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A New Keynesian Preferred Habitat Model with Repo

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SCAN ME

Motivation: Treasury Convenience in Recessions

- Magnitude: convenience yield explains $> 50\%$ term structure changes.
- Direction: convenience $\uparrow$ in GFC, but $\downarrow$ in Covid-19.

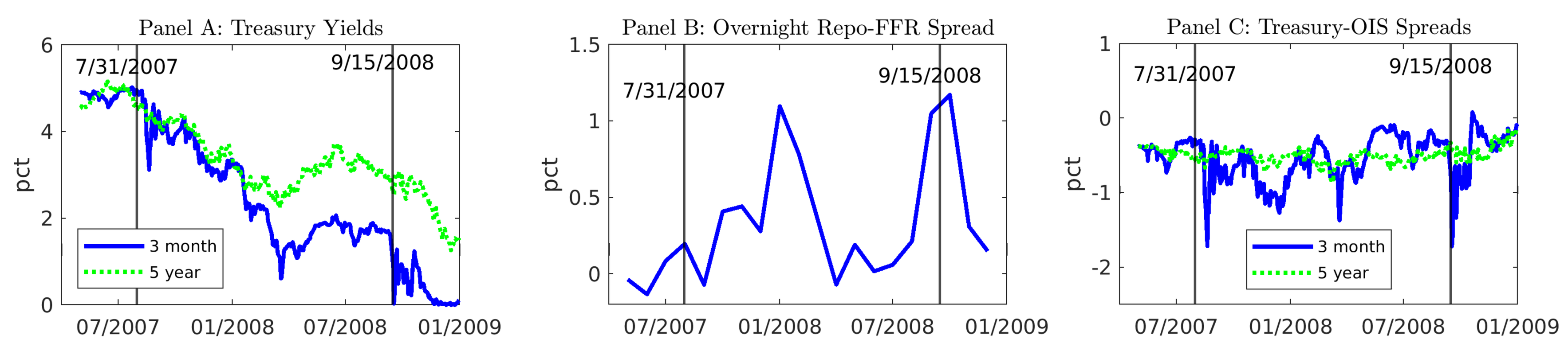


Figure 1. GFC: Collapse of Bear Sterns Lehman Brothers

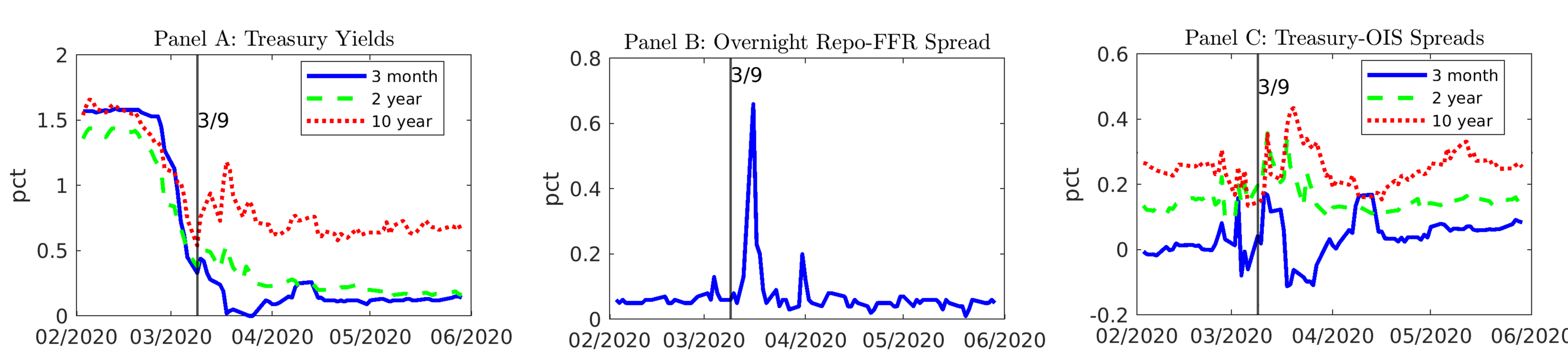
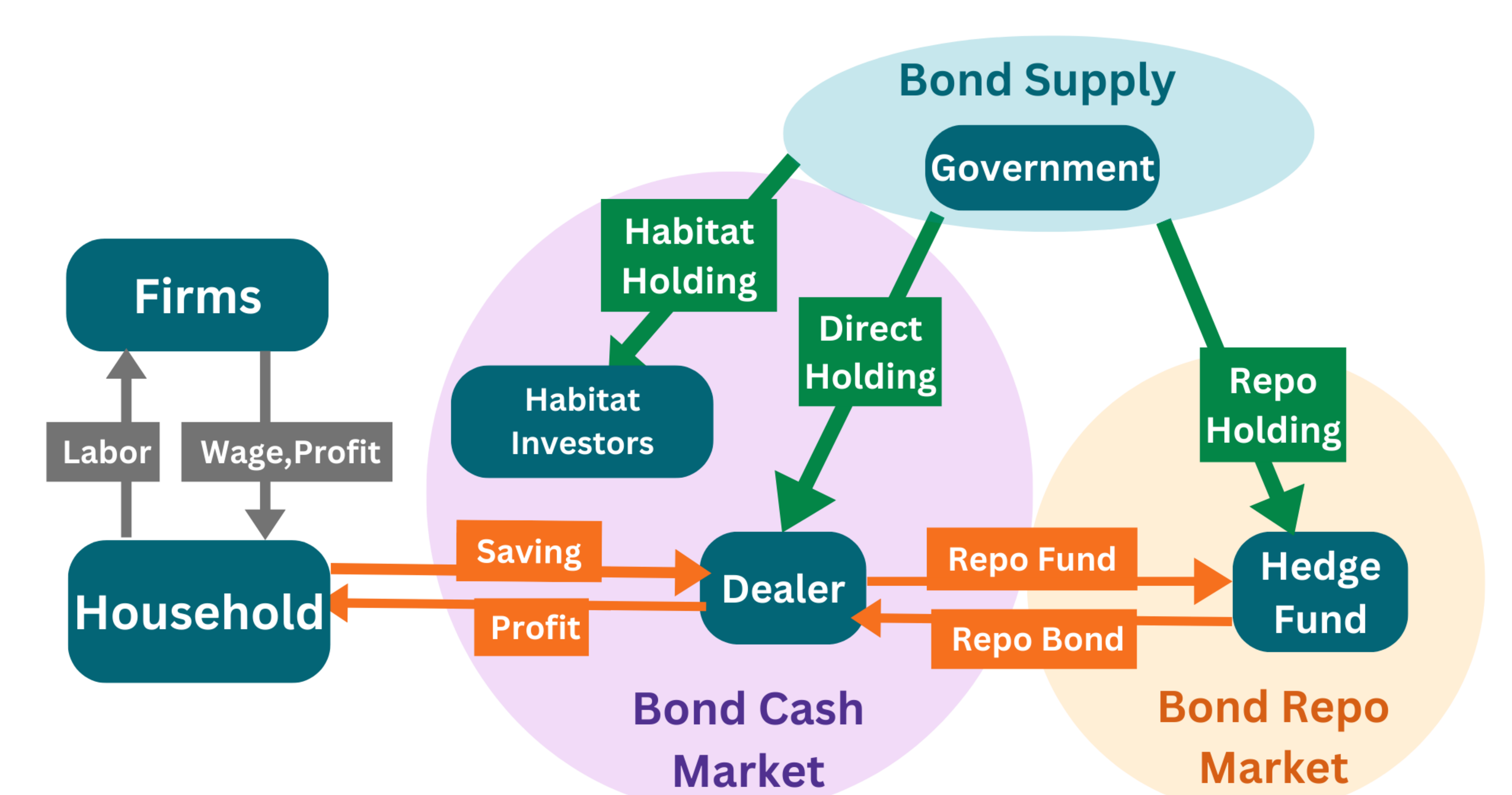


Figure 2. Covid-19: March 2020 Turmoil

This Theory Paper

- Studies convenience yield in a Preferred Habitat New Keynesian framework with repo.
- Answers two questions:
  - How to explain the different convenience dynamics?
  - What are the macroeconomic implications?
- Key mechanisms:
  - Non-pecuniary trading cost $\Rightarrow$ endogenous convenience yield.
  - Preference shifter $\Rightarrow$ novel preference channel linking demand shock to consumption.
  - Limited access to the capital market $\Rightarrow$ market returns shape overall borrowing cost.

Model Overview



Selected Agents' Problems

- Representative dealer's problem:

$$\max_{X_t(\tau),Q_t^d(\tau)} E_t\left[dW_t^d\right] - \frac{1}{2\rho_d}\mathrm{Var}_t\left[dW_t^d\right],$$

$s.t.$

$$dW_t^d - W_t^d r_t d_t = \int_0^T \underbrace{X_t(\tau)}_{\text{direct holdings}} \Big(\underbrace{\frac{dP_t(\tau)}{P_t(\tau)} - r_t dt}_{\text{excess return}} - \underbrace{\Lambda_t(\tau)dt}_{\text{non-pecuniary cost}}\Big)d\tau + \int_0^T \underbrace{Q_t^d(\tau)}_{\text{repo supply}}\Big(\underbrace{\Delta_t(\tau)}_{\text{repo wedge}} - \underbrace{\Lambda_t(\tau)}_{\text{non-pecuniary cost}}\Big)dt d\tau.$$

Broker-dealers require compensation for non-pecuniary cost.

- Household j's problem:

$$\max_{c_t(j),n_t(j),k_t(j)} \int_0^\infty e^{-(\rho+\varpi_t)t}\left(\log c_t(j) - \frac{n_t(j)^{1+\phi}}{1+\phi}\right)dt$$

s.t.

$$dk_t(j) = (i_t(j)k_t(j) + W_t n_t(j) - P_t c_t(j))\,dt + dT_t$$

Demand shock affects intertemporal consumption decisions.

Financial Market Equilibrium

- Bond Cash Market:

$$\underbrace{\mu_t(\tau) - r_t}_{\text{expected excess return}} = \underbrace{\lambda B_t(\tau)}_{\text{convenience yield}} \underbrace{+\rho A(\tau)'\Sigma\Sigma'\left[\int_0^T B_t(\tau)A(\tau)d\tau\right]}_{\text{risk premium}}$$

- Bond Repo Market:

$$\underbrace{R_t(\tau) - r_t}_{\text{excess repo return}} = \underbrace{\lambda B_t(\tau)}_{\text{Convenience yield}}$$

Incorporating Macro Dynamics

- Innovative IS curve: $dx_t = \varsigma^{-1}(\underbrace{\tilde{r}(s_t)}_{\text{nominal rate}} + \underbrace{\varpi(s_t)}_{\text{preference}} - \pi_t - \bar{r})dt.$
- Standard Phillips curve: inflation $\pi_t \uparrow$ when output gap $x_t \uparrow$.
- Standard Taylor rule: short rate $r_t \uparrow$ when output gap $x_t \uparrow$ or inflation $\pi_t \uparrow$.

Result 1: Applications to GFC and Covid-19

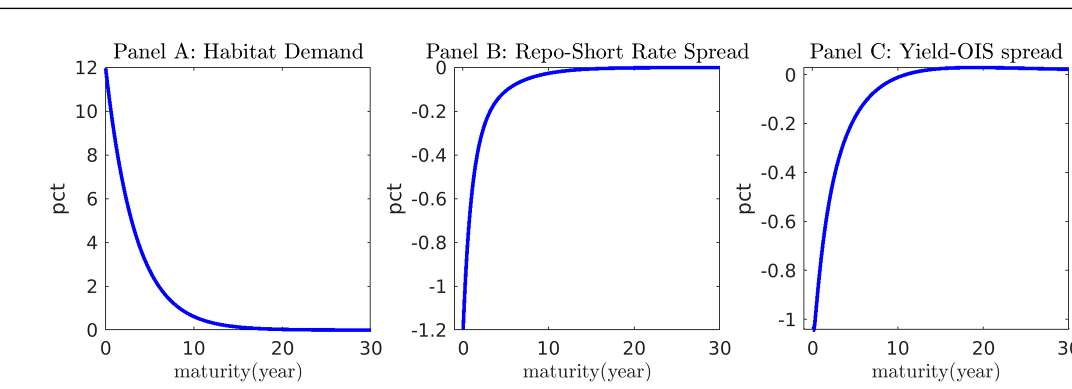


Figure 3. GFC: Instantaneous IRFs of Flight-to-Liquidity Shock

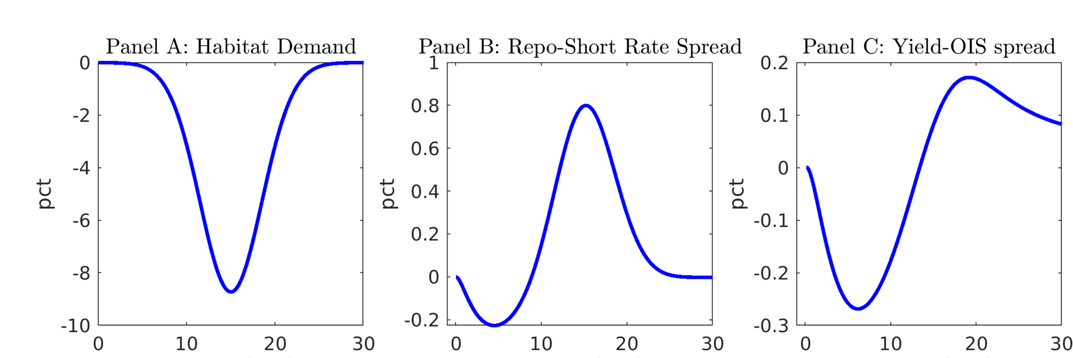


Figure 4. Covid-19: Instantaneous IRFs of Flight-from-Safety Shock

Result 2: $\downarrow$ vs. $\uparrow$ Convenience in Recession

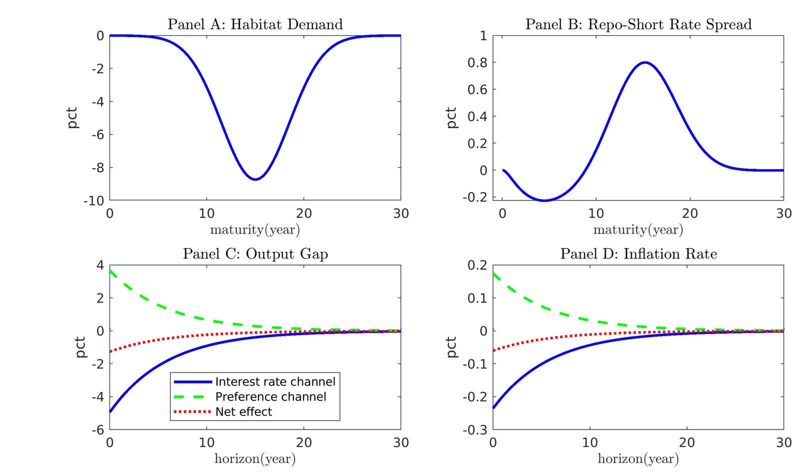


Figure 5. Recession with Lower Convenience

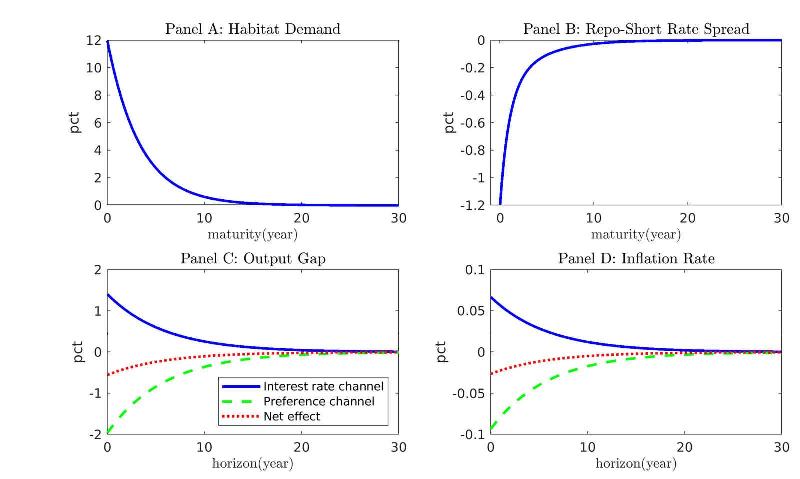


Figure 6. Recession with Higher Convenience

Result 3: Monetary Policy Implications

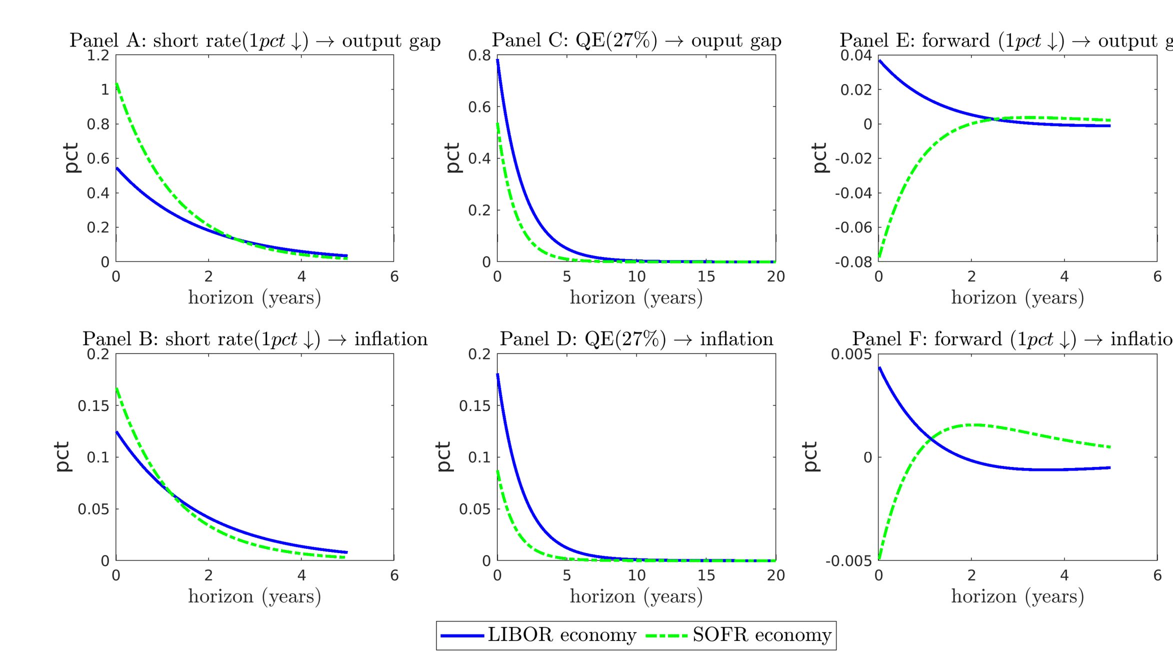


Figure 7. IRFs of Monetary Policy Shocks in LIBOR and SOFR Regimes.

Concluding Remarks

- This paper develops a New Keynesian Preferred-Habitat model with non-pecuniary trading cost, limited access to capital market, and preference shifter.
- I find:
  - Flight-to-liquidity drove up convenience in GFC; Flight-from-safety drove down convenience in Covid-19.
  - Demand shocks can originate real downturns with higher or lower convenience.
  - Compared to the LIBOR regime, SOFR regime features stronger conventional policy but weaker QE and forward guidance.