Discussion of

"Monetary Policy, Segmentation, and the Term Structure"

by Kekre, Lenel, and Mainardi

Vadim Elenev
Johns Hopkins Carey
CICM| June 2022

Short → Long Rates: What We Know

- Naïve view: expectations hypothesis (EH)
- Classic evidence from non-identified predictability regressions rejects EH
  - FB 87: Forward rates do not move one-for-one with future short rates (controlling for current short rates to remove highly persistent inflation expectations)

$$\Delta y_{t+n}^{1} = a_{n+1}^{0} + a_{n+1}^{1}\left(f_t^{n\rightarrow n+1} - y_t^{1}\right) + \epsilon_t, a_{n+1}^{1} < 1$$

  - Yield curve slope does not move one-for-one with changes in short rates

$$\frac{1}{n}\sum_{i=1}^{n-1}(n-i)\Delta y_{t+i}^{1} = \gamma_n^0 + \gamma_n^1\left(y_t^n - y_1^t\right) + \epsilon_t, \gamma_n^1 < 1$$

  - CS 91: Yield curve slope does not move one-for-one with changes in long rates

$$y_{t+1}^{n-1} - y_t^n = \alpha_n + \beta_n \frac{y_t^n - y_1^t}{n-1} + \epsilon_t, \beta_n < 1 \text{ or even } \beta_n < 0 \text{ for large n (!!)}$$

Short → Long Rates: What We Just Learned

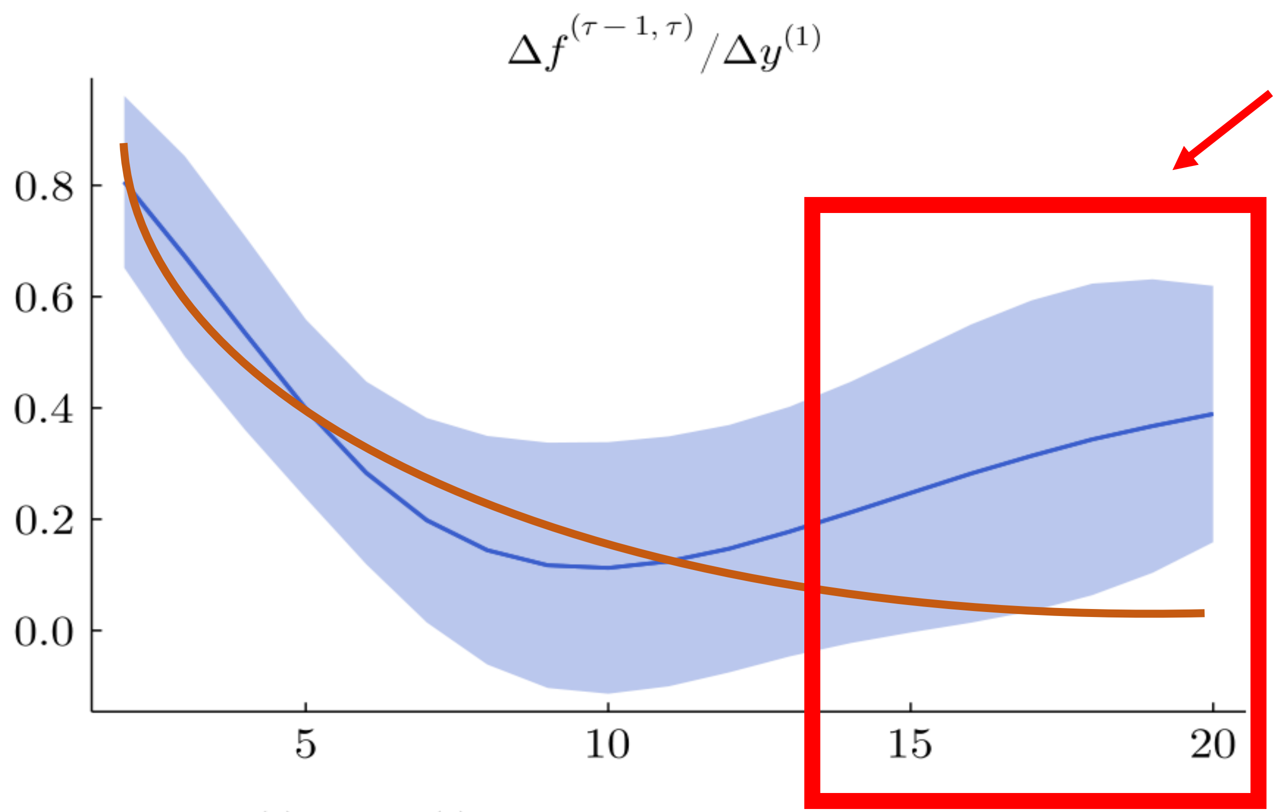


Figure 1: $\Delta f_t^{(\tau)}$ on $\Delta y_t^{(1)}$, instrumented by high-frequency surprise

Identified version of FB $a^1_{n+1} < 1$ puzzle:
Need a model of time-varying risk premia to explain overreaction of forward rates

Data

Expected Future Short Rates = Forward Rates under EH

$1 = E_t[M_{t+1} \frac{P_{t+1}^{n-1}}{P_t^n}]$: Theories of Bond Risk Premia

- Representative Agent Models with "clever" SDFs
  - Bonds are in zero net supply, need large and time-varying effective risk aversion
  - E.g. External Habit, Long Run Risk
- Incomplete/"Segmented" Markets Models (e.g. Vayanos Vila 21, Haddad Sraer 20)
  - (Types of) agents have heterogeneous bond positions
  - Exposure enters the SDF → source of time-varying exposure (price & quantity of risk)
    - *"The more n-year bonds I hold, the more my marginal utility covaries with their returns"*
  - The marginal agent's ("arbitrageur"/"bank") exposure depends on
    - (Time-varying) demand of other agents for specific maturities ("preferred habitat")
    - Short rate dynamics i.e. profitability of the carry trade holding others' demand constant
  - Effective risk-aversion constant b/c marginal agents have myopic mean-variance preferences
- This paper: time-varying exposure & time-varying effective risk aversion
  - Make arbitrageurs long-lived and give them CRRA → wealth determines risk aversion
  - Don't need any additional "cleverness" to ramp up time variation b/c their wealth is volatile (unlike the wealth of RAs – insight of intermediary asset pricing literature due to HK 08 and BS 12)

$1 = E_t[M_{t+1} \frac{P_{t+1}^{n-1}}{P_t^n}]$: Theories of Bond Risk Premia

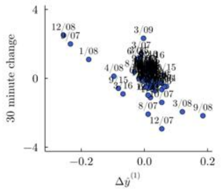
- Representative Agent Models with "clever" SDFs
  - Bonds are in zero net supply, need large and time-varying effective risk aversion
  - E.g. External Habit, Long Run Risk
- Incomplete/"Segmented" Markets Models (e.g. Vayanos Vila 21, Haddad Sraer 20)
  - (Types of) agents have heterogeneous bond positions
  - Exposure enters the SDF → source of time-varying exposure (price & quantity of risk)
    - *"The more n-year bonds I hold, the more my marginal utility covaries with their returns"*
  - The marginal agent's ("arbitrageur"/"bank") exposure depends on
    - (Time-varying) demand of other agents for specific maturities ("preferred habitat")
    - Short rate dynamics i.e. profitability of the carry trade holding others' demand constant
  - Effective risk-aversion constant b/c marginal agents have myopic mean-variance preferences
- This paper: time-varying exposure & time-varying effective risk aversion
  - Make arbitrageurs long-lived and give them CRRA → wealth determines risk aversion
  - Don't need any additional "cleverness" to ramp up time variation b/c their wealth is volatile (unlike the wealth of RAs – insight of intermediary asset pricing literature due to HK 08 and BS 12)

$1 = E_t[M_{t+1} \frac{P_{t+1}^{n-1}}{P_t^n}]$: Theories of Bond Risk Premia

- Representative Agent Models with "clever" SDFs
  - Bonds are in zero net supply, need large and time-varying effective risk aversion
  - E.g. External Habit, Long Run Risk
- Incomplete/"Segmented" Markets Models (e.g. Vayanos Vila 21, Haddad Sraer 20)
  - (Types of) agents have heterogeneous bond positions
  - Exposure enters the SDF → source of time-varying exposure (price & quantity of risk)
    - *"The more n-year bonds I hold, the more my marginal utility covaries with their returns"*
  - The marginal agent's ("arbitrageur"/"bank") exposure depends on
    - (Time-varying) demand of other agents for specific maturities ("preferred habitat")
    - Short rate dynamics i.e. profitability of the carry trade holding others' demand constant
  - Effective risk-aversion constant b/c marginal agents have myopic mean-variance preferences
- This paper: time-varying exposure & time-varying effective risk aversion
  - Make arbitrageurs long-lived and give them CRRA → wealth determines risk aversion
  - Don't need any additional "cleverness" to ramp up time variation b/c their wealth is volatile (unlike the wealth of RAs – insight of intermediary asset pricing literature due to HK 08 and BS 12)

Why Wealth Matters

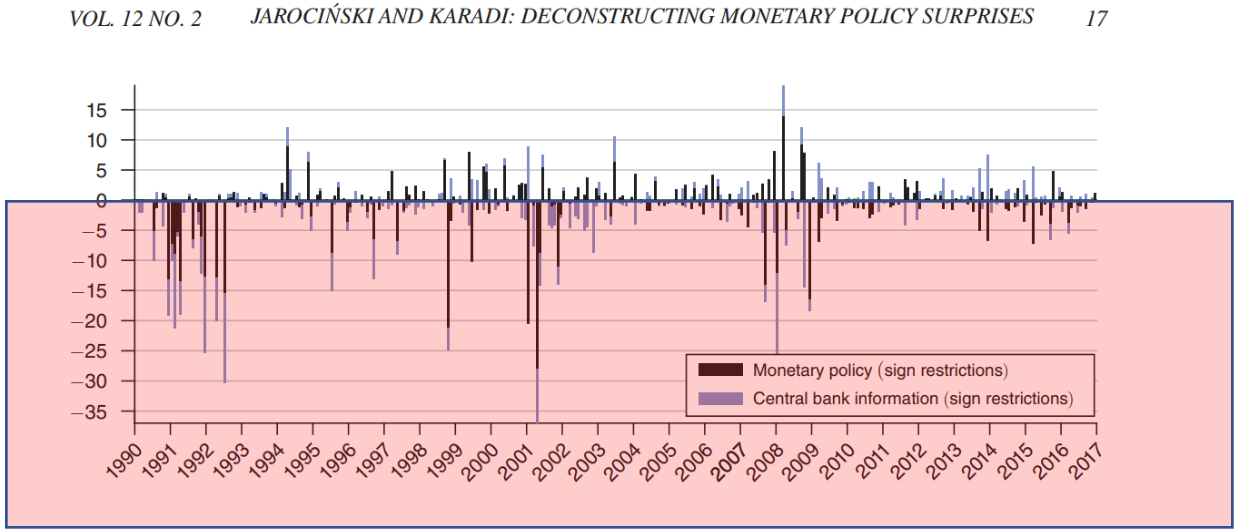
- MP shocks (shocks to the short rate) **of either sign** create a profitable carry trade b/c LT bond habitat investors don't price them in
  - + shock: LT bonds too expensive, so borrow long, invest short
  - - shock: LT bonds too cheap, so borrow short, invest long
- Carry trade profitability ↑ → Exposure ↑ → risk premia ↑
  - + shock: expected future short rates ↑ + risk premia ↑ = forward rates over-react ✔
  - - shock: expected future short rates ↓ + risk premia ↑ = forward rates under-react ✘
- Add wealth effects: if arbitrageurs have unconditionally large and + duration,
  - + shock: wealth ↓↓ → risk aversion ↑↑
  - - shock: wealth ↑↑ → risk aversion ↓↓



- Combining
  - + shock: expected future short rates ↑ + risk premia ↑↑↑ = forward rates over-react ✔
  - - shock: expected future short rates ↓ + risk premia ↓ = forward rates over-react ✔

Comment 1: Check for (Lack of) Asymmetry in the Data

- The model's main novel implication is the over-reaction of forward rates in response to **expansionary** (-) MP shocks
  - Do we know this to be true? Empirical evidence presented is unconditional
  - My guess is that it's fine -- expansionary shocks are bigger so they weigh more in OLS, but worth checking



Comment 2: How much of $\frac{dW_t}{dMP_t}$ is caused by duration in the data?

- Model has a financial accelerator
  - Contractionary MP shock → LT bond price ↓ → wealth ↓ → risk premia ↑ → LT bond price ↓ → wealth ↓ …
  - Don't need arbitrageur to be *that* levered to make risk premia very sensitive to MP shocks
  - Key calibrated parameter: initial endowment of arbitrageurs $\overline{W}$
- Suppose primary dealers are largely immunized, and their cash flows are just a levered claim on aggregate output
  - Model: arbitrageur wealth has an extra stochastic exogenous term that loads negatively on the short rate, and they bought term risk insurance from an agent outside the model
- Contractionary MP shocks → negative cash flow news → stock price falls (more than the market b/c of leverage → high beta)
- Put this into the model:
  - Contractionary MP shocks still cause wealth to fall, risk premia to rise
  - But there is no more accelerator. High risk premia further depress the value of LT assets, but it no longer matters much for wealth
  - Need larger leverage (lower $\overline{W}$) to match $\frac{dW_t}{dMP_t}$ -- important for drawing policy implications regarding primary dealer capitalization and MP passthrough
- Any direct evidence on primary dealer term risk exposure?

Comment 3: Nominal vs. Real

- Writing a term structure model in real terms has a trade-off
- Pros:
  - No need to model inflation dynamics – which models had 2022 in their support?
  - No need to deal with inflation risk premia – what's the covariance with consumption again?
  - Nominal yields move due to hard-to-measure changes in long-run inflation targets
- Empirical cons: TIPS as a measure of the real yield curve
  - Lack of 1-year TIPS requires extrapolation from 2-year TIPS. Check extrapolation against 1y inflation swaps.
  - Good data only starts in mid-2000s
  - Nominal bonds have a time-varying liquidity advantage over TIPS. How does it respond to MP shocks?
- Theoretical cons:
  - Wealth effect of MP shocks goes through nominal assets whose stock on primary dealer balance sheets dwarfs TIPS. Need to argue inflation channels are insignificant. Are they?
  - There are no such thing as MP shocks to the real rate. There are shocks to the nominal rate which pass through to the real rate through endogenous response of inflation expectations, which are a function of every variable describing the macroeconomy, some of which are themselves functions of the nominal rate. There is no way the exclusion restriction – "MP shocks affect forward rates only through the short real rate." -- holds b/c risk premia are functions of some of those same macro variables.
    - Only a problem for identified shock evidence. All the classic predictability results go through.
- Hard choice. Current approach may be optimal (stick to real, acknowledge and address limitations)

Conclusion

- Interesting, well-written, and tightly focused paper
- Two perspectives on the model contribution
  - Relative to existing preferred habitat models: Intermediary Asset Pricing style SDF
  - Relative to intermediary AP models: focus on term structure, exogenous incompleteness with demand shocks
- Empirical contribution: responses to MP shocks of
  - The real yield curve
  - Equity of investors likely to be marginal for term risk
- Look forward to seeing the next version!