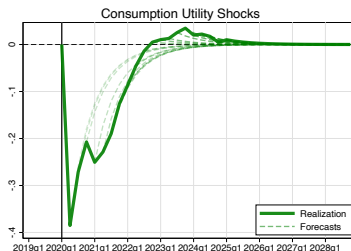
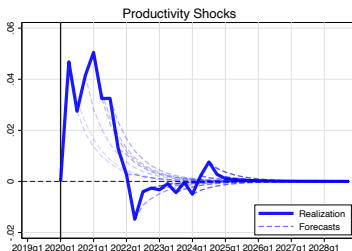
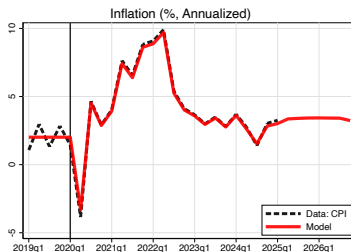
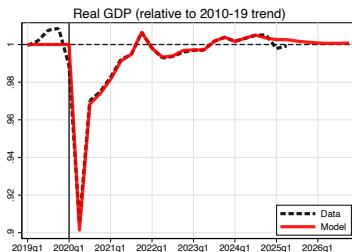
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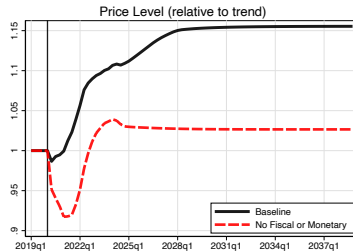
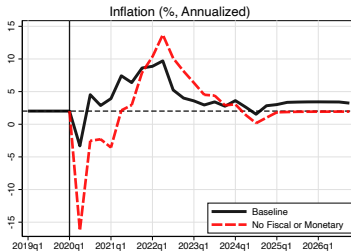
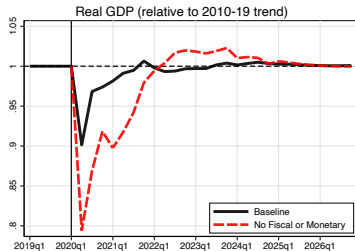


# HANK model with State-dependent Pricing Kaplan and Miyahara (2025)



- Estimate AR(1) innovations:
  - Productivity (supply)
  - Consumption utility (demand)to match GDP and inflation
- Multiple rounds of stimulus unexpected, targeted
- Discipline fed funds rate expectations with median consensus forecasts

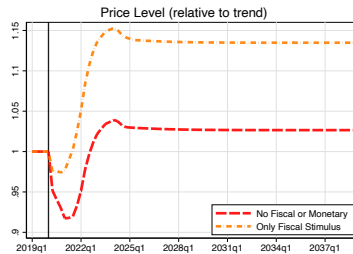
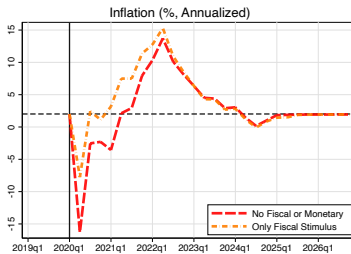
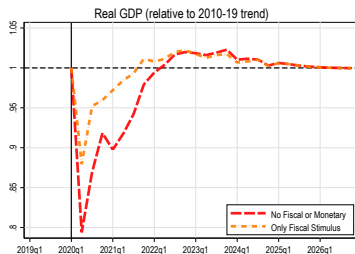
# What did Monetary and Fiscal Policy do?



- Counterfactual: no fiscal stimulus, no change in nominal rates
- Large impact !

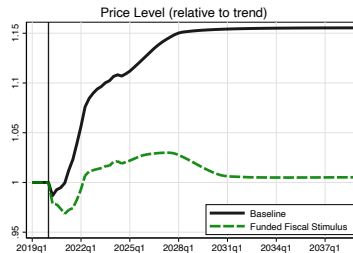
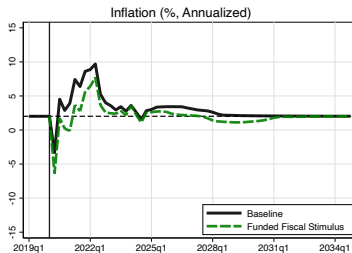
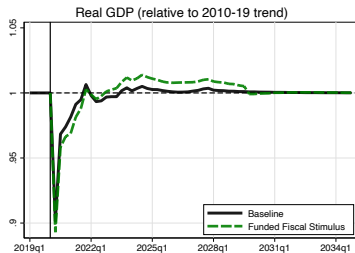


# The Role of Fiscal Stimulus



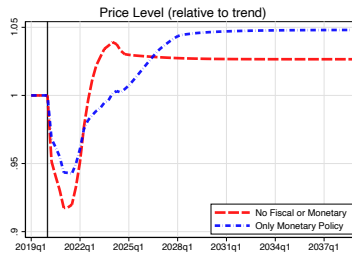
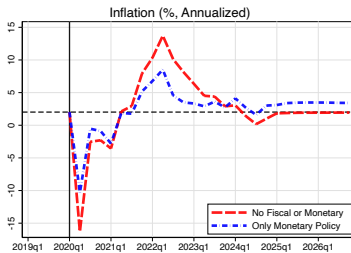
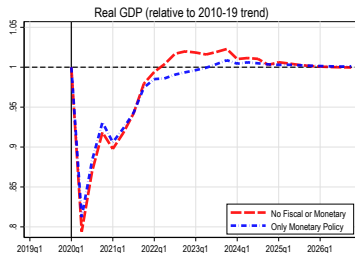
- **Fiscal stimulus:** supported output, prevented deflation, at cost of permanently higher prices
  - Inflation would have surged to similar heights even without stimulus, but long-run price level would have been similar
- ⇒ both views were right

# What if Stimulus Package Had Been Funded?



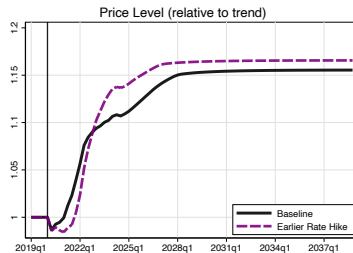
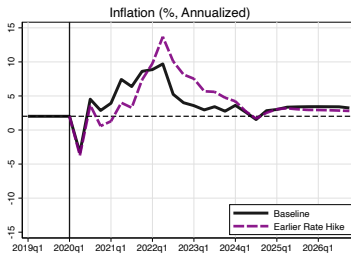
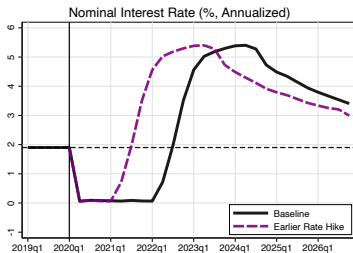
- **Experiment:** Announce commitment to repay additional debt starting in 2030Q1, by lowering uniform lump-sum transfers, compare with unfunded stimulus
- Lower inflation throughout
- Minimal difference on GDP in 2020, higher GDP through 2020's

# The Role of Monetary Policy



- **Monetary easing in 2020:** little effect on output, some effect on deflation
- **Monetary tightening in 2022:** lowered spike at cost of persistently high inflation and permanently higher price level

# What if Fed had Started Raising Rates Sooner?



- **Experiment:** Start raising rates, and associated forecasts, one year earlier
- Lower inflation in 2021
- Higher inflation from 2022 to 2024, with larger cumulative effect on price level

# Conclusions

- **Lesson:** government budget constraint matters  $\Rightarrow$  textbook RANK model is very special
- Key features of HANK models give rise to fiscal-monetary interactions :
  - MPC heterogeneity
  - Ricardian non-equivalence
  - Inelastic steady-state asset supply

Not unique to HANK: OLG, spender-saver models, bonds-in-utility models, ...

- **Fiscal and monetary policy** both important for aggregate dynamics in 2020s