

# Monetary Policy, the Yield Curve, and the Repo Market

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# Motivation: QE Effects in Bond and Money Markets

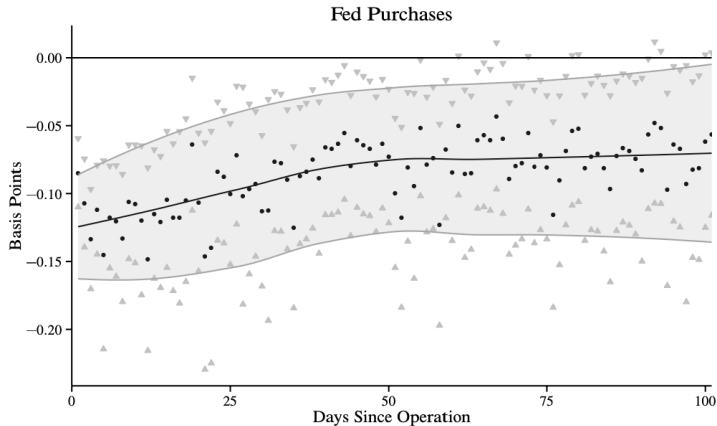
- Frictionless models of bond markets are insufficient for understanding **balance sheet policies** over the last 15 years
- Macro-finance literature on unconventional policy transmission:
  - Constrained intermediation [Gertler & Karadi (2012, 2015), Sims and Wu (2021), ...]
  - Departures from rational expectations [Farhi & Werning (2017), Iovino & Sergeyev (2023), ...]
  - Market segmentation and preferred habitat [Vayanos & Vila (2021), Greenwood & Vayanos (2014), ...]
- The **preferred habitat** tradition has gained in popularity, but mostly focused on simple bond markets

## This paper:

- Extends the preferred habitat framework to model both bond and **repo markets**
- **Takeaway:** QE impact on repo rates is important (missing in standard habitat models)

# Motivating Facts

- QE has large effects on spot yields and [repo rates](#) [D'Amico, Fan, & Kitsul (2018)]



# Model Overview

- Continuum of zero-coupon bonds with maturity  $\tau$ , with risk-free rate  $r_t$  (following exogenous stochastic process)
- Bonds are either “general” or “special” (as a function of investor demand and segmentation frictions). Bonds on special have overnight repo rate  $r_t^{(\tau)}$
- Risk-averse **arbitrageurs** allocate wealth across all assets. Bond carry trades:
  - General bonds with funding cost  $r_t$
  - Special bonds with repo rates  $r_t^{(\tau)}$
- Specialized **preferred habitat** investors trade special bonds only of specific maturities
- Bond yields and repo rates determined in equilibrium:
  - Arbitrageurs satisfy their optimality conditions
  - Habitat investors are on their demand curve
  - Markets clear  $\implies$  **market price of risk** reacts to demand (QE) shocks

## Standard Preferred Habitat: Setup

- Suppose there are two types of bonds: “silver” and “gray”:  $P_t^{(\tau,s)}$  and  $P_t^{(\tau,g)}$
- Habitat investors like silver bonds, dislike gray bonds

$$Z_t^{(\tau,s)} = -\alpha(\tau) \log P_t^{(\tau,s)} - \beta_t^{(s,\tau)}, \quad Z_t^{(\tau,g)} = 0$$

- Arbitrageurs with mean-variance preferences solve

$$\begin{aligned} & \max E_t(dW_t) - \frac{a}{2} \text{Var}_t(dW_t) \\ \text{s.t. } & dW_t = W_t r_t dt + \int_0^T \chi_t^{(\tau,s)} \left( \frac{dP_t^{(\tau,s)}}{P_t^{(\tau,s)}} - r_t dt \right) d\tau + \int_0^T \chi_t^{(\tau,g)} \left( \frac{dP_t^{(\tau,g)}}{P_t^{(\tau,g)}} - r_t dt \right) d\tau \end{aligned}$$

- Market clearing:

$$Z_t^{(\tau,s)} = -\chi_t^{(\tau,s)}, \quad Z_t^{(\tau,g)} = -\chi_t^{(\tau,g)} = 0$$

- Risk factors: short rate  $r_t$  and demand shocks  $\beta_t^{(\tau)}$

# Standard Preferred Habitat: Equilibrium

- How do bond prices evolve in equilibrium?

$$\frac{dP_t^{(i,\tau)}}{P_t^{(i,\tau)}} = \mu_t^{(i,\tau)} dt + \sigma_t^{(i,\tau)} dB_t, \quad i = s, g$$

- Endogenous drift  $\mu_t^{(i,\tau)}$  and diffusion  $\sigma_t^{(i,\tau)}$  for  $i = s, g$  determined by:

$$\begin{aligned}\mu_t^{(i,\tau)} - r_t &= \sigma_t^{(i,\tau)} \Lambda_t^\top \\ \Lambda_t &= a \int_0^T \left[ \chi_t^{(s,\tau)} \sigma_t^{(s,\tau)} + \chi_t^{(g,\tau)} \sigma_t^{(g,\tau)} \right] d\tau \\ &= a \int_0^T \left( \alpha(\tau) \log P_t^{(\tau,s)} + \beta_t^{(s,\tau)} \right) \sigma_t^{(s,\tau)} d\tau\end{aligned}$$

- Demand shocks  $\beta_t^{(s,\tau)}$  affect *both* bonds
- Why? The (global) market price of risk  $\Lambda_t$  is equivalent across both types of bonds

$$\implies P_t^{(\tau,s)} = P_t^{(\tau,g)}$$

# Preferred Habitat and Segmentation

- Because arbitrage is [global](#), demand shocks in one market have spillover effects through the re-pricing of risk in other markets
  - With “silver” and “gray” bonds, the pass-through is one-to-one
  - In more realistic situations, the spillovers depend on the equilibrium loadings on joint sources of risk
- But preferred habitat models still feature some kinds of segmentation in equilibrium
  - Localization across maturities [Vayanos & Vila (2021), Ray, Droste, & Gorodnichenko (2024)]
  - Imperfect spillovers to risky assets [Ray, Droste, & Gorodnichenko (2024)]
  - Spillovers across currencies [Gourinchas, Ray, & Vayanos (2024)]
- However, other types of more extreme segmentation [cannot be captured](#)
  - On/off the run
  - Covered interest parity
- Even with extreme segmentation due to habitat forces, strict no-arbitrage conditions imposed by arbitrageurs imply silver and green bonds have the same price

- Extending the preferred habitat framework to capture additional sources of segmentation is crucial! Great contribution
- Spell out very precisely what additional frictions your model imposes
  - Segmentation via habitat demand alone is not necessarily enough
- Discuss and contrast with the local/global spillovers in the model which are inherited from the preferred habitat setup