Discussion of "The Transmission of Monetary Policy through Redistributions and Durables Purchases" by Silvana Tenreyro and Vincent Sterk

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and Transmission in the Post-Crisis Period
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What this paper does

This paper:

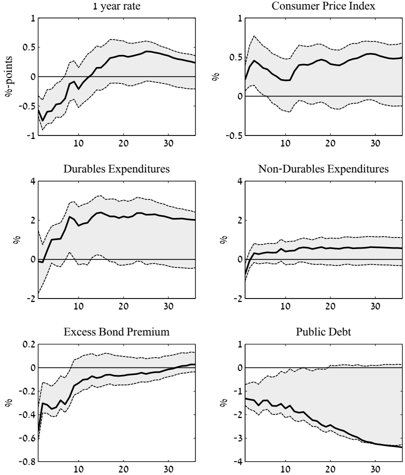
- Provides impulse responses to monetary policy shocks without constraining impact price effect, following Gertler and Karadi (2015)
- Rationalizes these responses in a *flexible price model* in which nominal redenomination provides a key *redistributive* impulse
- Brings back focus on nature of open market operations in implementation of monetary policy

This discussion:

- Focuses on the model mechanism and its quantitative importance
- Identifies another channel that could act in the other direction

Key facts from S-VAR exercise

Figure 1: Responses to an Expansionary Monetary Policy Shock in the VAR.



Note: horizontal axes denote months after the shock.

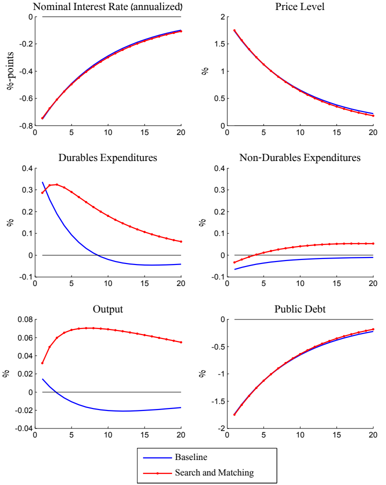
- Gertler-Karadi high-frequency identification, monthly data
- $\widehat{P_0}$ is unrestricted
  - "better" than Cholesky
- 75bp identified fall in $i \Rightarrow$
  - 0.5% sustained P **increase**
  - 1-2% D increase
  - 0-0.5% ND incrase
  - 1.5% fall in B
- But GK *find* $\widehat{P_0} \simeq 0$
  - Difference?

Key mechanism

- Overlapping generations of households (HH), all nominal savers
- Government (G) nominal borrower
- OMO: $M \uparrow \Rightarrow P \uparrow$, redistributes from HH to G
- G gains not fully rebated to the currently alive (OLG+fiscal policy rule) $\Rightarrow$ **negative wealth effect**
  - **Labor supply $\uparrow$, Consumption $\downarrow$**
  - Real rate $r \downarrow$ to clear markets
  - In equilibrium:
    - Labor and output $\uparrow$, durables $\uparrow$, *nondurables* $\downarrow$
    - $i \downarrow$
  - Qualitatively consistent with data, except for nondurables
  - Quantitative responses are *very small* in benchmark model

Key results from calibrated model

Figure 2: Responses to an Expansionary Monetary Policy Shock in the Baseline Model and the Model with Search and Matching Frictions.



Note: horizontal axes denote quarters after the shock.

- 75bp identified fall in $i \Rightarrow$
  - 2% reversing P increase
  - 0.3% D increase
  - 0.1% ND decrease
  - 0.02% Y increase
  - 1.5% fall in B

Outline

1. Simplified version of model
2. Model mechanism and quantification
3. Alternative mechanism and conclusion

Simplified version: OLG model

- Two groups: young y and old o.
  - $y \to o$ with probability ρ_0
  - Old die with probability ρ_x
  - Steady-state: ν y agents and $1-\nu$ o agents
  - First death draw at retirement: $\rho_x = 1$ limit is $\nu = 1$
- Calibration: $\frac{1}{\rho_0} = 40$ years, $\frac{1}{\rho_x} = 20$ years, $\nu \simeq \frac{2}{3}$
- **No annuity markets**: self-save for retirement
- Simplified model with only nondurable consumption:

$$\mathbb{E}\left[\sum \beta^t \frac{c^{1-\sigma}}{1-\sigma}\right]$$

- One real bond, gross real rate R.
- Endowment: $y = 1$ for young, 0 for old
- Calibration: $R = 4\%$ annual, $\beta^{-1} - 1 = 11\%$ annual, $\sigma = 1$

Old problem (Fisher (1930), Yaari (1965))

- *o* solve:

$$V^o(a) = \max \frac{c^{1-\sigma}}{1-\sigma} + \beta(1-\rho_x) V^o(a')$$
$$c + \frac{a'}{R} = a$$

Fisherian solution: $\ln\left(\frac{c_{t+1}}{c_t}\right) \simeq \frac{r-\rho-\rho_x}{\sigma} \simeq \frac{4-11-5}{1} = -12\%$

$$c_{t+1} = \left[\beta R(1-\rho_x)\right]^{\frac{1}{\sigma}} c_t$$
$$c_t = \gamma a_t$$

Marginal propensity to consume:

$$\gamma = 1 - \left[\beta(1-\rho_x)\right]^{\frac{1}{\sigma}} R^{\frac{1}{\sigma}-1} \simeq 0.039/\text{quarter}$$

Young problem

- y solve:

$$
\begin{aligned}
V^{y}(a) &= \max \frac{c^{1-\sigma}}{1-\sigma} + \beta(1-\rho_0)V^{y}(a') + \beta\rho_0(1-\rho_x)V^{o}(a') \\
& c + \frac{a'}{R} = a + y
\end{aligned}
$$

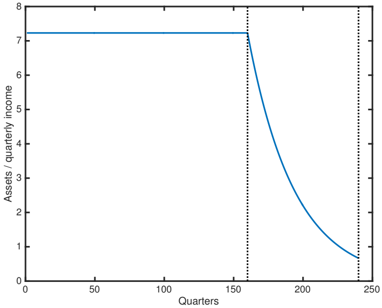
Euler equation shows **precautionary savings**

$$c_t^{-\sigma} = \beta R(1-\rho_0)c_{t+1}^{-\sigma} + \beta R\rho_0(1-\rho_x)(\gamma a_{t+1})^{-\sigma}$$

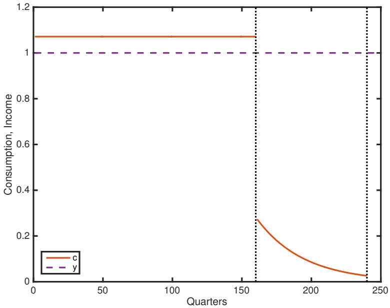
- Insert $c_t = a_t - \frac{a_{t+1}}{R} + y$, find second-order ODE in a_{t+1}
- Steady state has buffer stock $a^* = y\left(\gamma\left[\frac{\beta R\rho_0(1-\rho_x)}{1-\beta R(1-\rho_0)}\right]^{-\frac{1}{\sigma}} + \frac{1}{R} - 1\right)^{-1}$
  - $a^* = 1.80\times$annual income
- Shooting solution: given a_0, find a_1 such that $a_\infty = a^*$

Solution assuming young starts at $a = a^*$

Assets



Consumption and income

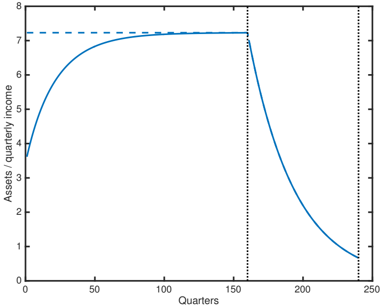


- Representative young agent

- Large c jump at retirement
- $\Rightarrow \beta R \ll 1$ in steady-state

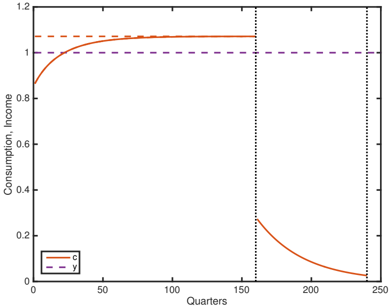
Solution assuming young starts away from a^*

Assets



- Long transition to a^*
- Explains slow unwind of $P \uparrow$

Consumption and income



- Depressed c in transition

Explaining the model mechanism

- Wealth distribution has closed-form solution. Total

$$a = \nu a^* + (1-\nu)(.3)\, a^*$$

  - young own 87% of wealth

- In full calibrated model, wealth is

$$a = (1-\delta)\, d + m + Rb$$

  - $(1-\delta)\, d$: durables, real, 155% of annual GDP
  - m: money, **nominal**, 16% of annual GDP
  - Rb: government debt, **nominal**, 60% of annual GDP

- OMO: $P \uparrow \Rightarrow a_i \downarrow$ with $da_i = -(m_i + Rb_i)\frac{dP}{P} \equiv -NNP_i \frac{dP}{P}$
  - NNP_i: i's net nominal position (Doepke-Schneider)
  - $\Rightarrow$ prolonged $c \downarrow$ and $n \uparrow$
  - $\Rightarrow r \downarrow$, imbalance correction from **durables** (substitution effect)

Explaining the model mechanism

- Doepke-Schneider (2006) evidence

TABLE 1
Net Nominal Positions of U.S. Households in 1989

Type of Instrument	Age Cohort					
	≤ 35	36–45	46–55	56–65	66–75	> 75
	A. All Households					
Short-term	−2.3	4.4	5.5	10.8	12.4	18.1
Bonds	11.7	13.2	11.4	12.6	12.4	16.4
Mortgages	−47.5	−23.4	−10.5	−4.7	−1.4	−.4
Equity	−4.5	−4.3	−4.1	−3.5	−4.0	−3.5
Total NNP	−42.6	−10.1	2.3	15.2	19.4	30.6

- NNPs are *negative* for most working agents! (mortgages)
- They experience a *positive* wealth effect of $P \uparrow$

Why are the responses small?

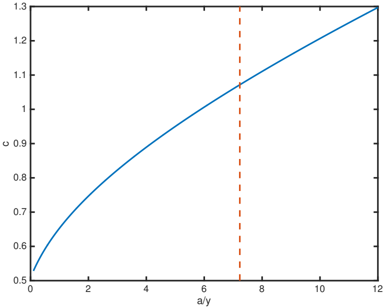
- In the calibration $MPH_i = -MPC_i$
- So individual c and h respond to $\frac{dP}{P}$ by

$$dc_i \simeq -MPC_i \times NNP_i \times \frac{dP}{P}$$
$$dh_i \simeq MPC_i \times NNP_i \times \frac{dP}{P}$$

- Here: $\frac{dP}{P} = 2\%$, $MPC = 5\%$, $NNP = 76\% \times 4$
  - total dh_i, dc_i **less than** 0.3**%** even though $\frac{dP}{P}$ large
  - GE: government rebate and $r \downarrow$ dampen even more!
- Root cause of small aggregate effect
  - small MPCs and MPHs
  - short asset durations
- But MPCs are *not* small in the (nonlinearized) model

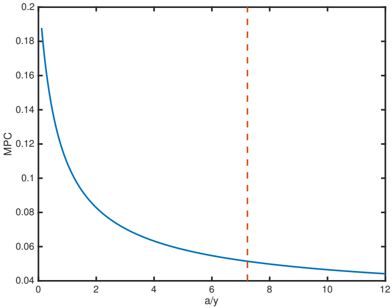
Implications for the cross-section of young agents

C function



- Concave (Carroll-Kimball)
- Aggregation only if all at a^*

Quarterly MPCs



- SS: MPC=0.051/quarter
- Away: huge heterogeneity

Plausible alternative mechanism

- MPCs are large for the young, negative-NNP agents
- MPCs are small for the old, positive-NNP agents
  1. Within-household redistribution pushes **up** consumption (Fisher effect)
  2. Households *as a whole* lose to government, pushes **down** consumption (Pigou effect)
- Which effect dominates?
  - Depends on $\mathrm{Cov}\,(MPC, NNP)$ and government fiscal rule
  - Empirical evaluation is possible
- Very different role for P redistribution in transmission of MP:
  - Under 1 it is an *amplification mechanism*
  - Under 2 it is a *source* of real interest rate effects of MP

Conclusion

- Very nice and tractable framework, very well written paper
- Plausible mechanism that explains effects of monetary policy with flexible prices (great)
- Allows one to think about consequences of MP implementation via OMOs vs Helicopter Drops (nice)
- Benchmark effects are small, higher MPCs and MPHs would increase them
- Going forward: more work needs to be done to evaluate Fisher vs Pigou hypotheses