Discussion of "Inflation and Treasury Convenience" by Anna Cieslak, Wenhao Li, and Carolin Pflueger

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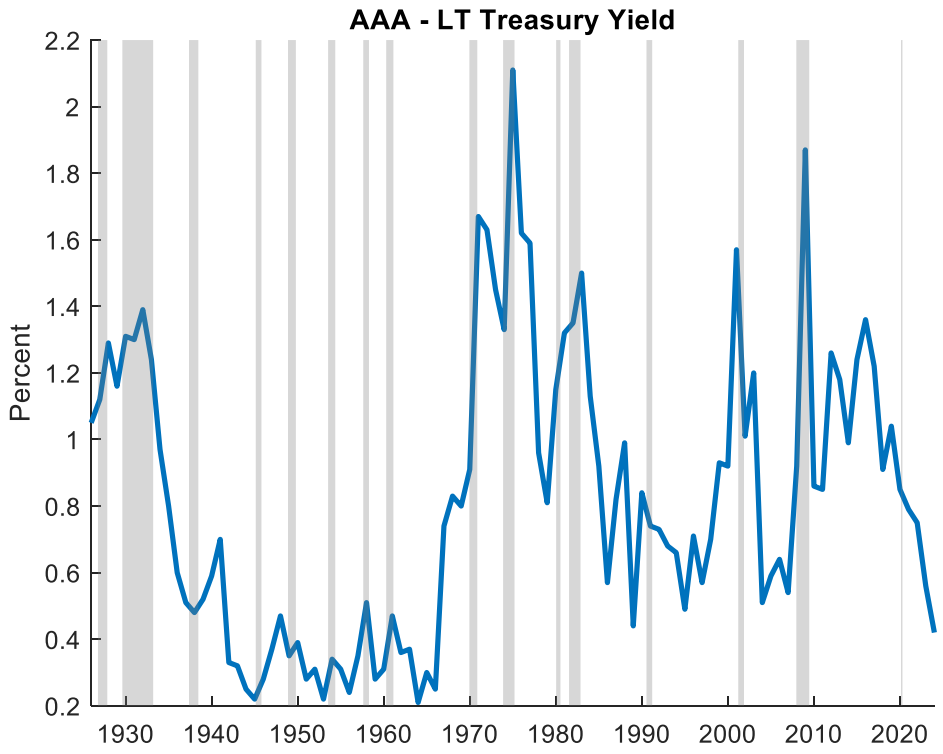
Why we should all care about this paper

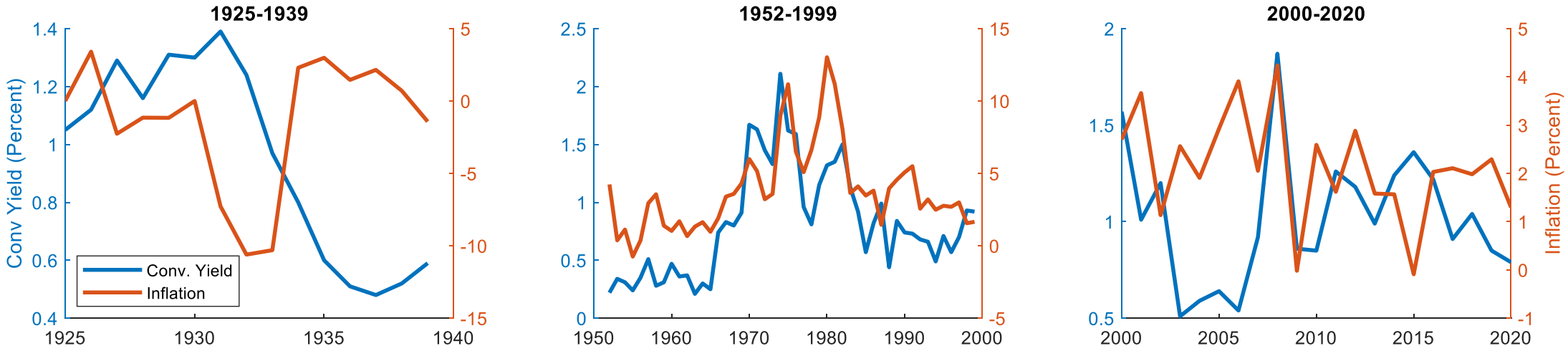
- Given market prices of assets with similar cash flows, it should be 80 bps more expensive for the Treasury to borrow than it is.
- [Marketable] debt outstanding: $24.6 trillion
- 0.8% x $24.6T approx. $200B / year savings
- Entire Federal transportation budget is only $115B

Why we should all care about this paper

- But this “convenience yield” varies over time
  - Risky asset for the Treasury
- Understanding the asset pricing properties of Treasury convenience yields key for assessment of fiscal capacity
- This paper: relationship between convenience yields and inflation
  - Particularly relevant given last few years

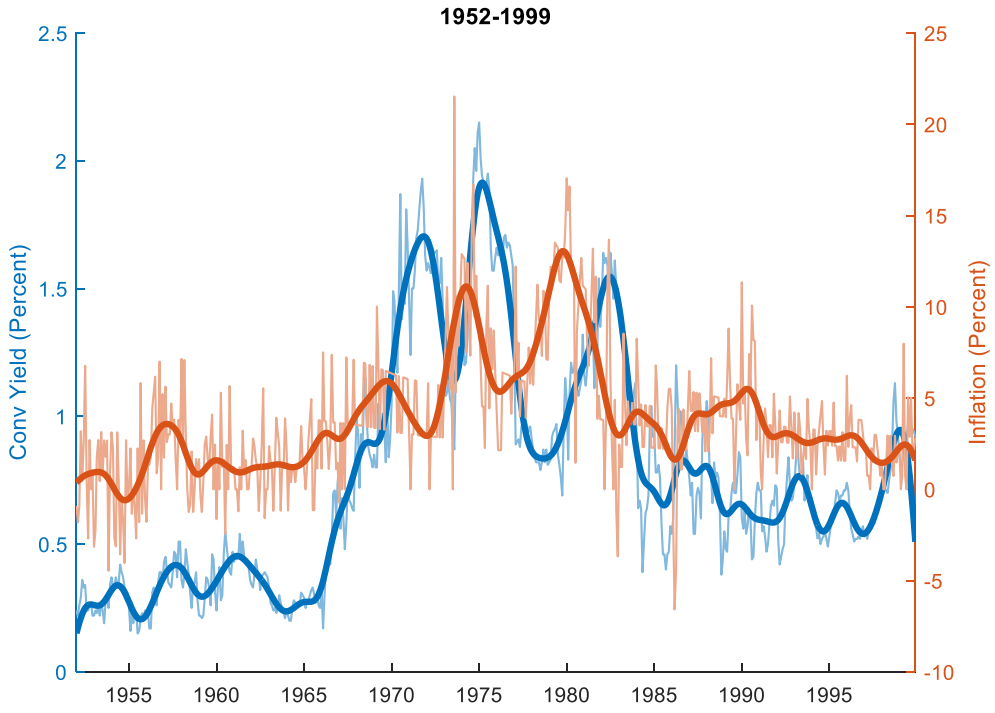


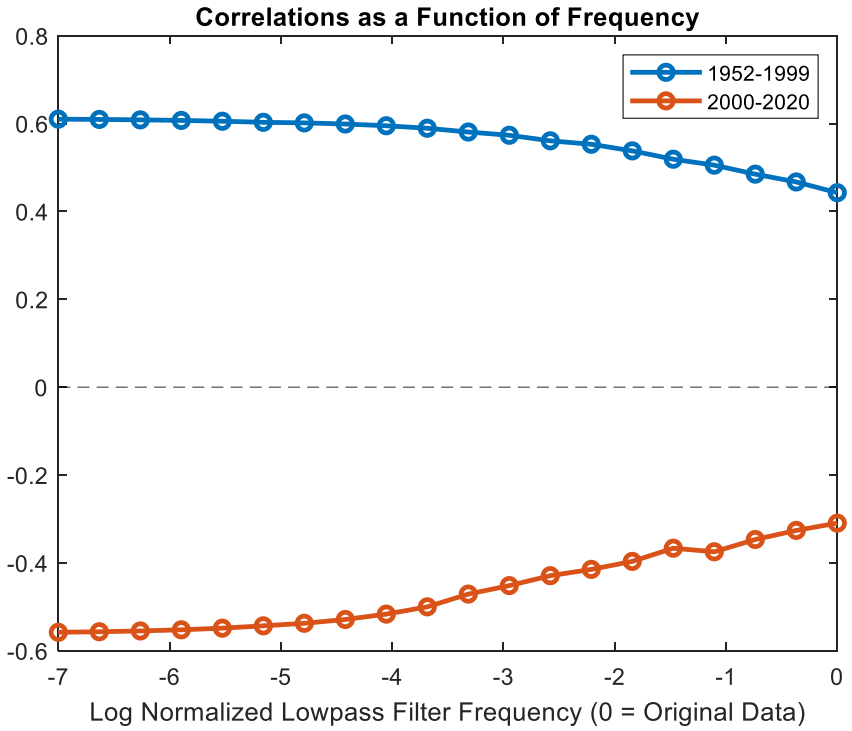
Empirics: Three Regimes



- Inter-war & 21st century: low inflation and negative correlation
- Second half of 21st century: high inflation and positive correlation
- Robust to controls, shifts in sample bounds, lead-lags

Empirics: Frequencies





- Particularly pronounced effects at low frequencies: apply lowpass filter to monthly data
  - Left panel: Example with normalized filter frequency of 0.001
  - Right panel: correlations of filtered series for a range of frequencies. Low frequency correlations are higher.

Theory: Two Channels

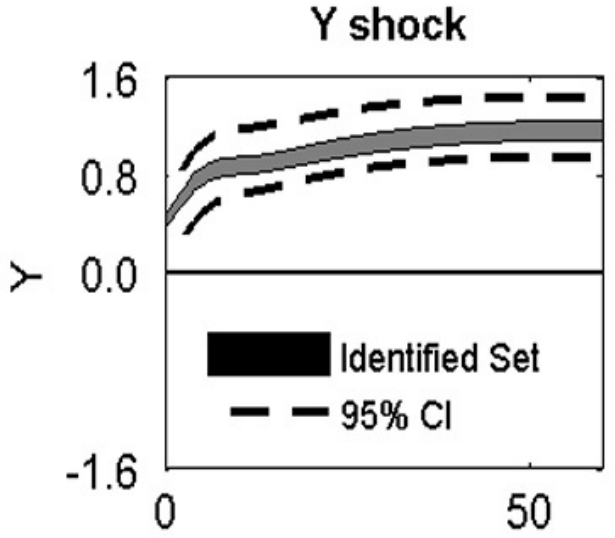
- Money: Inflation increases convenience yields on bonds because it raises the opportunity cost of holding the other convenient asset – money
  - For another monetary take on inflation and portfolio choice, see Aoki, Michaelides, Nikolov, Zhang (2024)
  - Consistent with the second panel
- Safety: a liquidity shock that raises the convenience yield of Treasuries effectively raises the private market real rate, acts like a negative demand shock, lowers inflation
  - Consistent with the first and the third

Identifying Drivers of Co-Movement

- An SVAR perspective
- Reduced-form VAR(1) with convenience yield and inflation
- $\begin{bmatrix} cy_t \\ \pi_t \end{bmatrix} = \Phi \begin{bmatrix} cy_{t-1} \\ \pi_{t-1} \end{bmatrix} + u_t, \qquad E_{t-1}[u_t\, u_t'] = \Omega \quad$ (2 x 2)
- Structural VAR: $u_t = H\, \Sigma\, \epsilon_t$
  - ϵ_t is an N x 1 vector of shocks with identity covariance matrix
  - Σ is a N x N diagonal matrix of shock standard deviations
  - H is 2 x N mapping of "structural" shocks to reduced-form innovations
- Identification challenge: we can estimate Ω from the data, but without additional restrictions that's not enough to identify economic channels H (even if N=2)

Two Approaches for Imposing Restrictions

- Micro-founded model provides cross-equation restrictions: Φ, H, and Σ are all functions of model parameters. Use empirical estimates of Φ and Ω to estimate parameters, then calculate H
  - Shocks ϵ_t show up in model equations, get economic interpretation
  - Write model such that $\epsilon_{1,t}$ directly affects cy_t, $\epsilon_{2,t}$ directly affects π_t
  - Direct channel := H_{12} or H_{21} a function of statistical parameters
  - Other channels: H_{12} or H_{21} a function of preference, technology, etc. parameters, H_{1j} or H_{2j} non-zero for $j > 2$
- Alternative approaches: long/short-run restrictions, narrative/**event-based partial ID**, etc.
  - E.g., Ludvigson, Ma, and Ng (2021)
  - Informally, already in the current paper when rejecting a FTPL explanation for the GFC episode
  - Why not formalize?



A 2+N Equation New Keynesian Model

- Taylor Rule (subject to MP shocks)
- New Keynesian Philips Curve (subject to supply shocks)
- N Euler Equations for N assets
  - The “real rate” is given by consumption dynamics (subject to demand shocks)
  - Nominal rate on each asset depends on
    - Real rate
    - Expected inflation
    - Marginal non-pecuniary benefit of the asset (“convenience yields”) – subject to “liquidity” shocks”)
  - Traditionally, two assets
    - Bond in 0 net supply with 0 convenience yield (“IS equation” + “Fisher Equation”)
    - Money (-in-the-utility) whose supply is M is chosen by the central bank such that convenience yield = bond nominal rate, i.e., nominal return on money is 0
  - To have other assets in positive supply (so they can provide convenience), need either other agents (heterogeneous households, intermediaries, government) or some exogenous market-clearing

This 2+3 Equation New Keynesian Model

$$U(C_t, Q_t, N_t; \Theta_t) = \frac{\Theta_t C_t^{1-\gamma}}{1-\gamma} + \alpha \log Q_t - \chi \frac{N_t^{1+\eta}}{1+\eta}$$

$$Q_t = (1 - \lambda_t) D_t + \lambda B_t$$

- The "real rate" is given by consumption dynamics (subject to Θ MU demand shocks)
- Loans i^l : no convenience yield, zero net supply and market-clearing rate
- Treasuries i^b: some convenience yield and rate set by a Taylor rule
- Deposits i^d : most convenience yield and exogenous prices: $1 + i^d = \delta(1 + i^l)$
  - Pins down Q, i.e., plays the role of the money supply equation in a standard NK model with money, where $\delta = \lambda = 0$ and so money supply $Q = \alpha\ \Theta C^{-\gamma}$ in steady state
- Liquidity shock to λ changes **relative** convenience of treasuries vs. deposits
- What kind of shocks cause a flight to safety into treasuries **from** deposits and money?

Inflation → Convenience Yields

$$cy_t^b \coloneqq i_t^l - i_t^b = \frac{\lambda_t(1-\delta)}{1-\lambda_t-\lambda_t(1-\delta)}\,(1+i_t^b)$$

- If δ is less than 1 (imperfect pass-through of loan rates to deposits) and λ_t is less than 1/2 (deposits are more convenient than Treasuries), convenience yields increase with the policy rate i_t^b
  - Which increases with inflation
- Cost-push shocks of the 1970s explain positive co-movement

1. But does δ stay constant?
   - Dreschler, Savov, and Schnabl (2023) argue that repeal of Reg Q raised δ causing lower inflation
   - Simultaneous increase in i_t^b and δ has ambiguous effects on cy_t^b in expression above
2. Curious implication of the perfect substitutability assumption
   - If deposits are money ($\delta = 0$) and if Treasuries are as convenient as money ($\lambda_t = 1/2$), then according to this model the Fed can't conduct monetary policy

Convenience Yields → Inflation

- In a standard model, IS + Fisher equation

$$x_t = E_t x_{t+1} - \gamma^{-1}(i_t - E_t \pi_{t+1}) + \nu_{x,t}$$

- Shows how policy rate i_t -- the only rate in the model -- lowers the output gap x_t like a negative demand shock $\nu_{x,t}$

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$$x_t = E_t x_{t+1} - \gamma^{-1}\left(i_t^b + c y_t^b - E_t \pi_{t+1}\right) + \nu_{x,t}$$

- Shows how policy rate i_t -- the only rate in the model -- lowers the output gap x_t like a negative demand shock $\nu_{x,t}$
- But here, the rate that matters for intertemporal substitution is $i_t^b + c y_t^b$
  - Log-linearized $c y_t^b = a\lambda_t + b\, i_t^b$ split into direct and inflation-driven effects

Convenience Yields → Inflation

- Plugging NKPC into the Taylor Rule, [inflation-only] Taylor rule and cy into IS + Fisher, we get

$$x_t = \frac{\gamma}{\gamma+(1+b)\phi} E_t x_{t+1} - \frac{[(1+b)\phi-1]}{\gamma+(1+b)\phi} E_t \pi_{t+1} + \frac{\gamma}{\gamma+(1+b)\phi} \nu_{x,t} - \frac{a}{\gamma+(1+b)\phi} \lambda_t$$

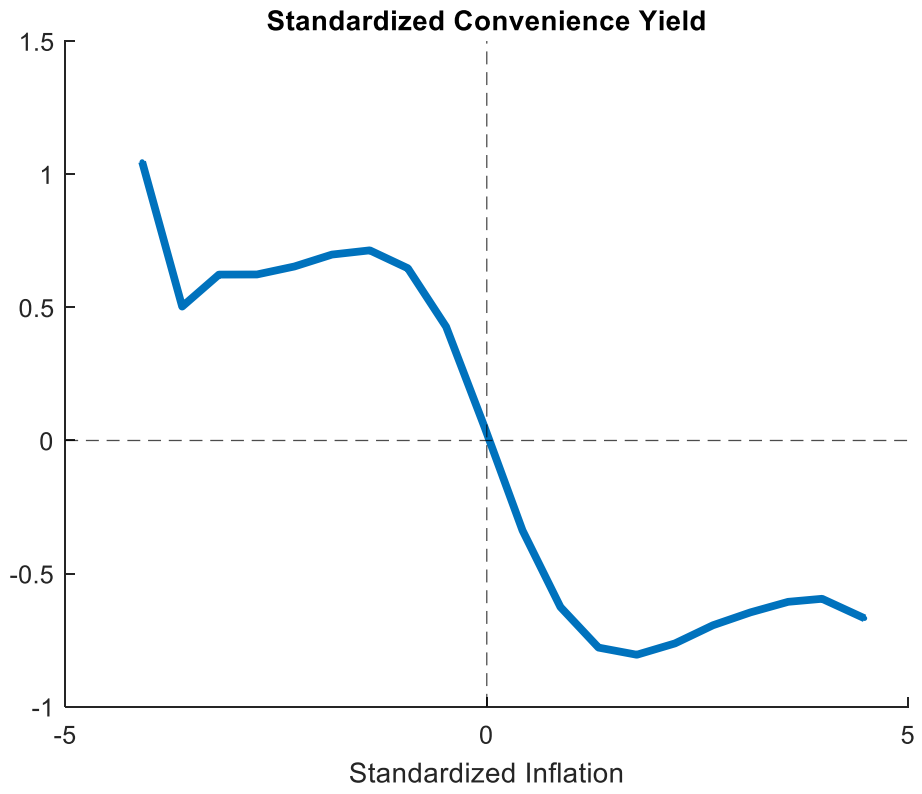
- + Convenience yield shock looks like a - demand shock:
  - Central bank sets convenient rate. Spike in cy raises the private rate, causing a contraction that's only partly offset by a lower policy rate
- Implication: the central bank should accommodate financial shocks, to the extent these shocks cause a flight to safety and raise convenience yields. Maybe the Fed already does?
  - New term in Taylor rule vs. higher coefficient on output?

Separability Matters

- $\frac{C_t^{1-\gamma}}{1-\gamma} + \alpha \log Q_t$ → Strong income effect
  - If consumption doubles, the marginal utility cost of buying a bond goes down, but the liquidity benefit the bond provides remains unchanged
  - Typical of how we model non-pecuniary liquidity demand (me too!)
- But this paper is specifically about the convenience yield – demand relationship
  - Worth showing robustness to alternative preference specifications
  - Same for the perfect deposit/bond substitutability (though qualitatively robustness is apparent)

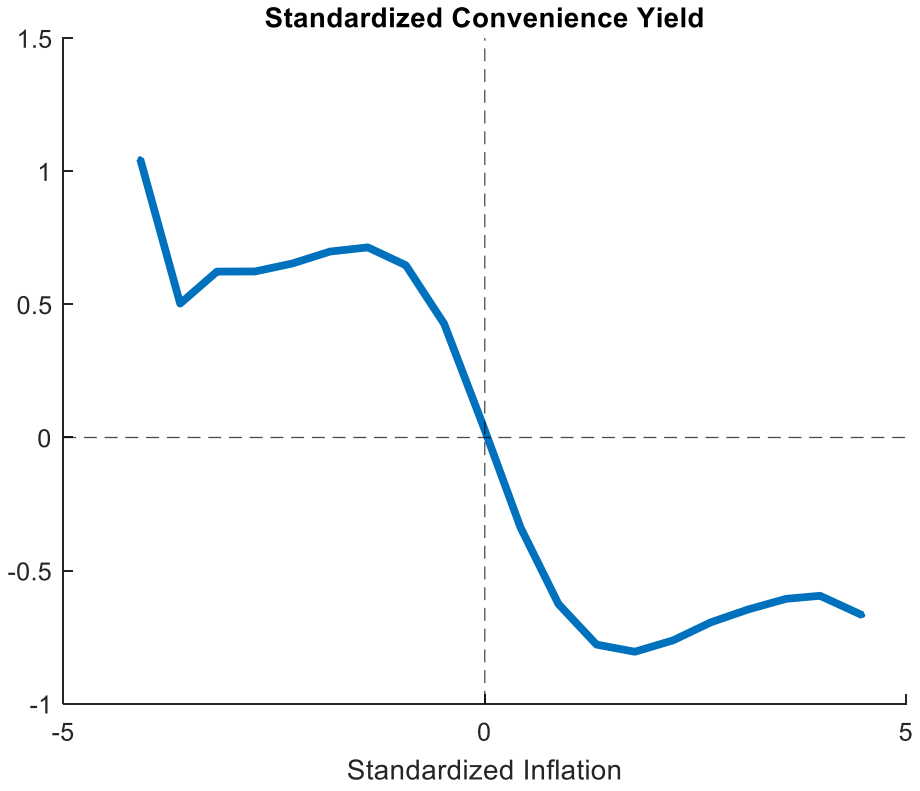
What the model may be missing

- Micro-foundation for the liquidity shocks
- Financial intermediaries (micro-foundations for δ, supply of deposits)
- Risk premia
- Fiscal policy and supply of treasuries (particularly relevant going forward)
- Alternative model: Elenev, Landvoigt, Shultz, and Van Nieuwerburgh (2022) [ELVNS]



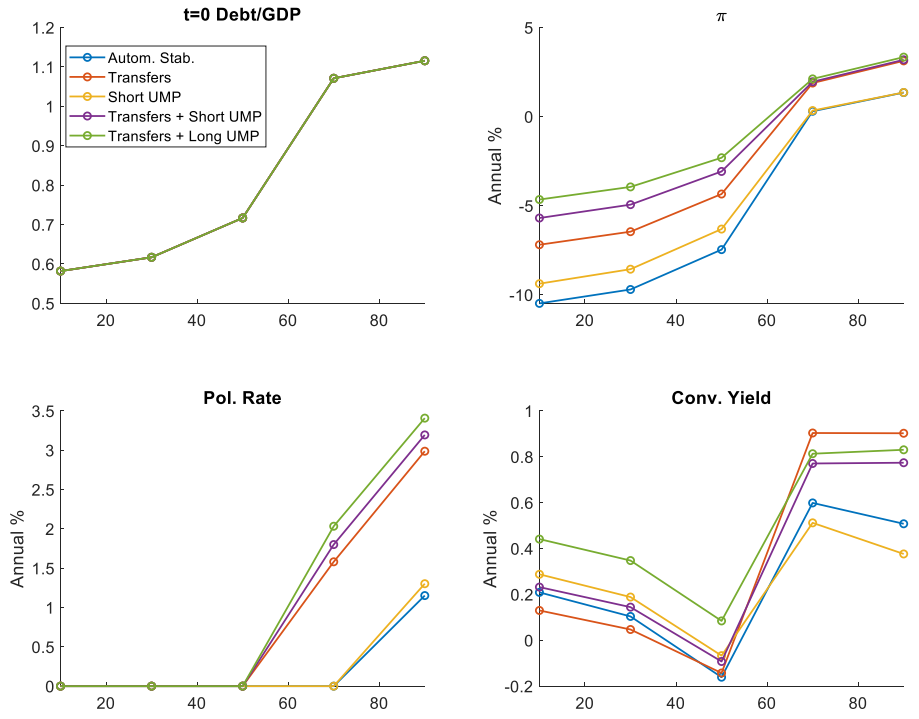
ELVNS

- Ingredients
  - NK firms
  - Households holding equity, deposits, and LT Treasuries
  - Banks holding loans and ST Treasuries
  - Fiscal authority with counter-cyclical fiscal policy **until it's no longer sustainable** (endog. regime switch)
- Binscatter of inflation and convenience yield
  - Negative correlation at typical inflation levels
  - Positive correlation at high inflation
  - Driven by fiscal policy regimes



Debt/GDP-Dependent Effects of a (Large) Negative Demand Shock and Policies

- Increase in the risk premia on future surpluses → higher convenience yields
- At low Debt/GDP levels, causes
  - Large contraction
  - ZLB
  - Deflation
  - Corr[cy, inflation] < 0
- At high Debt/GDP levels, concerns about fiscal sustainability
  - Raise expected inflation, act as a negative supply shock (no ZLB)
  - Corr[cy, inflation] > 0



Conclusion

- Interesting, important paper that sheds light on a relevant policy question!
- Simple, elegant model to highlight key channels that were operative in the last 100 years
- Summary of my comments
  - How much identification could we get without a full model?
  - How robust are the proposed channels to reduced-form assumptions and functional forms?
  - Even if a fiscal channel wasn't important in the past, it is likely to be in the future