Thoughts on Monetary Policy in a K-Shaped Economy

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The views expressed in this paper solely reflect those of the authors and do not necessarily represent those of the Bank of Canada or its Governing Council

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Preamble

- **Hypothesis:** AI will disrupt the labor market, creating winners and losers
- Winners:
  1. Workers possessing skills or performing tasks complementary with AI or, at least, not fully replaced by AI
  2. Individuals owning equity in AI companies
- Losers: workers displaced by AI automation
- This is a long-run, low-frequency shift in the production structure

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- Winners:
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- Losers: workers displaced by AI automation
- This is a long-run, low-frequency shift in the production structure
- Monetary policy is neither equipped nor supposed to address structural transformation

But... there are interactions

- Interactions between structural trends operating in the background and the conduct of monetary policy at three levels:

  1. Determination of r^*

  2. Cycle can worsen the trend

  3. Transmission mechanism of monetary policy

1. Determination of r^*

Labor market equilibrium (r)

- Task-based framework to model automation (Zeira, 1998; Acemoglu-Autor, 2011; Acemoglu-Restrepo, 2018)
- Two types of workers $z \in \{z_1, z_2\}$, equally productive but performing different tasks
- Aggregate production function:

$$Y(r) = \mathcal{Z}\left(\frac{\alpha}{r+\delta}\right)^{\frac{\alpha}{1-\alpha}} \prod_{z\in\{z_1,z_2\}} \ell_z^{\frac{(1-\alpha_z)\eta_z}{1-\alpha}} \qquad \text{with} \quad \frac{\dot{\mathcal{Z}}}{\mathcal{Z}} = g$$

- Wage rate for $z \in \{z_1, z_2\}$:

$$w_z(r) = (1-\alpha_z)\eta_z \frac{1}{\ell_z} Y(r)$$

- Demand for capital:

$$K(r) = \frac{\alpha}{r+\delta} Y(r) \quad \Rightarrow \quad \frac{d(K/Y)}{dr} < 0$$

Consumption and saving

- Two types of agents
- **Workers**:
  - Hand-to-mouth, consume their labor income every period $\rightarrow C_z$
- **Capitalists**:
  - Own capital, forward looking, discount the future at rate ρ
  - Period utility ($A :=$ wealth relative to income):

$$U = \frac{C_\kappa^{1-\gamma}}{1-\gamma} + \xi \frac{A^{1-\sigma}}{1-\sigma},$$

$\Rightarrow$ Supply of capital not perfectly elastic (Moll-Rachel-Restrepo, 2022; Mian-Straub-Sufi, 2021)

Supply of capital (r) from the household sector

- Balanced growth ($\gamma = 1$ & $g > 0$):

$$A(r) = \left[\frac{\xi(r-g)}{\rho-(r-g)}\right]^{\frac{1}{\sigma-1}}$$

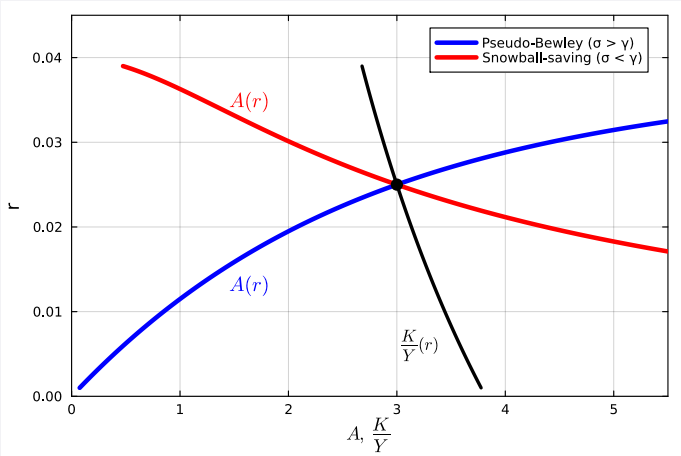
1. **Pseudo-Bewley economy** ($\sigma > \gamma$): marginal propensity to save out of permanent income decreases with wealth $\Rightarrow$ $A(r)$ is increasing

2. **Snowball-saving economy** ($\sigma < \gamma$): marginal propensity to save out of permanent income increases with wealth $\Rightarrow$ $A(r)$ is decreasing

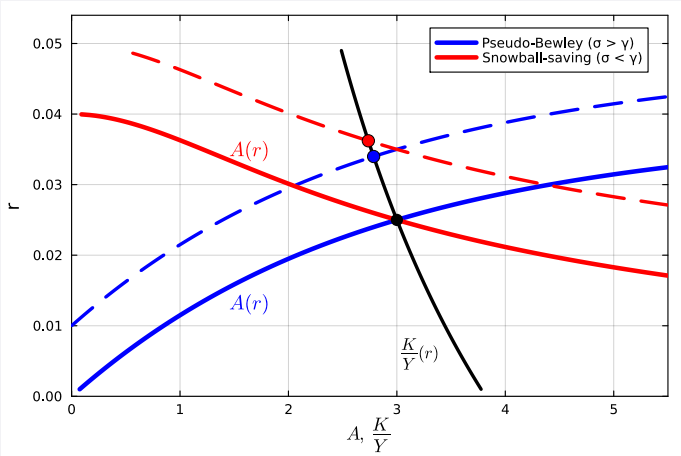
- Equilibrium in asset market:

$$A(r) = \frac{\alpha}{r+\delta}$$

Steady-state equilibrium in the two cases

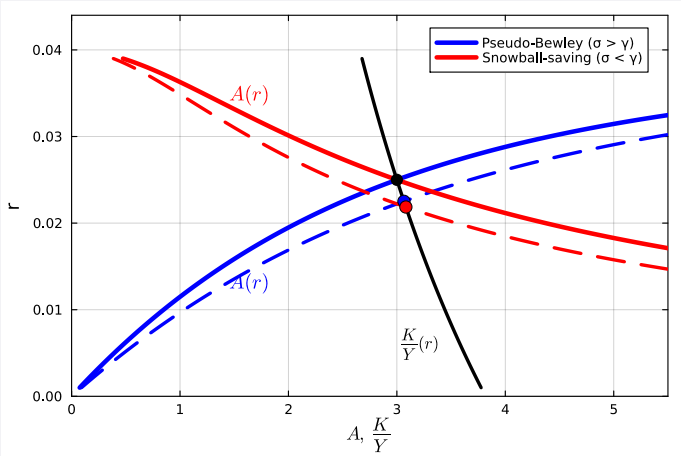


Faster growth: increase in g



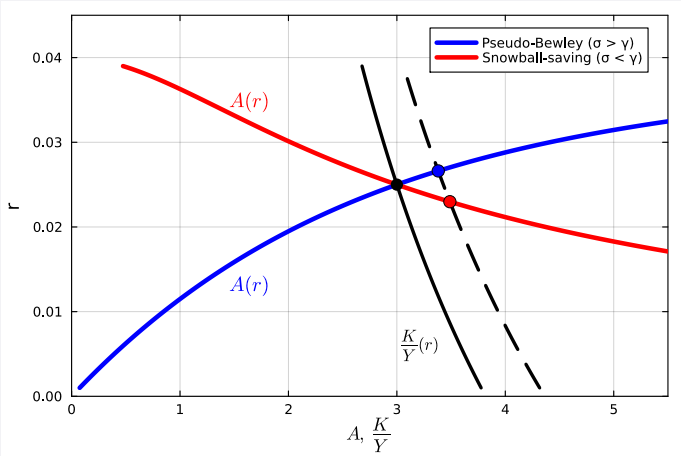
- r^* always increases

Higher uncertainty: increase in ξ



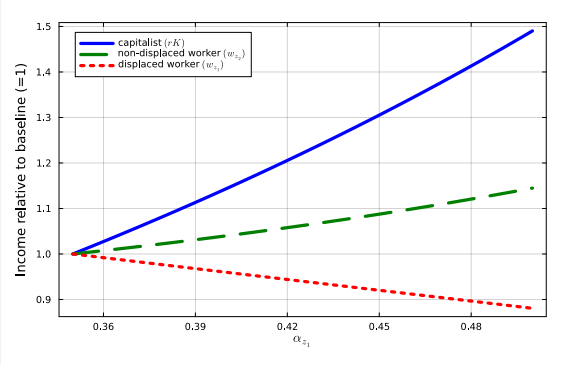
- r^* always falls

Automation: reduction in $1 - \alpha_{z_1}$



- r^* increases in the Bewley economy, but falls in the Snowball-saving economy

K-shape in incomes due to automation



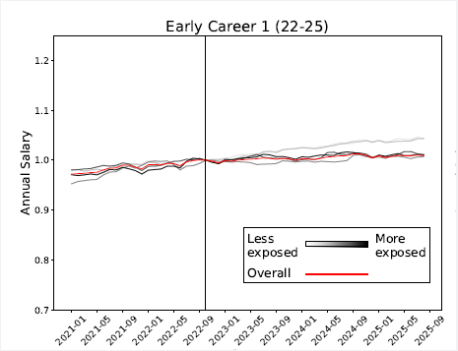
- Ranking invariant to γ vs σ
- Wages of the displaced workers:

$$d \log w_{z_1} = \underbrace{d \log(1 - \alpha_{z_1})}_{<0} + \underbrace{d \log Y(r)}_{>0}$$

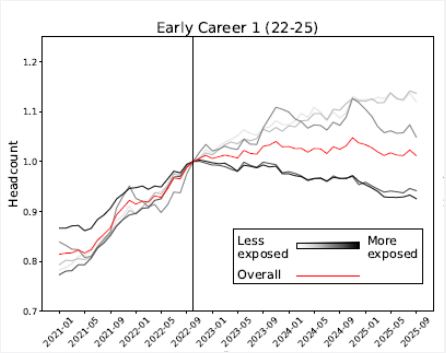
2. Business cycle worsens the trend

Early impact of AI: wages vs employment

Impact on wages

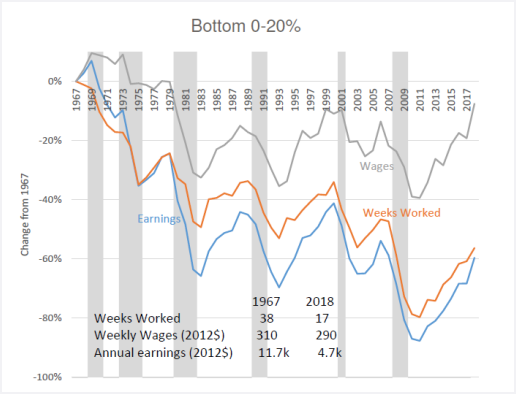


Impact on employment



Brynjolfsson-Chandar-Chen (2025): *Canaries in the Coal Mine? Six Facts about the Recent Employment Effects of Artificial Intelligence*

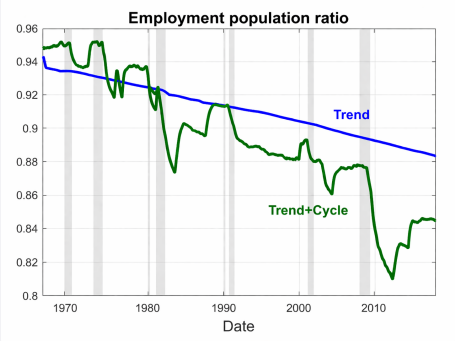
True for SBTC over the past 40 years



Heathcote-Perri-Violante (2020): *The Rise of US Earnings Inequality: Does the Cycle Drive the Trend?*

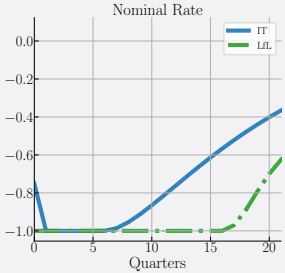
- Technological displacement occurs through a decline in employment/participation, not wages

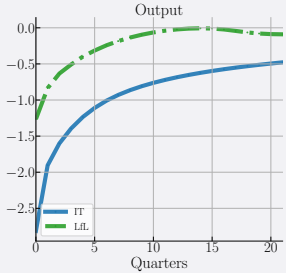
Recessions exacerbate the structural trend (HPV, 2020)

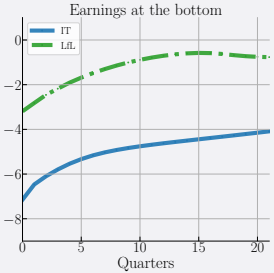


- **Mechanism**: scarring effects on skills from displacement induce labor-market hysteresis
- Underlying technological trend (here SBTC) is invariant to monetary policy
- Compounding effect of the cycle is not

Lower-for-Longer (LfL) as an antidote to scarring







Alves-Violante (2025): *Monetary Policy Under Okun's Hypothesis*

- Large negative demand shock which triggers the ZLB
- Standard IT strategy is unable to deal with scarring effects
- LfL strategy mitigates cycle-trend interaction, especially at the bottom, by extending recoveries

3. Transmission mechanism of monetary policy

Two offsetting forces in HANK models

1. Cyclical risk channel

- Governed by countercyclicality of precautionary saving
  - Higher displacement risk, especially in recessions

  $\Rightarrow$ Amplification of monetary surprises

2. Cyclical inequality channel

- Governed by cross-sectional covariance between MPC and exposure to aggregate shocks
  - Income of high-MPC households shifts from labor to transfers (less exposure)
  - Income to low-MPC households shift towards capital (more exposure)

  $\Rightarrow$ Dampening of monetary surprises

Conjecture: 1. dominates early in the transition and 2. later on, in the long run

Historical K-shape