The Fragility of Government Funding Advantage

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Princeton Initiative

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Introduction

- The US Federal government has often enjoyed a **funding advantage**:
  - Can issue bonds at lower yield than private sector, even when bonds have same payouts:

$$\underbrace{\chi_t}_{\substack{\text{Funding}\\ \text{advantage}}} := \underbrace{i_t^p}_{\substack{\text{Yield on comparable}\\ \text{private sector debt}}} - \underbrace{i_t^b}_{\substack{\text{Yield on US}\\ \text{public debt}}} > 0$$

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- ***Policy makers:*** have historically thought of χ_t as a policy choice:
  1. Use financial regulation to generate χ_t (e.g. Chase, Sherman)
  2. Worried that Treasury price instability would lose χ_t (e.g. McAdoo, Goldenweiser, Volcker)

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- We revisit how to model government funding advantage.

This Talk (From LPSS-26 and PS-26)

- Reconstructs the historical evidence on US funding advantage (χ_t) since 1860. Finds:
  - Macro-finance has targeted an erroneous negative relationship b/n χ_t and $q_t^b B_t$, and
  - This is support for the policy maker view that χ_t can be gained and lost.

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  - Macro-finance has targeted an erroneous negative relationship b/n χ_t and $q_t^b B_t$, and
  - This is support for the policy maker view that χ_t can be gained and lost.
- Builds model that endogenizes χ_t:

$$\chi = f\left(Debt/GDP;\ \text{financial regulation},\ \text{monetary-fiscal policy}\right)$$

  - Where shape of f is determined by FOCs from profit maximizing banks.
  - Explicit connection between regulation, GE dynamics, and demand system literature.
- Main result: government cannot choose all of:
  (i) high χ, (ii) healthy financial sector, (iii) inflation risk (or other debt-devaluation).

Comments on The Literature

- Macro largely ignored financial frictions, asset pricing spreads, and balance sheets
  (RBC model, NK model, FTPL model, . . .)

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- Macrofinance attempts reintroduce these features. In particular, the bond spreads:
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  - Term premia,
  - Funding advantage or convenience yield.

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- Macrofinance attempts reintroduce these features. In particular, the bond spreads:
  - Liquidity premia.
  - Term premia,
  - Funding advantage or convenience yield.
- Common macrofinance approach: treat spreads as environment features.
- My research: attempts to understand how governments can choose these spreads.

Comments on Doing Macrofinance Research

1. "Don't let the data intimidate you" (paraphrasing Lucas).
   - $\Rightarrow$ When data contradicts theory, it is not necessarily the theory that is wrong.
   - $\Rightarrow$ Make sure your team knows your dataset better than anyone/anything else.

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   $\Rightarrow$ Focus on endogenizing the key mechanisms not on complex microfoundations.

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2. "Don't let fancy theory intimidate you".
   ⇒ Focus on endogenizing the key mechanisms not on complex microfoundations.

3. "Don't build models that you believe are wrong".
   ⇒ Convincing others is easier if you have already convinced yourself.

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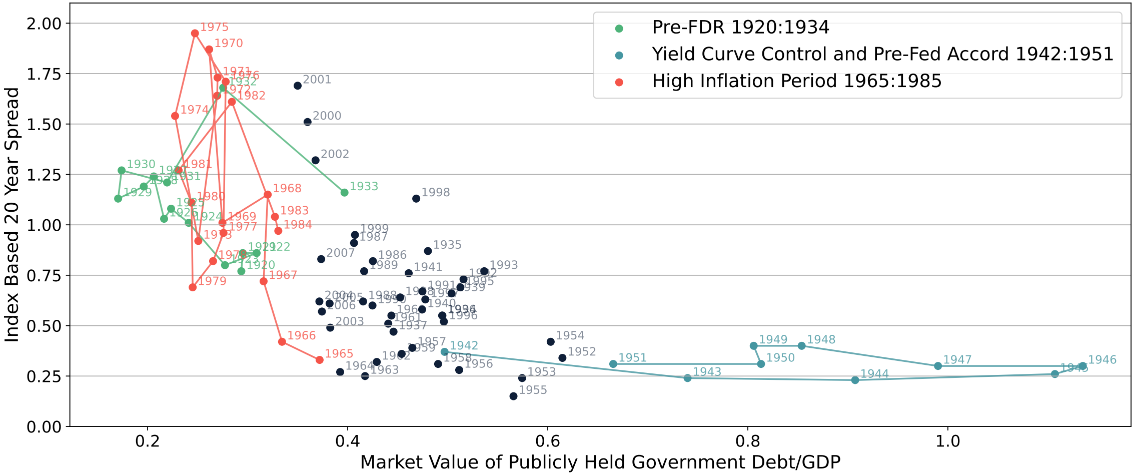
Revisiting The Time Series For Government Funding Advantage

A Model of Government Funding Advantage

- Environment
- Treasury Demand
- Equilibrium

Post WWI: Funding Advantage (20y) vs Debt/GDP: ***FRED Indices***



Literature has targeted this "stable" equilibrium relationship with Bond-in-Utility

(E.g. KVJ-12, N-16, KL-23, KL-24, CKP-24, CLP-24, CKP-24, MSS-24, JLVZ-24,25)

“Null” Model of Government Funding Advantage in The Literature

- Macro-finance often imposes a non-pecuniary household benefit from Treasuries:

$$\mathbb{E}_0 \left[\sum_{t=0} \beta^t \left(u(c_t) + \exp(\zeta_t) \nu(q_t^b B_t, Y_t) \right) \right], \quad q_t^b B_t = \text{ Market value of Treasuries}$$

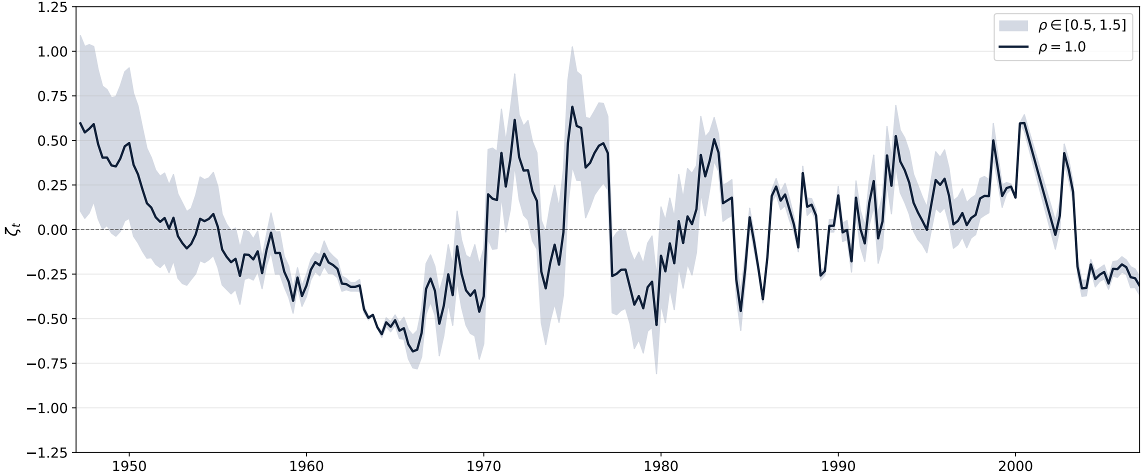
- Leads to relationship between funding advantage and quantities:

$$\chi_t \approx -\rho \log \left(q_t^b B_t / Y_t \right) + \zeta_t$$

  - $\rho \in (0.5, 1.5)$ inverse “elasticity” of treasury demand from ν (event studies, demand systems, IV)
  - ζ_t = i.i.d. shocks to relative Treasury demand (vs. corporate bonds)

Lit. claim: stable elasticity & ζ_t shocks fit the data well within a regulatory regime.

Fitted “Demand Shocks”: 1947-2006 ***FRED Indices***



Investigating The FRED Index-Based Measure of χ_t

- KVJ computes χ_t as difference b/n average yield-to-maturity on two bond indices:
  - Moody's Seasoned Aaa Corporate Bond Yield Index (all maturities $\geq$ 20 years)
  - The Fed's Long-Term US Government Bond Yield Index (all maturities $\geq$ 10 years)
- But our historical bond database (LPSS-26) reveals a lot of bond heterogeneity:
  - Tax advantages for Treasurys, call options, exchange privilege (on Treasurys)
- E.g. Treasury "Flower Bonds" (1917-71): Could be redeemed at par (rather than sold at market price) to pay bondholder's federal estate taxes upon death:
  - Tax provision is valuable when market prices are below par. So like an inflation "hedge":

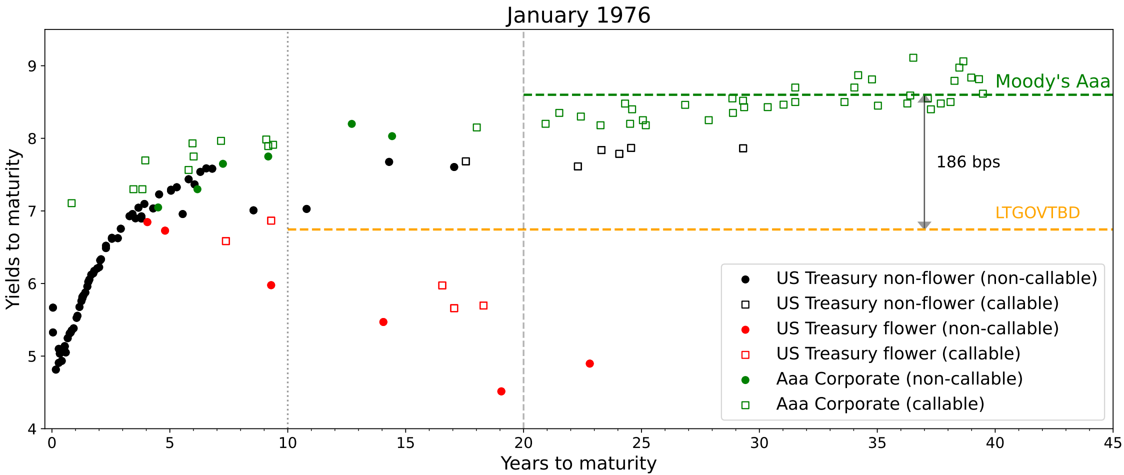
$$\uparrow \text{Inflation} \;\Rightarrow \uparrow \text{Interest rates} \;\Rightarrow \downarrow (\text{Price} - \text{Par}) \;\Rightarrow \uparrow \text{Value of Estate Tax Discount}$$

  - During 1960-70s, at least half of 10yr+ Treasurys are flower bonds.

Flower bond prices | Tax Exemptions | Bonds Trading Below Par | Composition of callable bonds | Default Risk

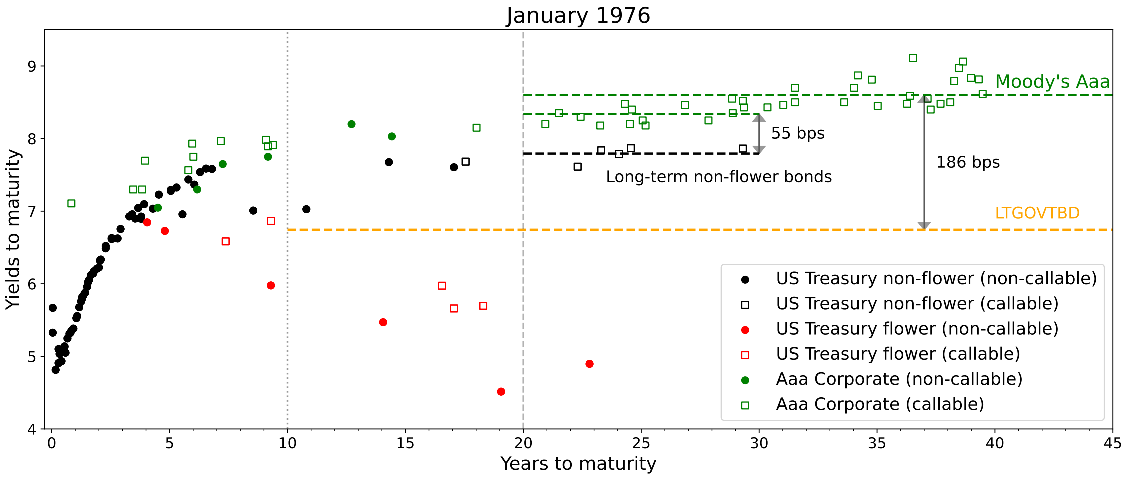
Did bond heterogeneity impact prices and spreads?

Commonly Used Measure of Long-Maturity Funding Advantage



Flower Bonds Back

“Inflation Hedge” in Government Bonds ⇒ Mismeasured Spread

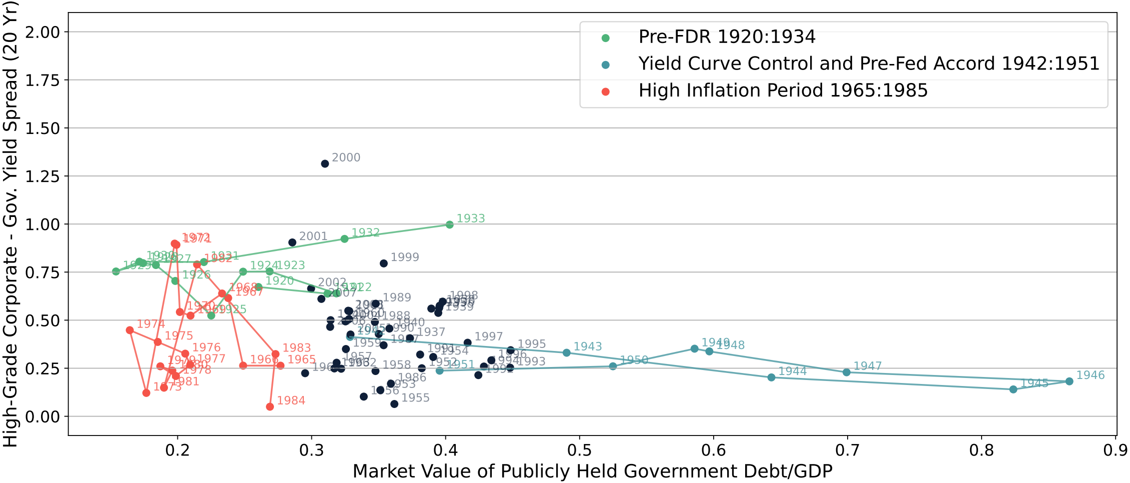


Flower Bonds Back

What if we correct for tax and option heterogeneity?

Estimation

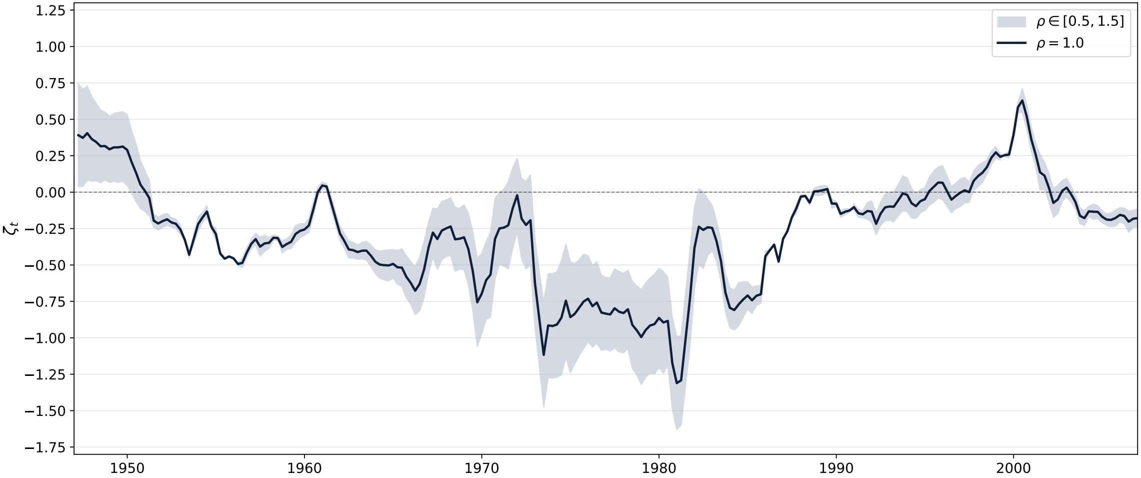
Post WWI: Funding Advantage (20y) vs Debt/GDP: ***Our-Spread***



After correcting for inflation & tax protections, χ collapsed in 1965-85; Time Series LPSS

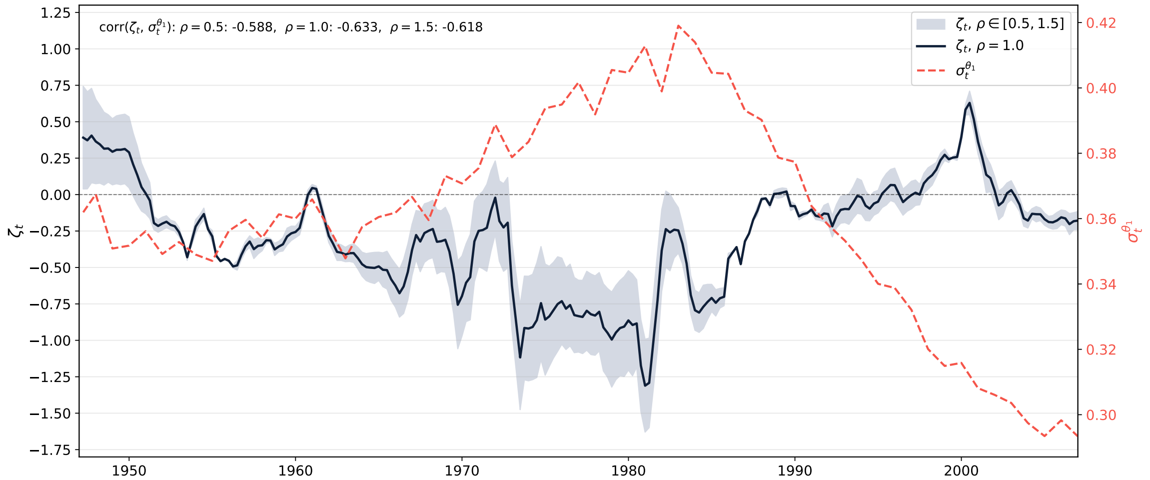
(Consistent with concerns of McAdoo, Goldenweiser, & Volcker about long-term price stability)

Fitted "Demand Shocks": 1947-2006 ***Our-Spread***



LPSS-26 tries many specifications and finds little evidence Δ quantities explains $\Delta\chi_t$.

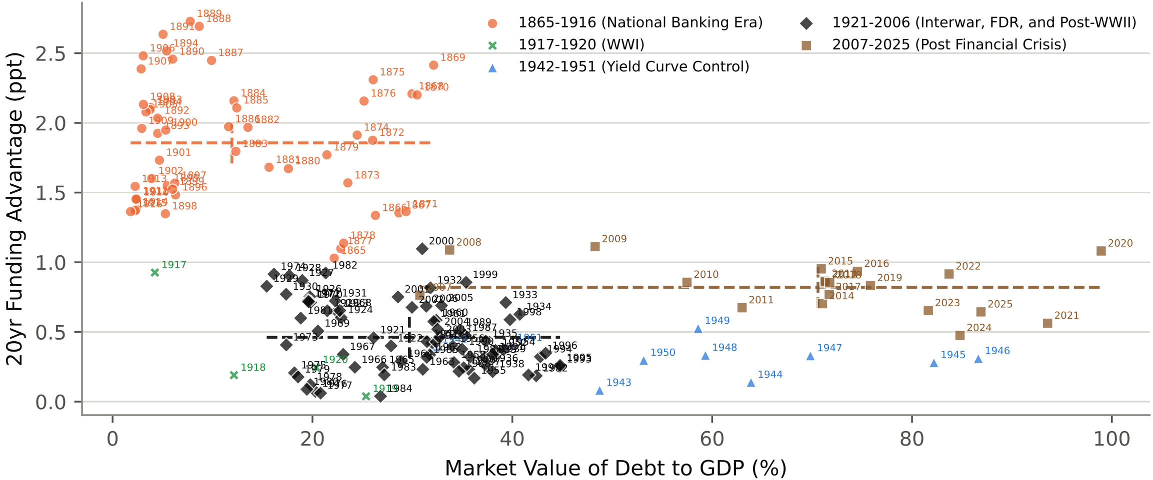
Fitted "Demand Shocks": 1947-2006 ***Our-Spread***



Response 1: keep $\rho > 0$ & explain large negative relative demand shocks in 1970s and/or
Response 2: abandon constant elasticity ρ and explain how ρ evolves.

What about the long sample?

1860-2026: Funding Advantage (20y) vs Debt/GDP: ***Our-Spread***



Long run differences in χ correspond to financial regimes changes Regs Time Series

(Consistent with Chase-Sherman hypothesis that financial regulation related to χ.)

Lessons And Goals For Modeling Funding Advantage χ

Fitting government funding advantage: Want to:

1. Move away from models targeting a stable eqm relationship b/n χ & Debt-to-GDP
   ... with a stable, policy invariant demand function.
2. Explain funding advantage in 1970s-80s during high inflation risk.
   (i.e. why non-pecuniary benefit decreased during a period of pecuniary return risk)
3. Characterize how financial regulation impacts elasticities (& non-pecuniary demand).

Take seriously: view that the government can "manipulate" bank demand for Treasurys

Questions about funding advantage:

1. What are limits on the government's ability to restrict financial sector and $\uparrow \chi$?
2. What are the macroeconomic costs of increasing χ?

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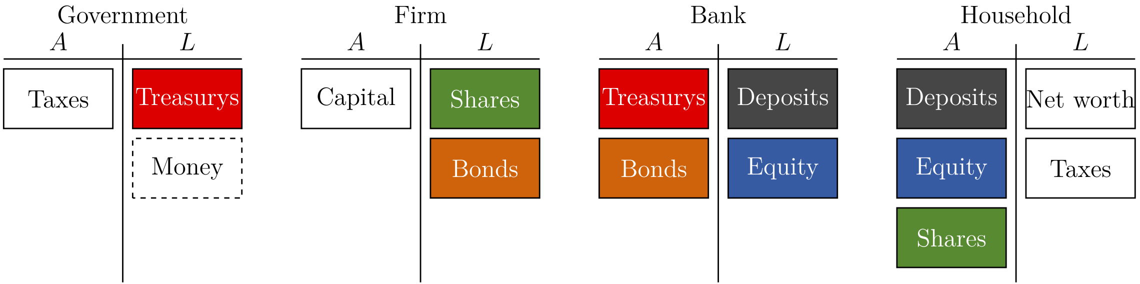
Setting and Preferences

- Discrete time $t \in \{0, 1, 2, \ldots\}$ RBC economy with production broken into subperiods:
  - PM: Final goods production; frictionless competitive markets
  - AM: Input goods production; incomplete markets and settlement frictions
- Populated by households with CRRA utility from consuming final goods.
- Also contains firms, banks, and a government,

  ...government issues bonds and money (although we take cashless limit).

  ...model banks in similar way to Gale-Yorulmazer (2017) & Piazzesi-Schneider (2021)

Balance Sheets



Production Technologies and Deposit-in-Advance

- PM: Final goods: Firms have technology to produce final goods by $y_t = z_t k_{t-1}^{\alpha} v_t^{1-\alpha}$
  - z_t = productivity; follows exogenous AR(1) process,
  - k_t = capital; evolves by $k_t = (1-\delta)k_{t-1} + i_t$, and
  - v_t = input goods.

- AM: Input goods: Households have technology to produce input goods by $v_t = \breve{l}_t$
  - $\breve{l}_t$ = labor; which households can supply at linear disutility.
  - Stochastic fraction λ_t need labor from other households; remaining $1-\lambda_t$ use own labor.
  - ...where λ_t follows Markov chain.

- ***Friction 1:*** In AM, households can only pay for labor using bank deposits.
  ... So $\uparrow \lambda_t$ means an $\uparrow$ deposit withdrawals.

Financial Markets: Frictionless PM Market

- Use final goods as numeraire.
- Frictionless, competitive bonds markets:
  - **Govt.** issues nominal bonds (b_t), at price q_t^b that repay fraction ω of principle each PM.
  - **Firms** issue nominal bonds (h_t), at price q_t^h, also repay fraction ω, s.t. $q_t^h h_t \leq \theta q_t^k k_t$

    ...and equity at price q_t^e.
- Govt.'s **funding advantage** is spread between yield on firm & govt. bonds:

$$\chi_t := (-\omega \log(q_t^h)) - (-\omega \log(q_t^b))$$

Financial Markets: Banks and AM Interbank Market

- *PM market:* banks:
  - Issue deposits d_t, at price q_t^d, that can be withdrawn in AM or PM; equity e_t at q_t^e.
  - Purchase gov or firm bonds or store output goods into asset that payoff $\phi < 1$ in AM.

- *AM Market*: Each bank has outflow of $\lambda_t d_{t-1}$ at start and inflow $\lambda_t d_{t-1}$ at end.
  - ***Friction 2:*** Banks cannot write uncollateralized IOUs to net settlement in AM.
  - Instead, banks manage gross outflows by:
    1. Trading govt. bonds (at price $\breve{q}_{t+1}^b$) & firm bonds (at $\breve{q}_{t+1}^h$) with each other,
    2. Raising equity $\breve{e}_t$ from hh's with idle deposits at cost $\Psi\left(\breve{q}_t^e \breve{e}_t\right) = 0.5\psi(\max\{\breve{q}_t^e \breve{e}_t, 0\})^2$,
    3. Using the input goods generated by the storage asset

Difficulty: $1 - \lambda_t$ households have idle deposits but costly to provide them to banks.
$\Rightarrow$ Banks value "hedging" assets that payoff when they facing equity/default costs.

Government Policy Rules

- *Government fiscal policy* (G_t, T_t, B_t, π_t) subject to budget constraint with $B_{-1} = 0$:

$$(\omega + (1-\omega)q_t^b)B_{t-1}/(1+\pi_t) \leq T_t - G_t + q_t^b B_t, \quad \forall t \geq 0$$

Fiscal rule: Spending G_t random; Taxes T_t follows $T_t/Y_t = \bar{\tau} + \eta\left(\frac{B_{t-1}}{(1+\pi_t)Y_t} - \bar{\mathsf{b}}\right)$

Inflation rule: $1 + \pi_t$ is lognormal with volatility σ_π.

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- *Financial policy:* Sets restrictions on AM bank portfolios: ($\equiv$ collateral at Fed)

$$\underbrace{\breve{q}_t^b b_{t-1} + \breve{q}_t^h h_{t-1} - d_{t-1}}_{\text{equity at start of AM}} + \underbrace{(1-\kappa^e)\breve{q}_t^e \breve{e}_t}_{\text{new equity in AM}} \geq \varrho \underbrace{\left(\kappa^b \breve{q}_t^b \breve{b}_t + \kappa^h \breve{q}_t^h \breve{h}_t\right)}_{\text{reg. weighted assets}}$$

Regulation: $\kappa^j \geq 0$ is penalty on $j \in \{b, h\}$; $\kappa^b < \kappa^h$ "regulatory privilege".

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We Describe Bank Treasury Demand Gradually

1. No leverage, financial frictions or regulation
2. . . . Add regulation
3. . . . Add bank deposits and leverage

Bank Problem: 1. No Leverage, Frictions, or Regulation

- Given prices and household SDF, $\xi_{t,t+1}$, the bank chooses portfolio to solve:

$$\max_{(b,h,d)_t,(\breve{b},\breve{h},\breve{d},\breve{e},x^e)_{t+1}} \left\{ \mathbb{E}_t\left[\xi_{t,t+1}x^e_{t+1}\right] - q^b_t b_t - q^h_t h_t \right\} \quad s.t.$$

$$\underbrace{x^e_{t+1}}_{\text{dividends}} \leq \sum_{j\in\{b,h\}} \left[\frac{\omega + (1-\omega)q^j_{t+1}}{1+\pi_{t+1}}\right] j_{t+1}$$

$$\ldots [\text{PM}]$$

$$\boxed{\text{Banks invest on behalf of households using household SDF.}}$$

Bank Problem: 1. No Frictions or Regulation

- Without frictions & regulation we get the basic RBC:

$$FOC: \qquad q_t^j = \mathbb{E}_t\left[\xi_{t,t+1} x_{t+1}^j\right], \quad j \in \{b, h\}$$

- Relative demand for government bonds:

$$\log\left(\frac{q_t^b b_t}{q_t^h h_t}\right) = [0, \infty)$$

Without any frictions, perfect elasticity between Treasuries & corporate bonds.

Bank Problem: 2. ...Add Regulation (Forced Demand)

- Given prices and household SDF, $\xi_{t,t+1}$, the bank chooses portfolio to solve:

$$\max_{(b,h,d)_t,(\breve{b},\breve{h},\breve{d},\breve{e},x^e)_{t+1}} \left\{ \mathbb{E}_t\left[\xi_{t,t+1}x^e_{t+1}\right] - q^b_t b_t - q^h_t h_t \right\} \quad s.t.$$

$$\text{Equity}_{t+1} \geq \varrho \underbrace{\left(\kappa^b \breve{q}^b_t \breve{b}_{t+1} + \kappa^h \breve{q}^h_t \breve{h}_{t+1}\right)}_{\text{reg. weighted assets}} \quad [\textit{with Lagrange mult. } \breve{\nu}_t] \qquad \ldots[\text{RC}]$$

$$\underbrace{x^e_{t+1}}_{\text{dividends}} \leq \sum_{j \in \{\breve{b},\breve{h}\}} \left[\frac{\omega + (1-\omega)q^j_{t+1}}{1+\pi_{t+1}}\right] j_{t+1}$$

$$\ldots[\text{PM}]$$

$\kappa^b < \kappa^b$ forces banks to hold more Gov. bonds (like household BIA or collateral).

Bank Problem: 3. ...Add Bank Leverage And Deposits

- Given prices and household SDF, $\xi_{t,t+1}$, the bank chooses portfolio to solve:

$$\max_{(b,h,d)_t,(\breve{b},\breve{h},\breve{d},\breve{e},x^e)_{t+1}} \left\{ \mathbb{E}_t\left[\xi_{t,t+1}x^e_{t+1}\right]+q^d_t d_t - q^b_t b_t - q^h_t h_t \right\} \quad s.t.$$

$$\breve{q}^b_t b_t + \breve{q}^h_t h_t - d_t + \underbrace{(1-\kappa^e)\breve{q}^e_t \breve{e}_t}_{\text{new equity in AM}} \geq \varrho(\kappa^b \breve{q}^b_t \breve{b}_{t+1} + \kappa^h \breve{q}^h_t \breve{h}_{t+1}) \quad [LM\ \breve{\nu}_t] \qquad \ldots[\text{RC}]$$

$$\underbrace{\frac{\lambda_{t+1}d_t}{1+\pi_{t+1}}}_{\text{withdrawals}} \leq \underbrace{\breve{q}^b_{t+1}(b_t - \breve{b}_{t+1}) + \breve{q}^h_{t+1}(h_t - \breve{h}_{t+1})}_{\text{proceeds from asset sales}} + \underbrace{\breve{q}^e_{t+1}\breve{e}_{t+1}}_{\text{new equity}} \qquad \ldots[\text{AM}]$$

$$\underbrace{x^e_{t+1}}_{\text{dividends}} \leq \sum_{j\in\{\breve{b},\breve{h}\}}\left[\frac{\omega+(1-\omega)q^j_{t+1}}{1+\pi_{t+1}}\right]\breve{j}_{t+1} - \underbrace{\frac{\breve{d}_{t+1}}{1+\pi_{t+1}}}_{\text{deposits left}} - \breve{e}_{t+1} - \Psi\left(\breve{q}^e_{t+1}\breve{e}_{t+1}\right) \qquad \ldots[\text{PM}]$$

Banks raise equity in AM to cover excess withdrawals (and relax regulation).

Bank Problem: 3. ... Add Bank Leverage And Deposits

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$\boxed{\text{But AM equity cost } \Psi\left(\breve{q}^e_{t+1}\breve{e}_{t+1}\right) \Rightarrow \text{banks value asset that payoff when } \breve{e}_{t+1} \text{ large}}$

Full Bank Problem: Euler Equations

- In the PM, banks relative asset demand is characterized by

$$q_t^j = \mathbb{E}_t\left[\underbrace{\xi_{t,t+1}}_{\text{HH SDF}} \underbrace{\frac{1}{(1+\psi\breve{e}_{t+1})(1-(1-\kappa^e-\varrho\kappa^j)\breve{\nu}_{t+1})}}_{\text{Non-pecuniary benefit}} \underbrace{\left(\frac{\omega+(1-\omega)q_{t+1}^j}{1+\pi_{t+1}}\right)}_{\text{Pecuniary payoff } =: x_{t+1}^j}\right] \quad j \in \{b,h\}$$

  - π_{t+1} inflation reduces pecuniary payoff x_{t+1}^j
  - $\psi\breve{e}_{t+1}$ is the marginal cost of raising equity.
  - $\breve{\nu}_{t+1} = \nu(\breve{e}_{t+1}, x_{t+1}^b, x_{t+1}^h, \dots)$ is Lagrange multiplier on regulatory constraint
  - $\kappa^b < \kappa^h$ regulatory privilege gives rise to asset-specific non-pecuniary benefit

Full Bank Problem: Treasury Demand Function

- Relative demand for government bonds satisfies:

$$\log\left(\frac{q_t^b b_t}{q_t^h h_t}\right) = \sigma_t \ \chi_t + \zeta_t$$

  - Where:

$$\sigma_t = \mathbb{E}_t\left[\xi_{t,t+1}\Omega(\breve{\nu}_{t+1}, \breve{e}_{t+1}, \Gamma^b_{t+1}, \Gamma^h_{t+1}) \times \left(\frac{(1-\kappa^b\varrho)}{(1+\varrho\kappa^b\breve{\nu}_{t+1})^2}\frac{x^b_{t+1}}{q^b_t} - \frac{(1-\kappa^h\varrho)}{(1+\varrho\kappa^h\breve{\nu}_{t+1})^2}\frac{x^h_{t+1}}{q^h_t}\right)\right]$$

$$\Gamma^b_t := \frac{(1-\varrho\kappa^b)x^b_t b_{t-1}}{(1+\psi\breve{e}_t)\left(\breve{d}_{t-1}+\kappa^e\breve{e}_t\right)}, \quad \Gamma^h_t := \frac{(1-\varrho\kappa^h)x^h_t h_{t-1}}{(1+\psi\breve{e}_t)\left(\breve{d}_{t-1}+\kappa^e\breve{e}_t\right)}$$

  - Aside: we also can derive a closed form expression for the entire demand system.

Our Model: σ_t and ζ_t are state and policy dependent; $\uparrow(\kappa^h - \kappa^b) \Rightarrow \downarrow\sigma_t$ & $\uparrow\zeta_t$
Recall that in the BIU model, $\sigma_t = \sigma = 1/\rho$ is constant and ζ_t is i.i.d.

Recap: Bank Problem Ingredients

- Regulatory privilege ($\kappa^b < \kappa^h$) restricts bank's from substituting away from Treasuries
  (Generates non-pecuniary benefit like in a BIU or BIA model)
- Banks have costly options to decrease regulatory constraints:
  - Decrease leverage
  - Raise equity in the morning
  - Increase storage (in extension with outside assets like gold)
- Banks want to hedge equity raising risk
  (Links pecuniary returns to non-pecuniary benefit)

Interaction between incentives to escape constraints and hedge equity raising risk.

Table of Contents

Revisiting The Time Series For Government Funding Advantage

A Model of Government Funding Advantage
- Environment
- Treasury Demand
- Equilibrium

Rational Expectations General Equilibrium

- **AM Equilibrium:** is a collection of morning prices $(\breve{q}^b_{t+1}, \breve{q}^h_{t+1}, \ldots)$ such that, given PM prices, banks optimize and morning markets clear:

$$\breve{b}_{t+1} = b_t, \qquad \breve{h}_{t+1} = h_t, \qquad \breve{d}_{t+1} = d - \breve{e}_{t+1}.$$

- **PM Equilibrium**: is collection of prices $(q^b_t, q^h_t, \ldots)$ and bank, firm, and household decisions such that, given AM prices, agent optimize and PM markets clear.

Full Definition

High Level Story: Regulatory Privilege Creates a Funding Advantage

- Assume no inflation risk $\sigma_\pi = 0$.
- AM: Regulatory privilege on govt. bonds ($\kappa^b < \kappa^h$):
  - Incentivizes banks to hold govt. bonds in AM to satisfy regulation *("forced demand")*.
  - Incentive is stronger in bad states because regulatory constraint binds more tightly.
  - $\Rightarrow$ AM govt. bond prices high in bad state $\breve{q}^b_{t+1}(\lambda_H) > \breve{q}^h_{t+1}(\lambda_H)$ *("hedging demand")*.
- PM: Forced & hedging bank demand
  - Make govt. bond demand inelastic relative to corporate bond demand.
  - $\Rightarrow$ PM govt. bond prices relative high $q^b_t > q^h_t$
    (So yield on govt. debt is relatively low $\chi_t = (-\omega \log(q^h_t)) - (-\omega \log(q^b_t)) > 0$)

High Level Story: Inflation Activates Substitution Margins

- Now suppose $\sigma_\pi > 0$, $\text{Cov}(\pi, \text{output}) < 0$, $\mathbb{E}[\pi] > 0$.

- AM: Regulatory privilege on govt. bonds ($\kappa^b < \kappa^h$):
  - Incentivizes banks to hold govt. bonds in AM to satisfy regulation *("forced demand")*.
  - But inflation means that holding Treasuries to satisfy regulation leads to losses.
  - $\Rightarrow$ Banks raise equity/exit the deposit market.
  - $\Rightarrow$ AM govt. bond prices no longer high in bad state ~~*("hedging demand")*~~.

- PM: Banks hedge withdrawal and inflation risk:
  - Banks $\downarrow$ bonds, $\downarrow$ deposits, & $\uparrow$ storage asset *("captive market size decreases")*
  - Govt. bond demand elasticity (relative to corporate bond elasticity) increases.
  - $\Rightarrow \downarrow \chi_t$

Aside: Exponential Affine Approximation

- For welfare: global collocation approach
- For semi-analytic exposition: exponential affine projection to approx. eqm conditions:

$$\log q_t^j \approx \log \mathbb{E}_t \left[\exp\left(\log \xi_{t,t+1} + (1-\varrho\kappa^j)\breve{\nu}(x_{t+1}^b, x_{t+1}^h; b_t, h_t, d_t, m_t) + \log x_{t+1}^j\right)\right]$$

with the three terms being affine functions of state vector s_t with

$$\frac{\partial \breve{\nu}}{\partial b} < 0 \qquad \frac{\partial \breve{\nu}}{\partial h} < 0 \qquad \frac{\partial \breve{\nu}}{\partial d} > 0 \qquad \frac{\partial \breve{\nu}}{\partial m} < 0$$

- Funding Advantage

$$\chi_t \approx \varrho(\kappa^h - \kappa^b)\underbrace{\mathbb{E}_t^{\mathbb{Q}}[\breve{\nu}(b,h,d,m)]}_{\text{forced holding}} + \varrho(\kappa^h - \kappa^b)\underbrace{\mathbb{C}\text{ov}_t\big(\log \xi_{t,t+1},\ \log \breve{\nu}_{t+1}(b,h,d,m)\big)}_{\text{non-pecuniary hedging}} +$$

$$+ \quad \underbrace{\mathbb{E}_t^{\mathbb{Q}}[\log(x_{t+1}^b / x_{t+1}^h)]}_{\text{relative exp pecuniary payoffs}} + \underbrace{\mathbb{C}\text{ov}_t\big(\log \xi_{t,t+1},\ \log x_{t+1}^b - \log x_{t+1}^h\big)}_{\text{relative risk premia}} + \ldots$$

Aside: Computation For Macro Finance

- Last year, I presented a paper on solving macro-finance models with deep learning

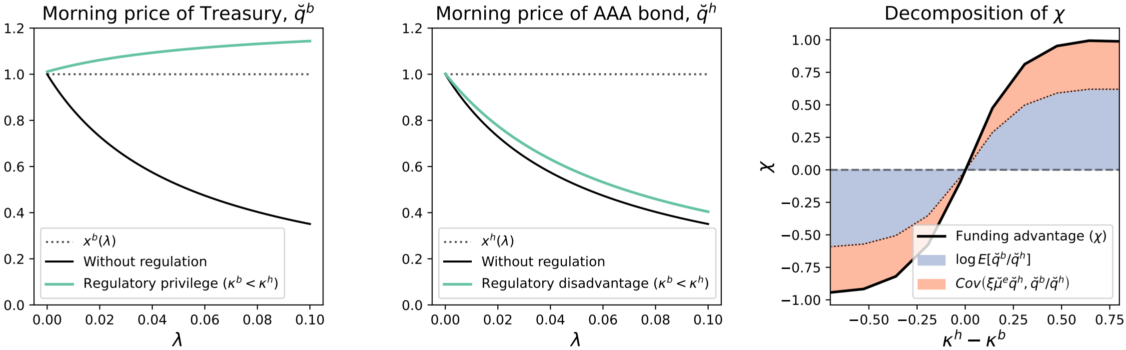
  … Argued we should choose a NN approximation to the equilibrium pricing kernel so market clearing can be exactly imposed.

- This year, we take an exponential affine approximation

  … But the spirit is also to choose a projection so LT bond market clearing is exact,

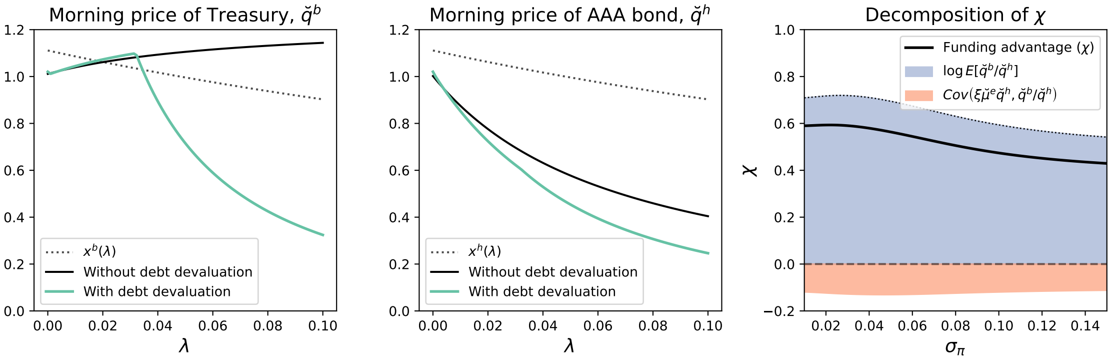
  … Means we get a collection of Ricatti equations for the term structure augmented with structural wedges.

General Equilibrium, Regulatory Privilege (High ψ; $\sigma_\pi = 0$)



Regulatory privilege opens up a funding advantage *(the Chase-Sherman view)*.
$\Rightarrow$ Risk weights are a self-fulfilling prophecy

Inflation Risk Erodes Funding Advantage ($\sigma_\pi > 0$, $\text{Cov}(\pi, \text{output}) < 0$)



- Pecuniary treasury return risk $\Rightarrow$ bank losses for holding Treasurys $\Rightarrow$ collapses non-pecuniary demand *(The McAdoo-Goldenweiser fear)*
- Comparison: $\uparrow \sigma^\pi \Rightarrow \uparrow \chi_t$ in BIU, BIA, Bewley Other Models

Bringing this together, what are the government's tradeoffs?

Ultimately, the government cannot choose all three of:

1. High funding advantage,
2. Well-functioning financial sector (profitable and stable), and
3. Monetary-fiscal policy that does not stabilize long-run bond prices (e.g. inflation risk, haircuts, issuance in "bad times").

Ultimately, the government cannot choose all three of:

1. High funding advantage,

2. Well-functioning financial sector (profitable and/or stable), and

3. ~~Monetary-fiscal policy that does not stabilize long-run bond prices e.g. inflation risk, issuance in "bad times", haircuts)~~.

We interpret this combination as a type of financial dominance:

- If the government wants to lower financing costs,
- Then monetary-fiscal policy must ensure banks stay profitable & active buyers.
- Similar to 1865-1913 (NBE with high $\kappa^h - \kappa^b$, low σ_π)
  ...and possibly 2010-2019 (tight financial regulation and stable bond prices)

Ultimately, the government cannot choose all three of:

1. ~~High funding advantage~~,

2. Well-functioning financial sector (profitable and/or stable), and

3. Monetary-fiscal policy that does not stabilize long-run bond prices
   (e.g. inflation risk, haircuts, issuance in "bad times").

1970s-80s: Debt devaluation and stable financial sector but no funding advantage.

Conclusion

- Instead of modeling US funding advantage as permanent and policy invariant

  ... we should think about it as part of the government choice set.

- This gives the govt. flexibility to $\downarrow$ borrowing costs by $\uparrow$ Treasury demand.

  ... But also requires monetary-fiscal policies that supports long-term debt prices,

  ... And protect the financial sector's balance sheet.

- So there is no free lunch!

Thank You!