Liquidity, Debt Denomination, and Currency Dominance

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Motivation

Currency dominance in global finance:

- US dollar dominance: large share of contracts denominated in $ by a broad cross-section of firms
- Historical precedents: Dutch florin (17^{th}–18^{th} c.), British pound sterling (19^{th}–20^{th} c.)

Question: what explains the emergence, persistence, and fall of these specific currencies?

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This paper: **liquidity**-based theory for currency dominance in debt issuance

- Debt obligations are denominated in the unit required to be delivered at settlement
- Obtaining unit for settlement is less costly in more liquid money markets

US $ is attractive for issuance because large, liquid $ stock of instruments benefits settlement

Key mechanism: **complementarity** in liquidity supply (issuance) & demand (settlement)

$\Longrightarrow$ Endogenous positive feedback: issuance begets more liquidity for settlement

Liquidity Force in the First Global Currency

International payments were made in **illiquid metallic coin** for much of history

- Hundreds of types; costly to verify, insure, and transport $\Longrightarrow$ uncertain supply at settlement

Bank of Amsterdam (1609) overcame settlement frictions with **financial technology (bank florin)**

- Standardized unit of account: obtainable with coin deposits for payments via account transfers
- Florin was liquid: at any given time, no limit to florins available in Amsterdam

Florin-denominated "bill on Amsterdam" used internationally

- Yield advantage for florin-denominated assets

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Dutch florin used as a financial unit of account rather than **(illiquid) Spanish "pieces of eight"**

- Despite Spain being bigger and wealthier economy with 6$\times$ trade volumes

Overview

Model of complementarity between liquidity supply and liquidity demand

1. Complementarity generates cross-section of debt issuance by different types of firms

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2. Unique dominant equilibrium arises from asymmetry in financial market liquidity
   - Historically seeded by large pool of safe government debt
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Endogenous investment in liquidity generates additional complementarities:

3. Incentives & ability to invest are higher for dominant country
4. Dominant currency pricing (trade invoicing) complements dominant currency financing
5. Welfare: Liquidity provision is a natural monopoly $\rightarrow$ gains from international cooperation
6. Policy tools: Contingent liquidity provision

Related Literature

International monetary system:

- *Dollar world*: Matsuyama Kiyotaki Matsui (1993), Obstfeld Dornbusch McKinnon (1995), Tirole (2002), Gourinchas Rey (2007a,b), Eichengreen Mehl Chitu (2017), Maggiori (2017), Farhi Maggiori (2018), He Krishnamurthy Milbradt (2019), Ilzetzki Reinhart Rogoff (2019), Gopinath Stein (2021), Chahrour Valchev (2021)
- *Historical precedents*: Keynes (1923), Nurske (1944), Dickson (1967), Despres Kindleberger Salant (1969), Lindert (1969), King (1972), Flandreau Jobst (2006), Eichengreen Flandreau (2008), Eichengreen (2008, 2012, 2017), Quinn Roberds (2014a,b), Kynaston (2015a,b), Roberds Velde (2016), Payne Szoke Hall Sargent (2022), Bolt Frost Shin Wierts (2023)

Safe asset shortages:

- Holmstrom Tirole (1998), Caballero Farhi Gourinchas (2008), Caballero Krishnamurthy (2009), Farhi Gourinchas Rey (2011), Krishnamurthy Vissing-Jorgensen (2012), Gorton Lewellen Metrick (2012), Obstfeld (2012), Greenwood Hanson Stein (2015)

US dollar dominance:

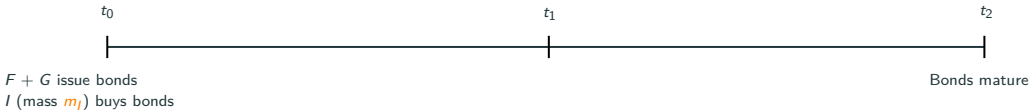
- *Trade invoicing*: Engel (2006), Goldberg Tille (2008), Gopinath Itskhoki Rigobon (2010), Gopinath Boz Casas Díez Gourinchas Plagborg-Møller (2020), Amiti Itskhoki Konings (2022), Mukhin (2022)
- *Global finance*: Krugman (1984), Frankel (1992), Cetorelli Goldberg (2012), Bruno Shin (2015a,b), Ivashina Scharfstein Stein (2015), McCauley McGuire Sushko (2015), Du Tepper Verdelhan (2018), Bahaj Reis (2020, 2021), Koijen Yogo (2020), Maggiori Neiman Schreger (2020), Bianchi Bigio Engel (2021), Jiang Krishnamurthy Lustig (2021), Kekre Lenel (2021), Jiang Richmond Zhang (2022), Correa Du Liao (2022), Eren Malamud (2022), Arslanalp Eichengreen Simpson-Bell (2022), Du Huber (2023)

Search frictions in financial markets:

- Kiyotaki Wright (1989, 1993), Pagano (1989), Trejos Wright (1995), Freeman (1996), Duffie Garleanu Pedersen (2005, 2007), Lagos Wright (2005), Garleanu Pedersen (2007), Vayanos Wang (2007), Vayanos Weill (2008), Weill (2008, 2020), Lagos Rocheteau (2009), Doepke Schneider (2017), Copeland Duffie Yang (2021), Passadore Xu (2022)

Model: Within-Country Setup

Debt Market: Firms and Investors



Preferences (risk neutral):

$$u_i^{F,I} = c_0 + \beta c_1 + \beta^2 c_2, \qquad c_t \geq 0$$

Debt suppliers & demanders at t_0:

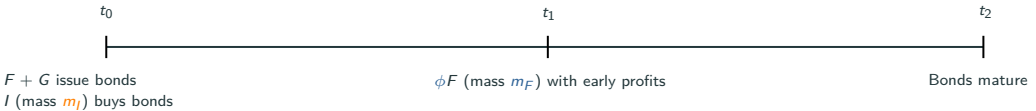
- Entrepreneur-owned Firms (mass F) and Government (mass G) issue bonds at t_0
  - Entrepreneurs borrow to finance project which costs β^2, and generates profits $\pi = 1$
- Investors (mass I) buy bonds, have endowments w; each investor can invest in 1 bond

F and G Bonds:

- Face value 1, mature at t_2, indivisible
- Zero default risk, perfect substitutes $\implies$ same endogenous price P_0

Total bonds mass: $m_I = F + G \leq I$

Timing Mismatch Generates Liquidity Demand at t_1



Central element: potential for timing mismatch generates liquidity demand

- Firms receive profits $\pi = 1$ at either t_1 or t_2
- Probability of early profits $\phi \rightarrow$ mass $m_F = \phi F$ of mismatched firms

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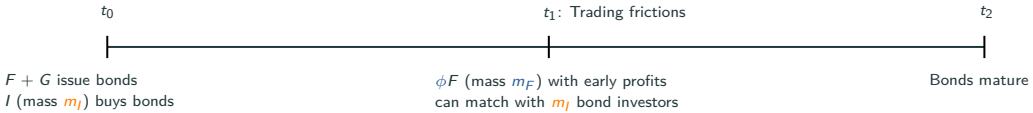

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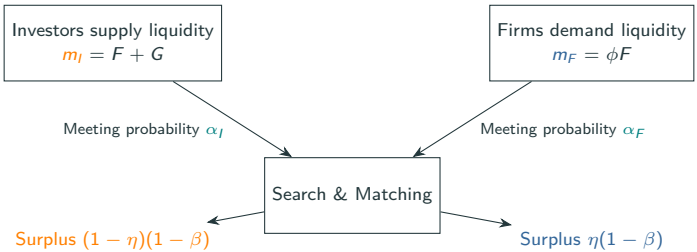
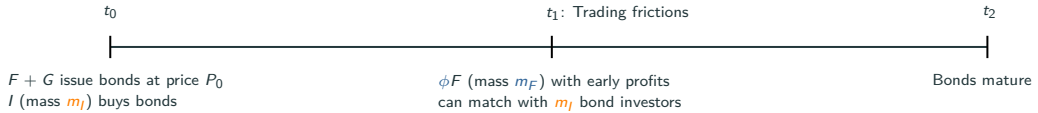
Gains from asset trade $(1 - \beta)$ possible in the market at t_1 if firm profits arrive early:



Asset Market Equilibrium and Issuance Benefits



Solving for P_0: market at t_0 is Walrasian, so investor bids result in price

$$P_0 = \underbrace{\alpha_I \beta(\beta + (1-\eta)(1-\beta))}_{P(\text{Matched}) \times \text{PV of Sale Price}} + \underbrace{(1-\alpha_I)\beta^2}_{P(\text{Not Matched}) \times \text{PV of 1}}$$

α_I: probability investor resells bond at t_1

Convenience yield at t_0 captured by $P_0 - \beta^2 = \beta(1-\beta)(1-\eta) \times \alpha_I$

- A fully illiquid bond ($\alpha_I = 0$) would be priced at β^2

Expected utility from debt issuance for firm i is increasing α_I and α_F:

$$\mathbb{E}[u_i^F] = \beta(1-\beta) \times \Big[\underbrace{(1-\eta)\alpha_I}_{\text{Convenience yield at } t_0} + \underbrace{\eta\phi\alpha_F}_{\text{Benefit of settlement at } t_1} \Big]$$

Closing the Model With Search Specification, Complementary Issuance Benefits

Matching function at t_1: number of meetings between firms (demanders) and investors (suppliers) is

$$n = \lambda {m_F}^{\theta} {m_I}^{\theta}, \qquad \lambda > 0, \qquad \underbrace{\theta > 1/2}_{\textbf{Increasing returns}}$$

- Duffie Garleanu Pedersen (2005) case: $\theta = 1$, micro-foundations in Duffie Qiao Sun (2018)

Meeting probabilities:

$$\underbrace{\alpha_F = \frac{n}{m_F} = \lambda {m_I}^{\theta} m_F^{\theta-1}}_{P(\text{Firm finds a bond seller})}, \qquad \underbrace{\alpha_I = \frac{n}{m_I} = \lambda {m_F}^{\theta} m_I^{\theta-1}}_{P(\text{Bond seller finds a firm})}$$

Expected firm utility given equilibrium prices and probabilities (taking $\theta = 1$ case):

$$\mathbb{E}[u_i^F] = \lambda\beta(1-\beta) \times \Big[\underbrace{(1-\eta)m_F}_{\substack{\text{Convenience yield at } t_0, \\ \text{increasing in liquidity demand } m_F}} + \underbrace{\eta\phi m_I}_{\substack{\text{Benefit of settlement at } t_1, \\ \text{increasing in liquidity supply } m_I}} \Big]$$

Investors and Institutional Structure of Money Market at t_1

Investors (m_I) hold liquidity at t_1 that firms (m_F) need. Who are these investors?

$ market today:

- In the US: investors are retail or dealer banks
  - Dealer banks buy Treasuries & MBS (G) at t_0
  - Access reserves via repo markets $\rightarrow$ supply reserves (or deposits) at t_1
- Internationally: investors are central banks or global banks
  - Buy bonds (G, F) at t_0
  - Provide liquidity to domestic firms at t_1

$\Longrightarrow$ Investors hold $ assets in order to provide $ liquidity

Model: Two-Country Environment

Debt Denomination Choice

Two countries $j = A, B$ with fundamentals $\{G_j, F_j, \lambda_j\}$

Currency denomination choice for firms i in each country

- Fixed cost $\propto K_i$ of foreign denomination
  - Add exchange rate volatility $\Rightarrow$ expected costs of balance sheet currency mismatch or hedging

Endogenous masses $\mathcal{M} = (m_{F,A}, m_{I,A}, m_{F,B}, m_{I,B})$

Four denomination possibilities with expected utility denoted:

$$U_{A\to A}(\mathcal{M}) \qquad U_{A\to B}(\mathcal{M}, K_i)$$

$$U_{B\to B}(\mathcal{M}) \qquad U_{B\to A}(\mathcal{M}, K_i)$$

Firm optimality requires *threshold strategy*: firms issue in foreign currency iff $K_i \leq \bar{K}$

- $H(K_i)$ is the (Pareto) CDF of $K_i \in [\underline{K}, \infty) \to$ share $H(\bar{K})$ issues in foreign currency

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- **Class BA** and class AB equilibria can arise

International Equilibrium Conditions

Define $\hat{K}$ as the equilibrium value of $\bar{K}$, equilibrium characterized by:

1. **Firm optimality**: the *marginal firm* ($K_i = \bar{K}$) has $K_i = \hat{K}$ in equilibrium and satisfies

$$\bar{U}_{j' \to j}(\hat{K}) = \bar{U}_{j' \to j'}(\hat{K})$$

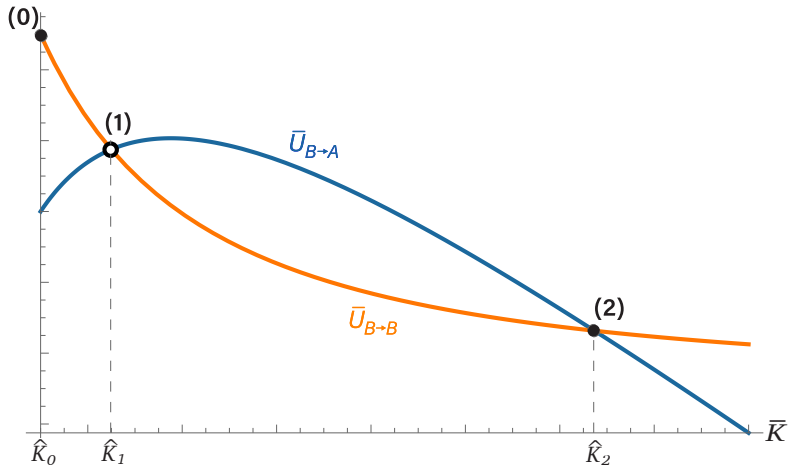
2. **Market clearing:** given $\hat{K}$, masses $\mathcal{M}$ satisfy

$$m_{I,j} = G_j + F_j + H(\hat{K})F_{j'} \qquad m_{I,j'} = G_{j'} + \left[1 - H(\hat{K})\right] F_{j'}$$

$$m_{F,j} = \phi \left[F_j + H(\hat{K})F_{j'}\right] \qquad m_{F,j'} = \phi \left[1 - H(\hat{K})\right] F_{j'}$$

Multiple Equilibria in Case with Symmetric Fundamentals

Class (BA) Equilibria: B firms switch to currency A



$$\underbrace{\bar{U}_{B\to A} = \lambda_A[m_{F,A}(\bar{K}) + \phi m_{I,A}(\bar{K})] - \bar{K}}_{\text{Expected utility of foreign denomination}} \qquad \underbrace{\bar{U}_{B\to B} = \lambda_B[m_{F,B}(\bar{K}) + \phi m_{I,B}(\bar{K})]}_{\text{Expected utility of home denomination}}$$

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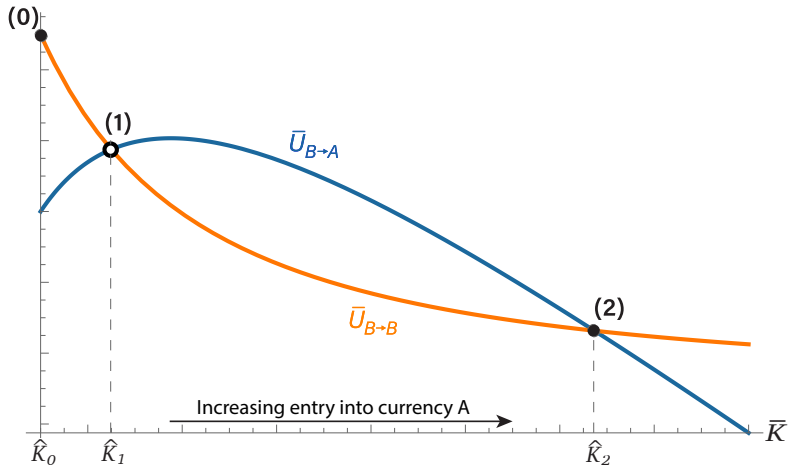

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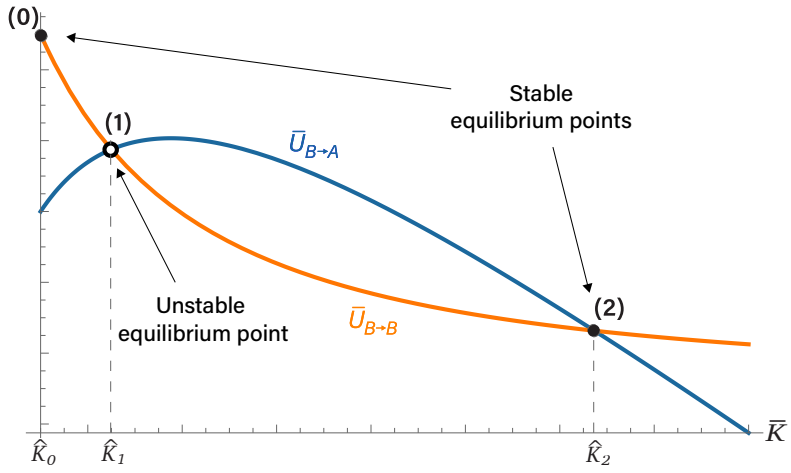

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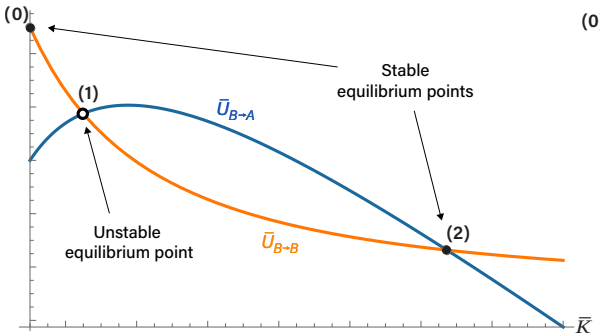
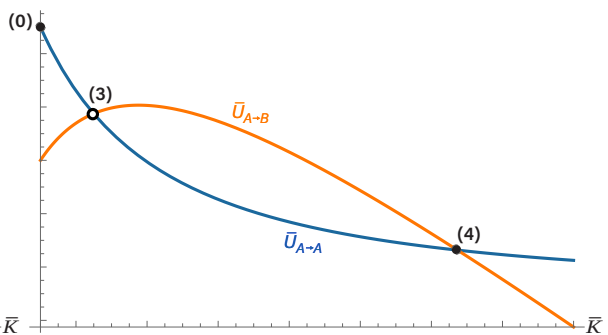


Class (AB) Equilibria: A firms switch to currency B



Contrast to Other Theories

1. **Costs** of asset & liability mismatch
   - Doepke Schneider (2017): credit chains for production + costly default
     $\longrightarrow$ Socially optimal to coordinate on single denomination in all contracts
   - Gopinath Stein (2021) and Chahrour Valchev (2022): special case for trade transactions
     $\longrightarrow$ Coordinate on denomination of assets (traded goods) and liabilities (debt)

   $\Longrightarrow$ **Benefits** of liquid financial markets as source of dominance
   - Model also features costs of mismatch
   - Adding coordination on asset/liability denomination generates additional complementarity

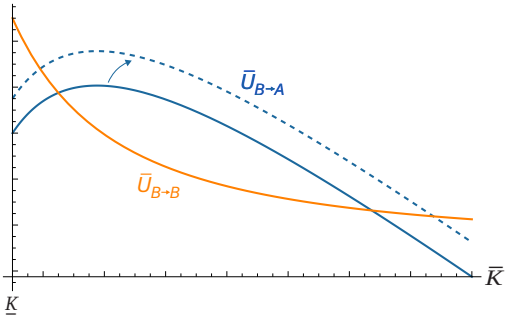
2. **Investor demand** for safety
   - Maggiori (2017), Jiang Krishnamurthy Lustig (2021), Gourinchas Rey (2022): risk aversion in ROW or preference for $ drives demand
     $\longrightarrow$ Incentive for safe issuance to capture convenience yield

   $\Longrightarrow$ **Benefits** accrue to all issuers
   - Results do not depend on payoff heterogeneity or investor demand

Liquidity and Dominance Throughout History

Result 2a: Historical Transitions - Fundamental Asymmetries Generate Dominance

- **Italian city-states** (15th – 16th c.) also prominent in trade and finance, but no dominant currency
- **Amsterdam** disrupted multipolarity; $G_A \uparrow$, $\lambda_A \uparrow$.



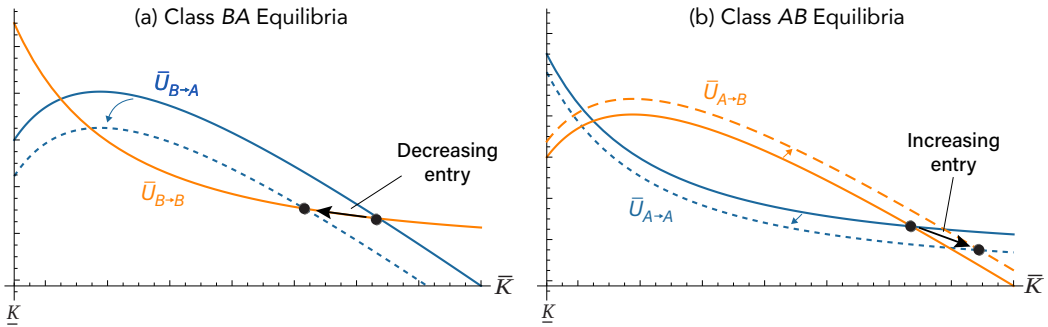
$$\bar{U}_{B\to A} = \phi\lambda_A[G_A + 2F_A + 2H(\bar{K})F_B] - \bar{K}$$

Increasing G_A sufficiently leads to unique equilibrium selection

Result 2b: Historical Transitions - Fundamental Asymmetries Generate Dominance

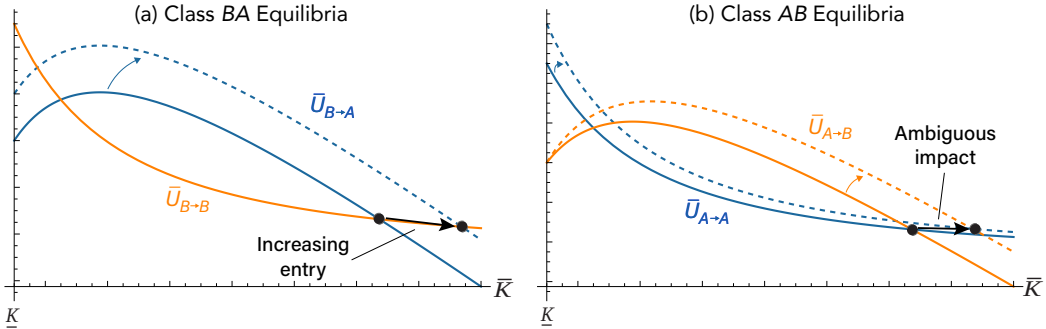
Transition to British pound:

- Left panel: Bank of Amsterdam collapses in 1791 ($G_{Amsterdam} \downarrow$)
- Right panel: Britain wins Napoleonic Wars ($G_{Britain} \uparrow$) and ($G_{Amsterdam} \downarrow$)



Result 2c: Private Sector Size Has Ambiguous Impact on Dominance

- Left panel: A is dominant currency; $F_A \uparrow$ increases A dominance
- Right panel: B is dominant currency; $F_A \uparrow$ increases B dominance



- Examples: Spain in 17th century, US in 19th century

Result 3a: Persistence - Sovereign Incentives to Supply Liquidity are Increasing in Dominance

Specify the **government's objective** as

$$W_j = \underbrace{G_j \left(P_{0,j} - \beta^2\right)}_{\text{Seignorage conv. yield}} + \underbrace{F_j \int u^F_{i,j}(K_i)\, \mathrm{d}H(K_i)}_{\text{Domestic firm utility}}$$

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Consider: $B \to A$ equilibrium with $G_A > G_B$, $\lambda_A = \lambda_B$, $F_A = F_B$

$$W_A = \lambda_A \left[G_A m_{F,A} + F_A(m_{F,A} + \phi m_{I,A})\right]$$
$$W_B = \lambda_B \left[G_B m_{F,B} + F_B(1 - H(\hat{K}))(m_{F,B} + \phi m_{I,B})\right] + U_{B\to A}.$$

1. **Bigger incentive to create liquidity** (G) for the leader (A): $\frac{\partial W_A}{\partial G_A} > \frac{\partial W_B}{\partial G_B}$
2. **Complementarity**: investment incentive reinforced by endogenous rise in entry ($\hat{K}$):

$$\frac{\partial^2 W_A}{\partial G_A\,\partial \hat{K}} > 0, \qquad \frac{\partial \hat{K}}{\partial G_A} > 0$$

Result 4: Trade Invoicing Dominance Follows Financial Dominance

International trade and finance are highly related

- Ex: bills of exchange in Amsterdam both settlement instruments for trade and source of credit

⊙ **So far: Trade/GDP shapes demand for banking and commitment of the bank**

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- If more revenues [exogenously] in dominant currency, lower FX mismatch reduces K_i (as in Gopinath Stein 2021)
- Shifting $H(K)$ to the left $\longrightarrow$ **more entry** with $\hat{K}_1 > \hat{K}_0$:

$$\underbrace{\lambda_A \phi \left[2F_A + G_A + 2F_B H(\hat{K}_0)\right] - \hat{K}_0}_{\bar{U}_{B\to A}} = \underbrace{\lambda_B \phi \left[G_B + 2F_B(1 - H(\hat{K}_0))\right]}_{\bar{U}_{B\to B}}$$

- If firms *choose* invoicing currency, generate trade dominance as by-product of financial dominance

$\Longrightarrow$ Additional complementarity that reinforces dominant equilibrium

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$\Longrightarrow$ Additional complementarity that reinforces dominant equilibrium

⊙ **Trade invoicing vs "liability" invoicing: Liabilities 6X trade, with both working in same direction**

Result 5: Welfare and International Cooperation

Global planner has objective:

$$\mathcal{W} = W_A + W_B$$

Socially optimal entry $>$ **competitive equilibrium** because entry carries positive *liquidity externality*

$$\underbrace{K^*}_{\text{Socially optimal entry}} > \underbrace{\hat{K}_{\max}}_{\text{Competitive Equilibrium}}$$

- First best (K^*) is a Pareto improvement over competitive equilibrium (with transfers)
- Optimal policy features subsidy to entry into currency A

Result 5: Welfare & Bretton Woods Arrangements

- Now examine shadow value of increasing liquidity G_A from global and single-country perspective
  - If $\frac{\partial \mathcal{W}}{\partial G_A} > \frac{\partial W_A}{\partial G_A}$, planner wants to increase G_A beyond what privately optimal for A's sovereign

- Direction hinges on relative importance of public (G_B) and private (F_B) borrowing of follower (B):

$$H(\hat{K})\frac{\lambda_A}{\lambda_B} > \frac{1}{2}\frac{G_B}{F_B} + \left[1 - H(\hat{K})\right] \quad \Longleftrightarrow \quad \frac{\partial \mathcal{W}}{\partial G_A} - \frac{\partial W_A}{\partial G_A} = \frac{\partial W_B}{\partial G_A} > 0$$

- If F_B is sufficiently large, there are **gains from international cooperation in liquidity supply**
  - Historical analog: **Bretton Woods** $\rightarrow$ major economies coordinated on US-provided liquidity
  - Response to the classic **Triffin dilemma**: transfers of commitment (gold) to the US

Result 6: Aggregate Risk and State-Contingent Liquidity, Role of Swap Lines

Aggregate risk:

- State at t_1 is $\omega \in \Omega$ with probability $q_\omega \rightarrow$ aggregate liquidity demand shock: ϕ_ω
- State-contingent liquidity supply G^A_ω chosen in advance at t_0

Equilibrium indifference condition now features **moments** of the $(\phi_\omega, G^A_\omega)$ distribution:

$$\lambda_A \left(\mathbb{E}[\phi_\omega] \left(2(F_A + H(\hat{K})F_B) + \mathbb{E}[G^A_\omega] \right) + \text{Cov}[\phi_\omega, G^A_\omega] \right) - \hat{K} = \lambda_B \mathbb{E}[\phi_\omega] \left(2(1 - H(\hat{K}))F_B + G_B \right)$$

- **State-contingent liquidity provision** (positive covariance) induces entry

Policy tool: Central bank swap lines that provide liquidity when it is most demanded

- **Default** makes currency less attractive, particularly if it *negatively covaries* with aggregate demand. **Demise of Euro**

Conclusion

Financial market liquidity is common thread for dominant currencies since 1609

- Seeded by largest pool of safe government-backed debt
- Entrenched by endogenous incentives and ability to invest in safe debt creation
- US dollar dominance today features all the sources of dominance highlighted:
  - Large, liquid, safe stock of T-Bills
  - Financial technologies to make private assets liquid (securitization, collateralization, repo)

20th century arrangements have coordinated on liquidity provision

- Explicit coordination during Bretton Woods
- Swap lines as policy tools today

Renminbi dominance question: current Chinese financial system lacks these elements

Thank you!

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Additional Slides

Model equilibrium:

- Equilibrium lemmas Go
- Formal firm problem Go
- Class AB equilibria Go
- Increasing F_A Go

Theoretical extensions:

- Issuance complementarities Go
- The $\theta < 1$ case Go
- Limited pledgeability Go
- Sovereign denomination choice Go

History:

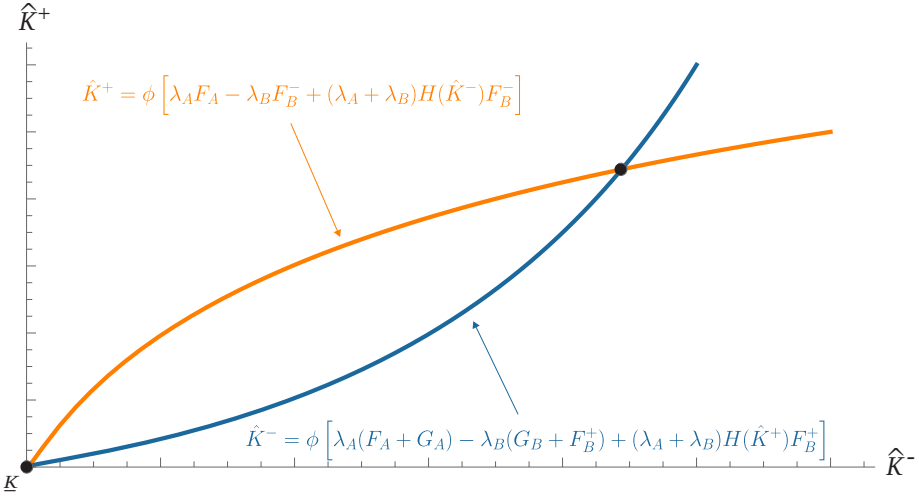
- Bank of Amsterdam mandate Go
- Florin quantities Go
- The florin *agio* Go
- Bank of England evolution Go

Empirics:

- Debt quantities Go
- British dominance Go
- Finance and trade Go

Extra Slides

The Denomination Choices of Safe and Risky Private Borrowers Are Complementary



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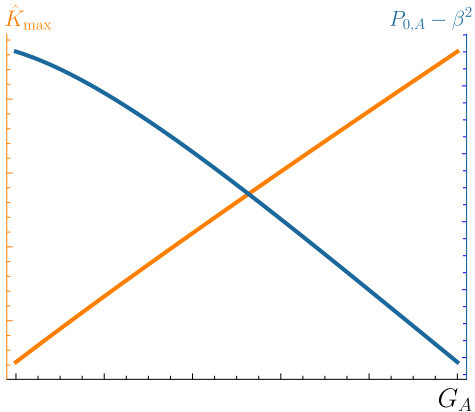
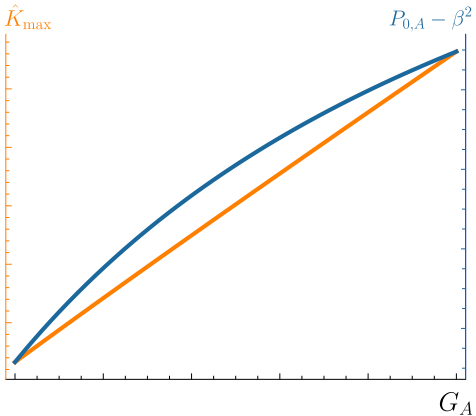
$$P_{0,j} - \beta^2 = \frac{\lambda_j \beta(1-\beta)}{2} m_{F,j}^{\theta} m_{I,j}^{\theta-1}$$

(a) Case 1: Convenience yield decreasing in G_A



(b) Case 2: Convenience yield increasing in G_A



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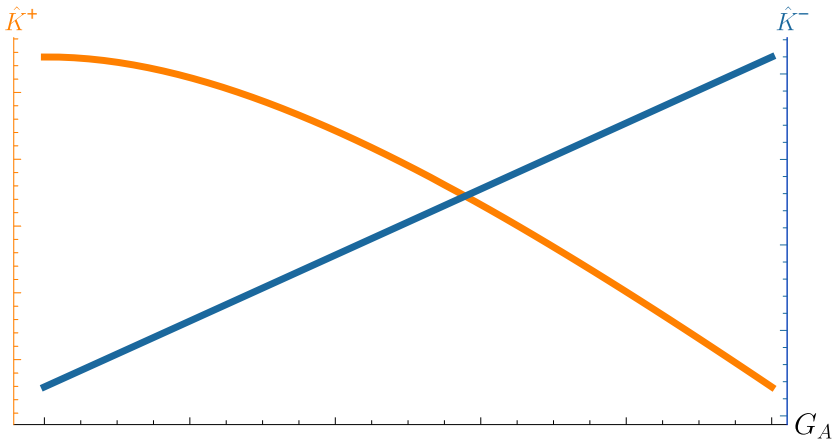
Crowding In and Crowding Out of Heterogeneous Private Borrowers

- In general case ($\theta < 1$), can generate negative impact of sovereign debt supply on conv. yields
- As a result, more government debt ***crowds out*** safe borrowers while ***crowding in*** risky borrowers



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Sovereign Incentives to Facilitate Private Sector Liquidity Creation Increasing in Dominance

Improving capacity of **private sector** to issue safe money-like assets also part of financial development

Extend model to include country-specific **pledgeability** parameter ρ_j

- After currency choice, firms find out if revenues are fully pledgeable (probability ρ_j) or not

Ex ante expectation of pledgeability is ρ_j, so equilibrium condition becomes:

$$\rho_A \left[\lambda_A(m_{F,A} + \phi\, m_{I,A}) - \hat{K}\right] = \rho_B \left[\lambda_B(m_{F,B} + \phi\, m_{I,B})\right]$$

As in previous case, sovereign incentives to invest in firm pledgeability **complementary** to dominance:

$$\frac{\partial W_A}{\partial \rho_A} > \frac{\partial W_B}{\partial \rho_B}, \qquad \frac{\partial^2 W_A}{\partial \rho_A\, \partial \hat{K}} > 0, \qquad \frac{\partial \hat{K}}{\partial \rho_A} > 0$$

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Bank of Amsterdam Created to Provide Liquidity and Convenience

Mandate from the Bank's founding decree:

> *"To check all agio of the current money and confusion of coin, and to be of use to all persons who are in need of any kind of coin in business."*

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The Entrepreneur's Decision Problem

Entrepreneur chooses whether to issue (D_i) at t_0 and whether to trade (T_i) at t_1:

$$\max_{D_i, T_i} \; E[c_0 + \beta c_1 + \beta^2 c_2]$$

subject to

$$c_0 = D_i(P_0 - \beta^2),$$

$$c_1 = \begin{cases} 0, & \text{late;} \\ 0, & \text{early, but not matched;} \\ D_i \, T_i \, \eta(1-\beta), & \text{early, and matched} \end{cases}$$

$$c_2 = 0.$$

Since $P_0 \geq \beta^2$ and $\beta < 1$, solution is to set $D_i = 1$ and $T_i = 1$

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Lemmas: Necessary Conditions for Firm Optimality

Lemma 1
Consider firms $\hat{i}$ and i in country j, where $K_i < K_{\hat{i}}$. If it is optimal for firm $\hat{i}$ to issue in foreign currency $j' \neq j$, then it is optimal for firm i to issue in foreign currency j'.

Lemma 2
Suppose that there is a positive mass of firms in j that find it optimal to issue in currency j'. Then, no firms in j' will issue in currency j.

Lemma 3
A necessary condition for a collection of firm denominations choices $\mathcal{D}_{i,j}$ to be consistent with firm optimality is that it must take the following threshold form:

$$\mathcal{D}_{i,j'} = \begin{cases} 1 & \text{if } K_i < \bar{K}, \\ 0 & \text{if } K_i \geq \bar{K}, \end{cases} \qquad \mathcal{D}_{i,j} = 0.$$

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Equilibrium Class "AB"

Consider the choice for firms in A and define $\hat{K}$ as the equilibrium value of $\bar{K}$

The **threshold firm** $(K_i = \bar{K})$ has $K_i = \hat{K}$ in equilibrium and satisfies:

$$\underbrace{\lambda_A \left[m_{F,A} + \phi m_{I,A}\right]}_{\tilde{U}_{A\to A}(\bar{\mathcal{M}})\text{: Utility from issuing in home currency}} = \underbrace{\lambda_B \left[m_{F,B} + \phi m_{I,B}\right] - \hat{K}}_{\tilde{U}_{A\to B}(\bar{\mathcal{M}},\hat{K})\text{: Utility from issuing in foreign currency}}$$

Given $\hat{K}$, masses are:

$$m_{I,A} = G_A + \left[1 - H(\hat{K})\right] F_A \qquad m_{I,B} = G_B + F_B + H(\hat{K}) F_A$$

$$m_{F,A} = \phi \left[1 - H(\hat{K})\right] F_A \qquad m_{F,B} = \phi \left[F_B + H(\hat{K}) F_A\right]$$

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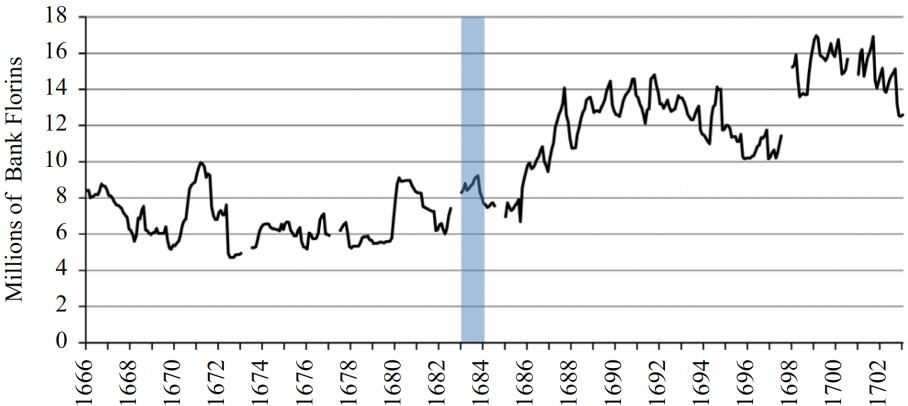
Financial Innovation Driving Florin Success



Monthly bank balances (1666 – 1703); Source: Quinn and Roberds (2014)

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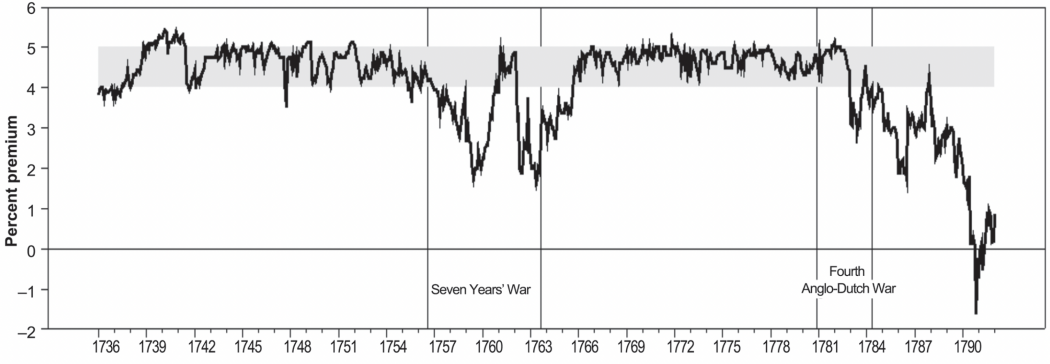
End of Dutch Dominance



Agio: percent premium of bank florin over current guilders (1736 – 1792)

Source: Quinn and Roberds (2019)

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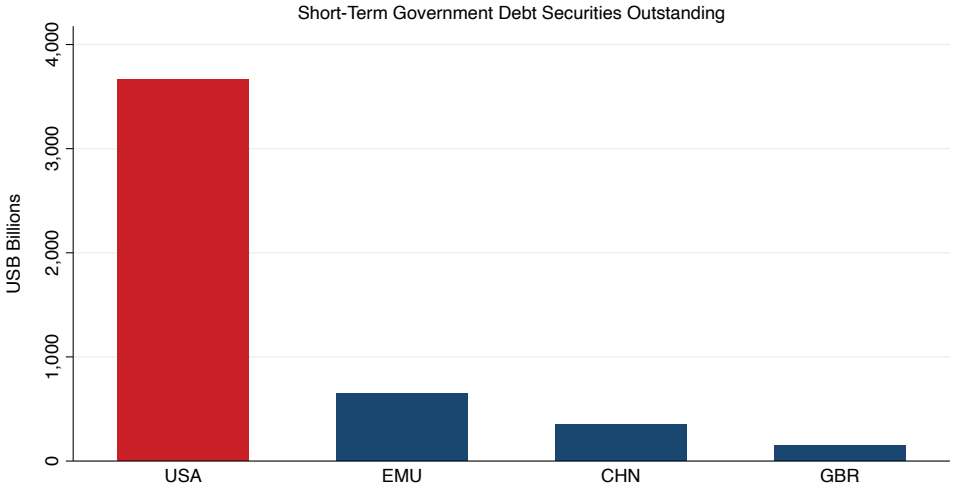
Short-Term Government Debt Supply Vastly Higher in the United States



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Allowing Denomination Choice for G Entrenches Dominance

Allow government in B to choose amount of denomination in currency A: $G_B^* \in [0, G_B]$

Government's objective:

$$W_j = \underbrace{G_j\left(P_{0,j} - \beta^2\right)}_{\text{Seignorage conv. yield}} + \underbrace{F_j \int u_{i,j}^F(K_i)\,\mathrm{d}H(K_i)}_{\text{Domestic firm utility}}$$

In equilibrium in the baseline model, the follower's objective (B) is

$$W_B = G_B \times \underbrace{\lambda_B m_{F,B}}_{\substack{\text{Conv. Yield in B} \\ \text{for govt debt}}} + F_B(1 - H(\hat{K})) \times \underbrace{\lambda_B(m_{F,B} + \phi m_{I,B})}_{\substack{\text{Conv. Yield +} \\ \text{Liquidity Benefit in B} \\ \text{for firm debt}}} + \underbrace{U_{B\to A}}_{\text{Switchers}}$$

With the choice, B trades off **better convenience yields** in govt debt with **lower liquidity benefit** to private firms

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$\Longrightarrow$ G_B^* will issue more in A if **convenience yields** are much better and **private firms are small**

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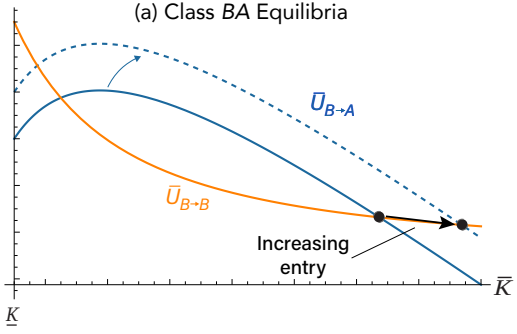
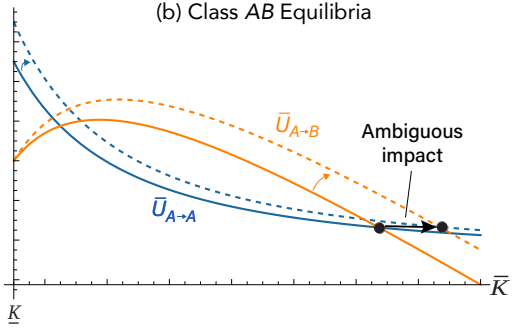
Increasing Private Sector Size Has Ambiguous Equilibrium Impact





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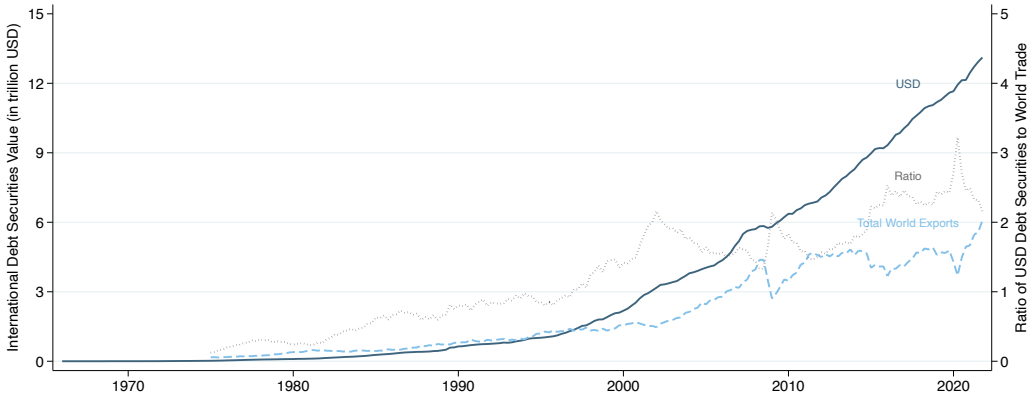
Trade Volumes and Financial Quantities Today



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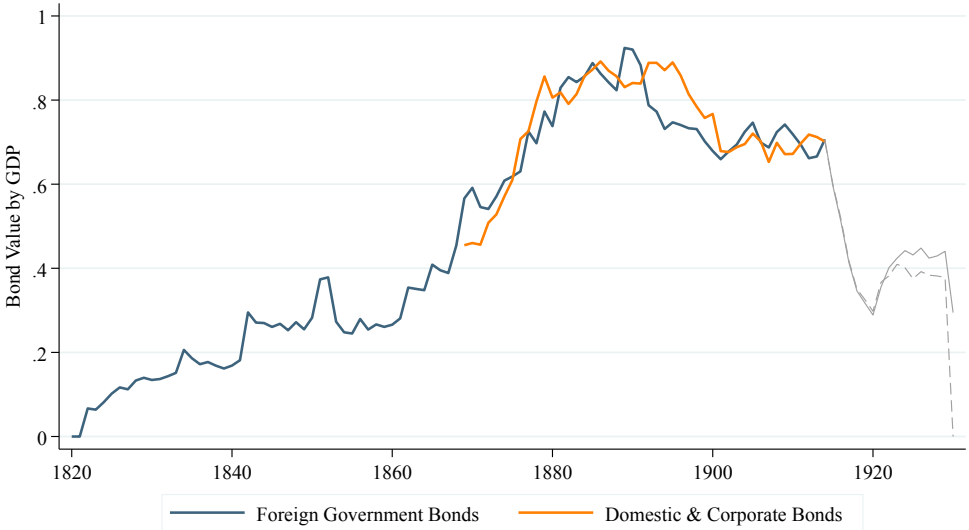
The Evolution of British Pound Dominance



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