

Redistribution and Reallocation

Monetary Policy with Heterogeneous Returns

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Joint Committee on Taxation

May 16, 2026

This paper reports on research undertaken as part of my doctoral dissertation at Carnegie Mellon University. The content herein does not represent the opinions of any member of the Joint Committee on Taxation nor of the United States Congress.

Motivation

- Wealth inequality largely due to **heterogeneous returns**
 - Top 0.01% earn returns **3.5x** higher than average (Smith et al., 2023)
 - Key component: **leverage**; relevant Debt/Assets **44%** (FRB)
- Expansionary monetary policy: **lowers** borrowing costs, **increases** asset values
 - Benefits wealthy households, as in data (Medlin, 2023)
- Aggregate implications of this redistribution: **critical** but **under-examined**
 - Implications: productivity (Baqee et al., 2021), **crucial** for understand agg. response
 - HANK: rep. firm, common returns, borrowers poor

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Question

Can heterogeneity in *returns*, leverage help us understand aggregate effects of monetary policy?

What I do

Approach:

- Build model capturing joint distn. of wealth, returns, leverage: **entrepreneurs**
 - Returns endog. to **monetary policy** and **wealth distribution**
 - Borrowers: wealthy, high **MPI**

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Results:

1. Monetary expansion: redistributes assets **towards wealthy households**
 - Two channels: inflation, profit margins
 - Increases **aggregate productivity**
2. Size of response **hump-shaped** in wealth inequality
 - Countervailing forces
3. Calibration: increase in **wealth inequality** since 1970s → decline in **MP effects**

Existing Literature

Supply-side HANK

- HANK with heterogeneous:
 - **Firms:** Baqaee et al. (2021); González et al. (2024); Auclert et al. (2025)
 - **Investors:** Matusche and Wacks (2021); Kekre and Lenel (2022); Melcangi and Sterk (2024)
- Puzzle in data: since 1970s, **inequality** \uparrow , but **MP effect on output** \downarrow (Boivin et al., 2010)

Main Contributions

- **Model:** HANK with heterogeneous returns
- **Results:** countervailing forces in wealth inequality \rightarrow can explain puzzle!

Model

Model

Households

- Assets: capital, **nominal** bonds; *net worth* a_{it} (assets - debt)
- Can become **entrepreneurs**: run firm with idios. productivity z_{it} ; $y_{it} = (z_{it}k_{it})^\alpha n_{it}^{1-\alpha}$
 - End of t : realize $z_{i,t+1}$, choose $k_{i,t+1}$
- Finc. friction $\implies k_{i,t+1} \leq \lambda a_{i,t+1}$, $\lambda \geq 1$

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Decisions

- $\underline{z}_{t+1} = (r_{t+1} + \delta)/\omega_{t+1}$: indifferent
- $z_{i,t+1} > \underline{z}_{t+1}$: **entrepreneur**, $k_{i,t+1} = \lambda a_{i,t+1}$
- $z_{i,t+1} < \underline{z}_{t+1}$: **lender**, $k_{i,t+1} = 0$

Model

Decisions and Returns

Gross return to a_t :

$$R_t(z) = \begin{cases} 1 + \underbrace{i_t - \pi_t}_{=r_t} & z \leq \underline{z}_t \text{ (lender)} \\ 1 + \lambda(\omega_t z - \delta) - (\lambda - 1)(i_t - \pi_t) & z > \underline{z}_t \text{ (entrepreneur)} \end{cases} \quad (1)$$

where $\omega_t \equiv \omega(w_t, p_{tx})$ agg. profit margin per zk

- Returns endog. to **Monetary Policy** i_t , **wealth dist.**
 - Key: **persistence in returns**
 - With probability p , **keep** $z_{i,t+1} = z_{i,t}$
 - With probability $1 - p$, draw $\ln z_{i,t+1} \sim \mathcal{N}(-\sigma_z^2/2, \sigma_z)$
- $\implies p = \text{corr}(z_{i,t}, z_{i,t+1})$

Model

Rest of Equilibrium

- Mass μ_w of workers: hand-to-mouth, $N_t^s = w_t^{1/\eta}$
- Production: entrepreneurs \rightarrow retailers \rightarrow final goods

$$\pi_t = \kappa_p \hat{p}_{tx} + \beta \mathbb{E}_t \pi_{t+1}$$

- Monetary policy: Taylor rule for period-ahead nominal rate

$$i_{t+1} = \bar{r} + \phi_\pi \pi_t + \nu_t$$

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Policy Experiment: Unanticipated Easing

“MIT” shock at $t = 0$: $\nu_0 < 0$, $\nu_{t+1} = \rho_\nu \nu_t$

Policy Experiment: Redistribution

Redistribution

Effect of MP *amplified* by shifting assets

- Wealth share: $s_t(z) \equiv K_t^{-1} \int_0^\infty ag_t(a, z) da$

Redistribution

Effect of MP *amplified* by shifting assets

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Result: Redistribution

Given π_0 , change at $t = 0$ is

$$\begin{aligned} \hat{s}_1(z) &= p\beta R(z) \left\{ \hat{R}_0(z) - \hat{R}_{0K} \right\} \\ &= p \underbrace{\beta R(z)}_{MPS(z)} \left(\underbrace{\frac{\lambda - 1}{R(z)}}_{\varepsilon_{R(z), r}} \pi_0 + \hat{\omega}_0 \underbrace{\left[\frac{\lambda\omega z}{R(z)} - \frac{\omega Z}{R_K} \right]}_{\varepsilon_{R(z), \omega} - \varepsilon_{R_K, \omega}} \right), \quad z > \underline{z} \end{aligned}$$

- Two channels: **inflation** devalues debt; agg. demand \uparrow \rightarrow agg. **profit margin** \uparrow
- Assets shift towards **entrepreneurs**, esp. **higher** z

Productivity

Redistribution raises aggregate productivity

Result: Productivity Response

The change in productivity following the shock is

$$\hat{Z}_1 \propto \pi_0 \beta p (Z - \underline{z}) \underbrace{\frac{\lambda - 1}{\lambda}}_{D/K} \quad \text{Inflation}$$
$$+ \hat{\omega}_0 p \mathbb{E}_s [(z - \underline{z}) \cdot MPS(z) \cdot (\varepsilon_{R(z), \hat{\omega}} - \varepsilon_{R_K, \hat{\omega}}) | z > \underline{z}] \quad \text{Profit}$$

- Pushes PPF out, Phillips curve down

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Major implication

Productivity $\uparrow \implies$ agg. effects of MP depend on **redistribution**

**Monetary Policy
and
Wealth Inequality**

Monetary Policy and Wealth Inequality

Question now

How does **redistribution** following monetary easing depend on **wealth inequality**?

Monetary Policy and Wealth Inequality

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How does **redistribution** following monetary easing depend on **wealth inequality**?

- Notion of wealth inequality: Gini Coefficient G
 - Intuitively: divergence between $F(z)$ and $S(z)$
- Key determinants of G : **persistence** p , **volatility** σ_z

Monetary Policy and Wealth Inequality

Question now

How does **redistribution** following monetary easing depend on **wealth inequality**?

- Notion of wealth inequality: Gini Coefficient G
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First Result:

No inequality ($G = 0$), perfect inequality ($G = 1$): **No** amplification through redistribution!

Redistribution and Inequality

Result: Redistribution hump-shaped in starting inequality

Proposition: Redistribution and Reallocation

Given a price change π_0 , for $z > \underline{z}$

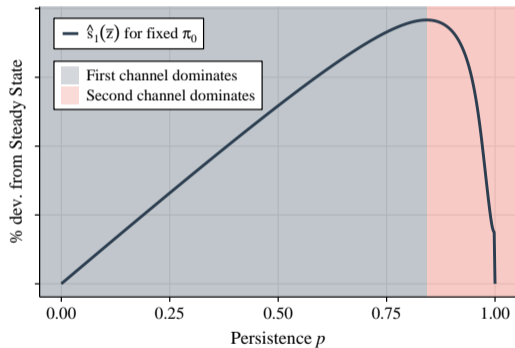
$$\frac{d}{dp} \hat{s}_1(z) = \underbrace{\beta R(z) (\hat{R}_0(z) - \hat{R}_{0K})}_{>0} \quad \textcircled{1}$$

$$+ p\beta \times \underbrace{\frac{d}{dp} \left\{ R(z) \cdot (\hat{R}_0(z) - \hat{R}_{0K}) \right\}}_{<0} \quad \textcircled{2}$$

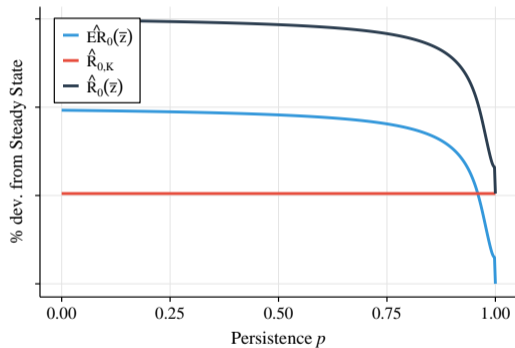
- Term ①: Given excess return $\widehat{ER}_0(z)$, scope for type $z > \underline{z}$ to *accumulate*
→ Is the initial redistribution *targeted*?
- Term ②: Given scope for accum., *level* of excess returns
→ Higher p : S.S. $R(z) \rightarrow R_K$, so $\hat{R}_0(z) \rightarrow \hat{R}_{0K}$ and $\widehat{ER}_0(z) \rightarrow 0$

Redistribution and Inequality

Figure: Initial responses to shock, fixed π_0



(a) Redistribution $\hat{s}_1(\bar{z})$ in p



(b) Period 1 Returns in p

Productivity Response

Result: Productivity response inherits hump shape

Productivity response:

$$\hat{Z}_1 \propto \int_{\underline{z}}^{\bar{z}} (z - \underline{z}) \hat{s}_1(z) s(z) dz$$

- Additional forces: $s(z)$, cutoff \underline{z}

Productivity Response

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Takeaway

Productivity inherits **hump-shape** in redistribution

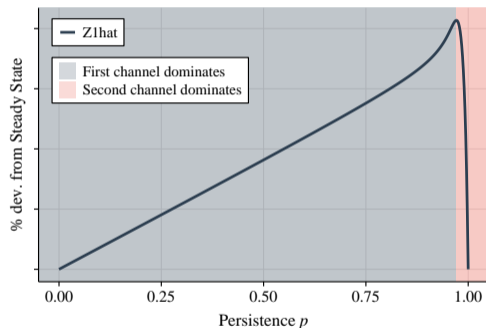


Figure: Productivity response \hat{Z}_1 , fixed π_0

Quantitative Results

Quarterly Calibration

Capturing joint distribution of wealth and returns, leverage

Table: Key Parameters (quarterly)

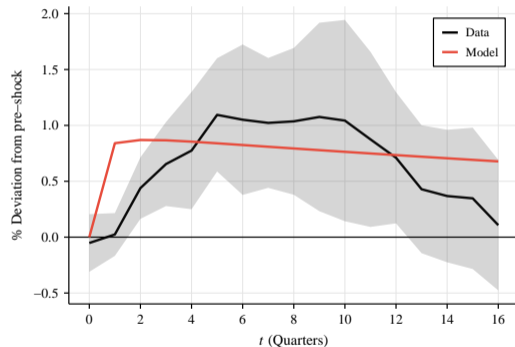
Parameter	Value	Parameter	Value
β	0.99	δ	0.02
p	0.98	σ_z	2.75
μ_w	0.4	λ	1.67

- β : avg. return to wealth (Fagereng et al., 2020), δ : $K/Y = 12$
- p, σ_z : Gini of 0.8 (1970-2022 avg.), SD of idios. returns 1.9% (Fagereng et al., 2020)
- μ_w : flat portion of Lorenz (wealth)
- λ : aggregate debt / assets (Corporate + noncorporate)

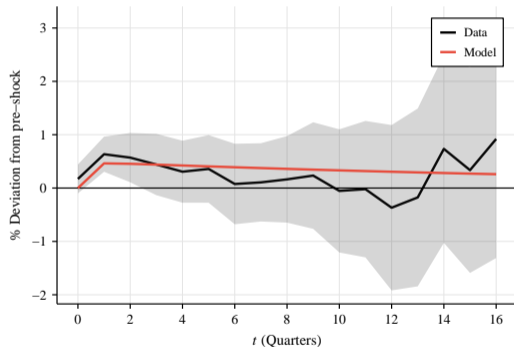
Baseline Calibration

Model captures responses of TFP, inequality

Figure: Impulse responses, 100bp monetary shock



(a) TFP \hat{Z}_t



(b) Gini \hat{G}_t

Empirical IRFs estimated using Jordà (2005) projections. Shaded areas are 90% CIs. Shocks from Wieland and Yang (2020).

Change in Inequality

Since 1970s: Increase in inequality, decrease in MP effect

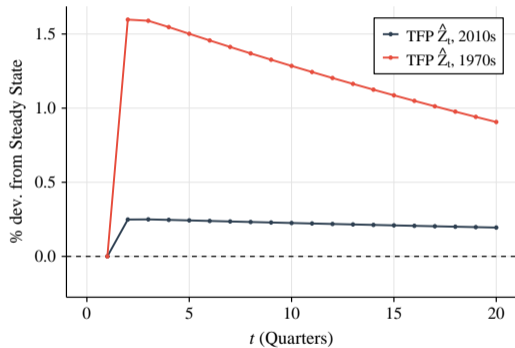
Table: Changes, 1970s-2010s

Parameter	Value, 1970s	Value, 2010s
p	0.980	0.985
σ_z	1.15	3.90
Gini	0.7	0.82

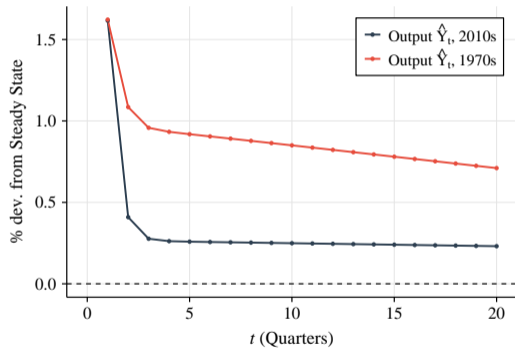
- Since 1970s: increase in persistence, variance
- **Both** decrease redistribution

Change in Inequality

Calibrating to data: second channel dominates



(a) TFP \hat{Z}_t



(b) Output \hat{Y}_t

Conclusion

- Model accounting for joint distribution of **wealth** and **returns, leverage**
- Monetary easing **increases productivity** by **redistributing to wealthy households**
- Size of aggregate effect: **hump-shaped in wealth inequality**
 - Countervailing forces
- Since 1970s: second force dominates, **increase in inequality** → **decreasing effect of MP**

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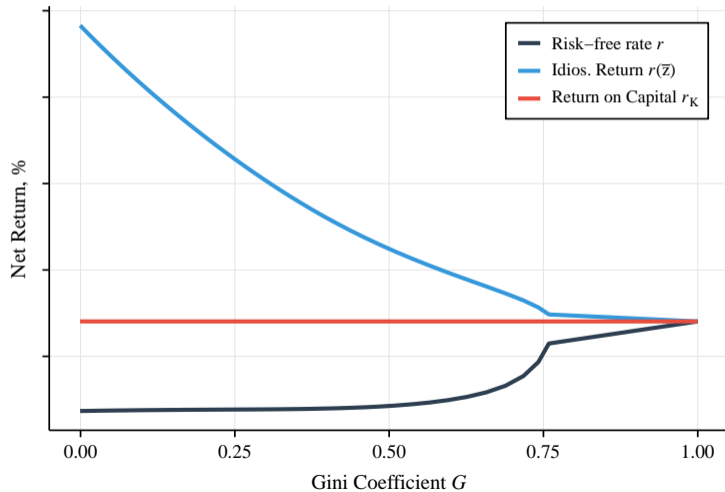
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Steady State: Inequality and Returns

Wealth concentration *aligns* returns



Baseline Calibration

Redistribution flattens Phillips Curve

