

The Coming Great Repression?

New Measures and a Century of Evidence

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Agenda

- Introduction
- Definitions, data, and motivation
- Theoretical framework
- Estimates and correlates of financial repression
- Financial repression in sovereign debt dynamics
- Conclusion
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Introduction

Why study financial repression now?

- **Conjuncture:** Advanced economies face historically high peacetime debt — fiscal consolidation and structural reforms remain politically slow and difficult to sustain.
- **Tools for dealing with high debt:** Beyond orthodox adjustment, governments have historically relied on less visible channels: surprise inflation, debt monetization, and financial repression.

The gap: Financial repression — regulatory policies that compress sovereign borrowing costs by creating captive demand for public liabilities — is less studied than inflation or monetization, owing to data limitations (including absence of an observable counterfactual interest rate).

Our contribution

1. We develop a **theoretical framework for measuring financial repression** based on sectoral holdings of public liabilities, distinguishing repression through the fiscal and monetary arms of the state.
2. We construct a **new historical dataset** covering 18 advanced economies since 1920, documenting the prevalence and correlates of financial repression over a century.
3. We derive a **model-implied counterfactual interest rate** absent repression, enabling us to quantify repression's contribution to sovereign debt dynamics.

Literature Review

1. Measuring financial repression

Key papers measure repression through assumptions on interest rates: wedge between external and domestic borrowing costs (Giovannini and de Melo, 1990), negative ex-post real interest rates on government debt (Reinhart and Sbrancia, 2015), distortions from interest-rate pegs (Acalin and Ball, 2024), and corporate–Treasury yield spreads (Lehner et al., 2025).

We add: quantity-based indicators that exploit differential sectoral absorption of public liabilities and map these shifts into an explicit repression wedge, allowing for systematic cross-country comparison.

2. Debt monetization and monetary financing

This literature studies how governments relax the resource constraint through currency issuance and other non-interest-bearing central bank liabilities (Sargent and Wallace, 1981; Reis, 2016; Feldberg and Lawson, 2020).

We add: a distinct channel, below-market remuneration on reserves, and a consolidated measure that captures both sovereign-yield repression and repression through central bank liabilities (Reis, 2025; Payne and Szoeké, 2025).

3. Debt reduction and debt decomposition

A broader literature studies inflation, interest-growth dynamics, fiscal consolidation, debt liquidation, and long debt overhangs (Eichengreen and Esteves, 2022; Reis, 2022; IMF, 2023; Reinhart and Sbrancia, 2015; Feldberg and Lawson, 2020; Reinhart et al., 2012; Kose et al., 2022; Acalin and Ball, 2024).

We add: debt decompositions that quantify financial repression alongside inflation-related and fiscal-adjustment channels.

Definitions, data, and motivation

Varieties of financial repression

		Measure 1 (fiscal repression)	Measure 2 (monetary repression)	Measure 3 (fiscal + monetary repression)
<i>Public sector perimeter</i>		General government	Central bank	General government + central bank
<i>Relevant liability</i>		Government bonds held by commercial banks	Commercial bank reserves	Government bonds and commercial bank reserves
<i>Policy instruments</i>		Liquidity requirements; capital requirements; portfolio requirements; collateral eligibility rules	Reserve requirements; remuneration policies; legal tender laws	All of the above, combined with QE
<i>Quantitative indicator</i>		Gov. bonds as share of bank assets (B^b/A^b)	CB reserves as share of bank assets (B^{CB}/A^b)	Combined public sector claims ($\frac{B^b+B^{CB}}{A^b}$)
<i>Primary episode</i>		World Wars	Bretton Woods era	Post-GFC

Sample: 18 advanced economies, annual data, 1870–2020, harmonized to span wars, Bretton Woods, capital account liberalization, and the post-GFC period.

Composite dataset

- Sectoral holdings of government debt: Abbas / Arslanalp.
- Bank balance sheets, rates, and asset returns: JST.
- Fiscal aggregates: PFIMH, with gaps filled using GMD.
- Central bank and currency variables: BIS and Finaeon.
- Household wealth: non-captive investor benchmark.
- Restructuring episodes and haircuts: Graf von Luckner et al.

Empirical object: The share of public sector liabilities held by regulated intermediaries relative to their total assets, benchmarked against the corresponding share for non-captive investors.

Motivation: three stylized facts

- **Stylized fact 1:** Higher sovereign debt burdens are associated with lower, not higher, relative returns on government bonds.
- **Stylized fact 2:** Commercial banks hold larger shares of government debt when sovereign returns are lowest and debt burdens are highest.
- **Stylized fact 3:** Government securities account for a larger share of commercial bank assets when debt burdens are higher and sovereign bond returns are lower relative to private assets.

Taken together, the three facts are inconsistent with frictionless portfolio choice and point toward regulation-driven demand shifts as the operative mechanism.

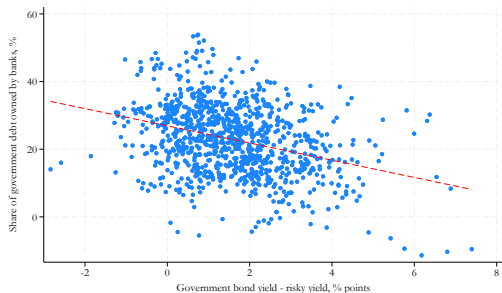
For each stylized fact, we run the regressions with country and time fixed effects and show visual relationships using binned scatterplots. More details are available in our paper.

Stylized Fact 1: Higher debt, lower relative sovereign returns

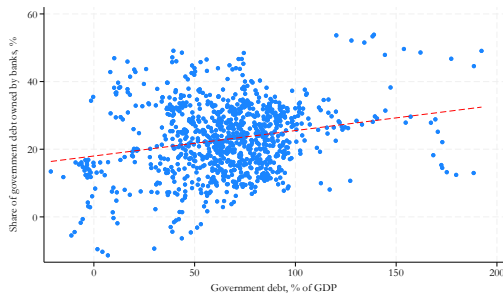


Stylized Fact 2: Banks hold more sovereign debt when returns are low

(a) Bank share vs. relative returns



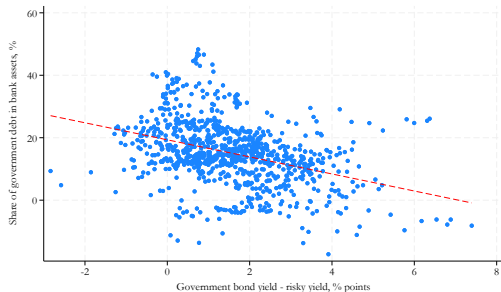
(b) Bank share vs. debt burden



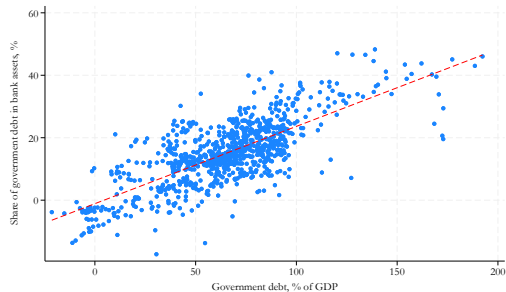
Banks absorb a larger share of sovereign debt precisely when relative returns are lowest and fiscal pressures are greatest — the opposite of return-maximizing portfolio behavior.

Stylized Fact 3: Banks substitute toward sovereign debt at the expense of private lending

(a) Gov. securities share vs. relative returns



(b) Gov. securities share vs. debt burden



The shift toward sovereign debt is within bank balance sheets, not driven by asset growth — consistent with crowding out of private credit and investment.

Theoretical framework

Model setup

Agents

- Households (h): choose freely between government bonds and private assets
- Banks (b): choose portfolios subject to potential regulatory pressure
- Corporations (c): issue private assets
- Government (g): issues nominal bonds B , held by banks (B^b) and households (B^h)

The key asymmetry

- Both banks and households hold government bonds and private assets
- Only banks face regulatory pressure to hold public liabilities
- Households provide a **clean, return-driven benchmark**
- The gap between bank and household portfolio behavior identifies repression

Demand structure and portfolio shares

Taste shifter

$$\zeta_j^i(\omega) = \tilde{\zeta}_j^i(\omega) \cdot \bar{T}_j^i \cdot \tilde{T}_j^i$$

- $\tilde{\zeta}$: idiosyncratic shock (Fréchet distributed)
- $\bar{T}$: structural preference — drops out in first differences
- $\tilde{T}_g^b$: **regulatory demand shifter** — financial repression
- $\tilde{T}_g^h = 1$: households face no regulatory pressure

Portfolio share (Fréchet $\Rightarrow$ logistic)

$$s_g^i = \frac{\left(\bar{T}_g^i \cdot \tilde{T}_g^i \cdot R_g^e\right)^{\theta^i}}{\left(\bar{T}_g^i \cdot \tilde{T}_g^i \cdot R_g^e\right)^{\theta^i} + \left(\bar{T}_c^i \cdot R_c^e\right)^{\theta^i}}$$

- θ^i : elasticity of substitution between bonds and private assets
- Higher $\tilde{T}_g^b$ raises s_g^b holding returns and household behavior fixed
- Banks absorb more bonds than households would voluntarily hold at any given yield

From portfolio shares to the repression wedge

Log-odds transformation

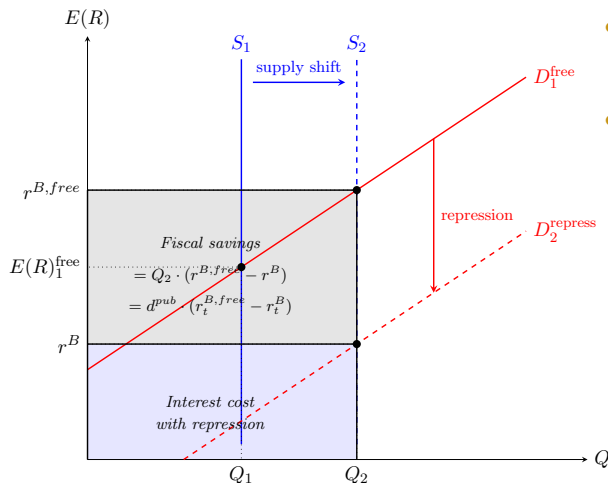
$$\ln \tilde{s}_g^i \equiv \ln \frac{s_g^i}{1 - s_g^i} \quad (3)$$

Change in repression

$$\Delta \ln \tilde{T}_g^b = \underbrace{\Delta \ln \tilde{s}_g^b - \Delta \ln \tilde{s}_g^h}_{\text{raw quantity signal}} - \underbrace{(\theta^b - \theta^h) (\Delta r_g^e - \Delta r_c^e)}_{\text{return adjustment}} \quad (4)$$

Repression is identified as the residual shift in banks' relative demand that cannot be explained by changes in returns or household behavior. When $\theta^b = \theta^h$, the return correction drops out and repression equals the raw bank-household divergence.

Fiscal Savings from Financial Repression



- The shaded rectangle is the annual fiscal saving generated by repression.
- It scales with the stock of publicly held debt and the gap between the free-market and observed sovereign rate.

$$d_{t-1}^{\text{pub}} \cdot (r_t^{B, \text{free}} - r_t^B)$$

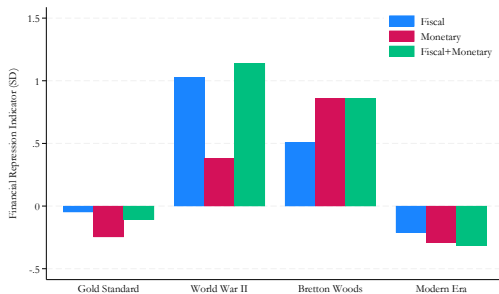
Estimates and correlates of financial repression

Results 1: The use of financial repression over time

(a) Time series



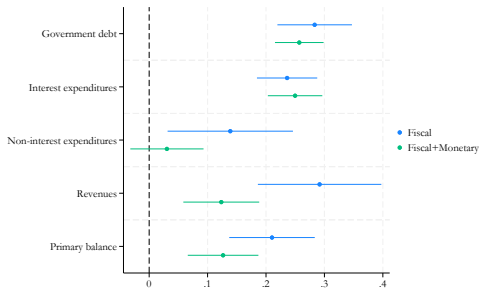
(b) By era



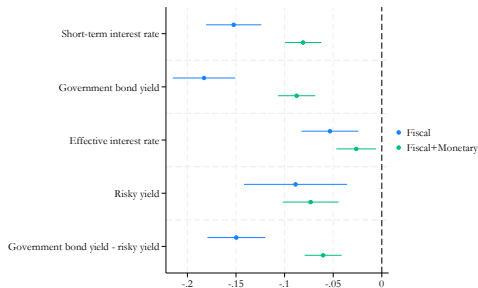
Repression is highest in wartime and low-capital-mobility regimes, recedes under capital account liberalization, and rises after the Global Financial Crisis.

Results 2: Higher debt pressures correlate with more financial repression

(a) Debt pressures



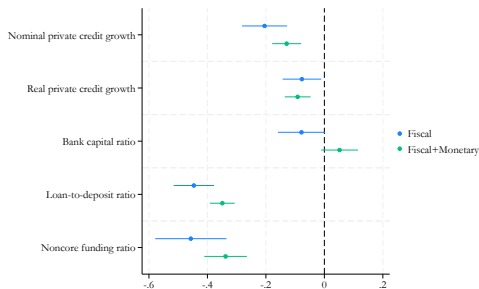
(b) Rates and relative returns



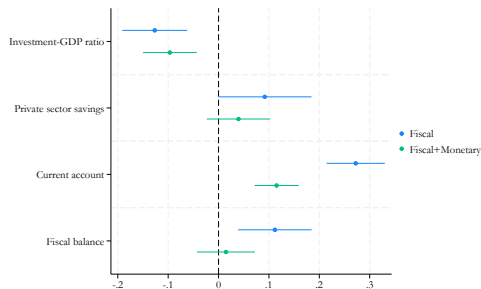
A one-standard-deviation increase in debt or interest burdens is associated with 0.2–0.4 standard deviations more repression; low sovereign yields relative to private assets also line up with higher repression.

Results 3: Repression is also associated with crowding out

(a) Crowding out



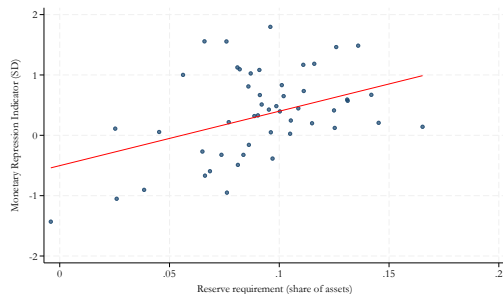
(b) Investment and saving balances



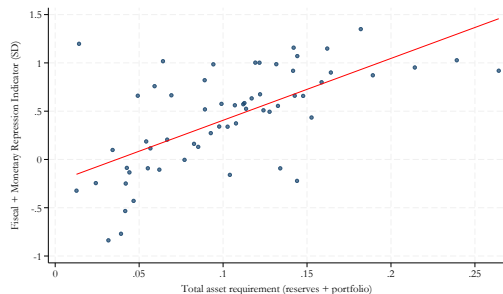
Slower private credit growth, lower loan-to-deposit ratios, and lower investment all line up with higher repression — banks absorb more public liabilities without expanding assets one-for-one.

Results 4: De jure policy measures track quantity-based indicators

(a) Reserve requirements and monetary repression



(b) Total asset requirements and fiscal-monetary repression



Historical reserve and portfolio requirements are strongly correlated with the quantity-based indicators, validating that the measures capture meaningful policy variation rather than arbitrary balance-sheet noise.

Financial repression in sovereign debt dynamics

Debt decomposition: what changes relative to standard accounting?

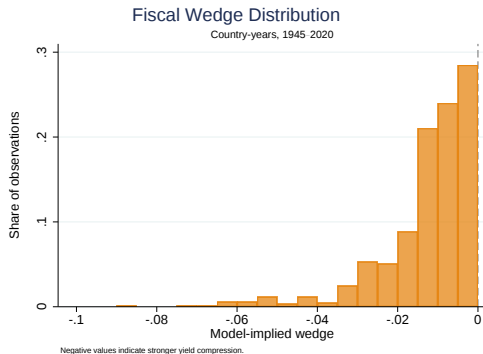
- Standard debt decompositions nest repression inside the observed interest-growth differential.
- This paper replaces the observed sovereign rate with a model-implied free-market counterfactual.
- The gap $(r_t^B - r_t^{B,free})$ enters as its own debt-dynamics term, alongside surprise inflation, the primary balance, and stock-flow adjustments.

Publicly-held debt decomposition

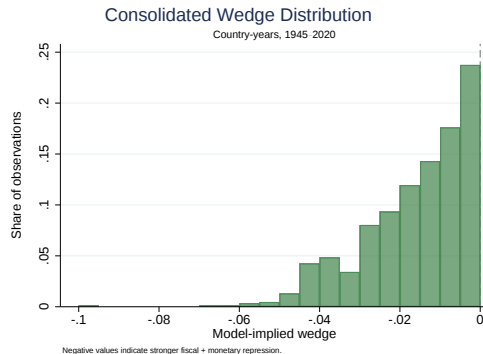
$$\Delta d_t^{pub} = \frac{1}{1 + g_t^Y} \left[(r_t^{B,free} - g_t) - (\pi_t - \pi_t^e) + (r_t^B - r_t^{B,free}) \right] d_{t-1}^{pub} - pb_t - cb_t - h_t + sf_t$$

Interpretation: repression lowers debt when sovereign borrowing costs are pushed below the rate that would clear the market absent captive demand.

Debt decomposition: estimated repression wedges



Fiscal wedge



Consolidated wedge

The estimated wedges are economically large: the median interest-rate compression is about 1.5 to 2 percentage points, and the consolidated wedge is generally stronger once the monetary arm of the state is included.

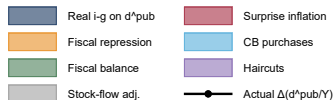
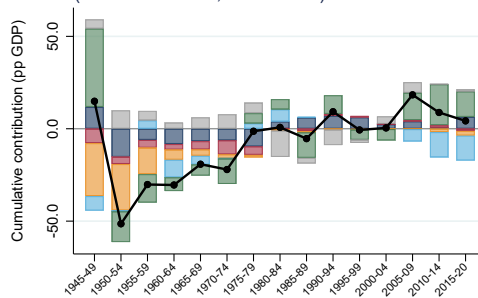
Debt decomposition: key magnitudes from selected episodes

	UK <i>1945–55</i>	US <i>1945–55</i>	Japan <i>2013–20</i>	18 AE avg. <i>2008–20</i>
Financial repression	52.5	16.6	10.5	17.0
Surprise inflation	20.3	15.2	-13.5	-9.7
Primary balance	3.9	20.9	-17.5	-10.7
Reinhart-Sbrancia benchmark	60.6	21.9	35.5	12.9
Seigniorage on cash (S^1)	1.5	1.8	0.0	0.2
Seigniorage on reserves (S^2)	NA	2.4	0.0	0.0

Financial repression is much larger than direct seigniorage in every episode shown. In the UK postwar case, it is also the dominant debt-reduction channel. Note that the Reinhart-Sbrancia benchmark uses a fixed counterfactual real rate of 2 percent over each episode.

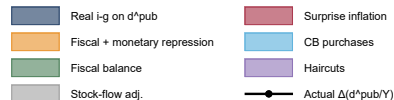
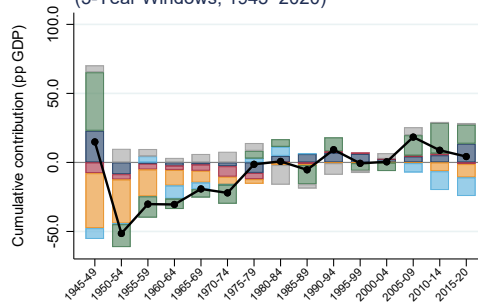
Debt decomposition: United Kingdom

UK: Publicly-Held Debt Decomposition
(5-Year Windows, 1945–2020)



Bars are non-overlapping windows.
Final window covers 2015–2020.
Surprise inflation loads on d^{pub} (t-1) only, per eq.29.

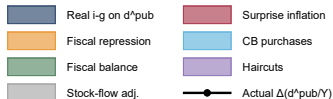
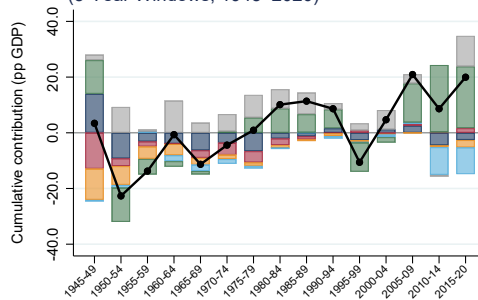
UK: Publicly-Held Debt Decomposition
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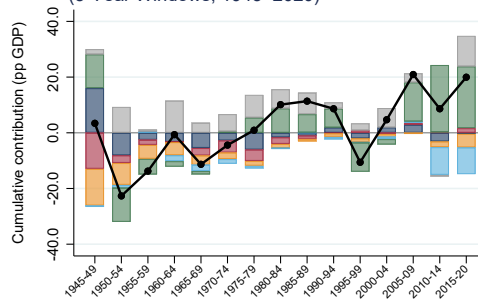
Debt decomposition: United States

USA: Publicly-Held Debt Decomposition
(5-Year Windows, 1945–2020)



Bars are non-overlapping windows.
Final window covers 2015–2020.
Surprise inflation loads on d^{pub} ($t-1$) only, per eq.29.

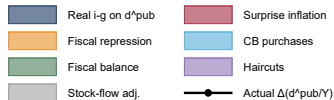
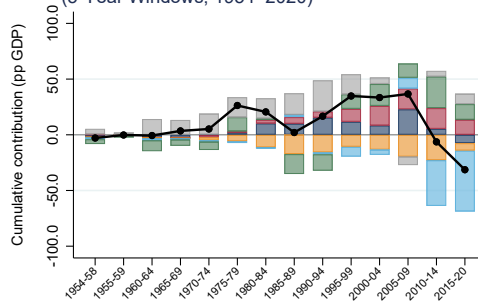
USA: Publicly-Held Debt Decomposition
(5-Year Windows, 1945–2020)



Bars are non-overlapping windows.
Final window covers 2015–2020.
Surprise inflation loads on d^{pub} ($t-1$) only, per eq.29.

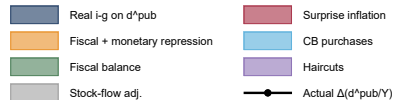
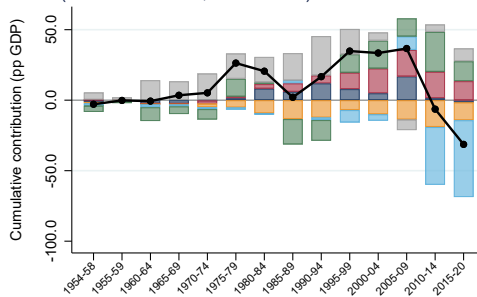
Debt decomposition: Japan

Japan: Publicly-Held Debt Decomposition
(5-Year Windows, 1954–2020)



Bars are non-overlapping windows.
Final window covers 2015–2020.
Surprise inflation loads on d^{pub} (t-1) only, per eq.29.

Japan: Publicly-Held Debt Decomposition
(5-Year Windows, 1954–2020)



Bars are non-overlapping windows.
Final window covers 2015–2020.
Surprise inflation loads on d^{pub} (t-1) only, per eq.29.

Debt Decomposition: Cross-Country Takeaway

- **United Kingdom (1945–55):** repression contributed 52.5pp of GDP — the *single largest* channel, ahead of both surprise inflation (20.3pp) and fiscal consolidation (3.9pp)
- **United States (1945–55):** repression contributed 16.6pp, roughly comparable to surprise inflation (15.2pp) and fiscal consolidation (20.9pp) — all three channels operated together
- **Post-GFC (18AE average, 2008–20):** repression (17pp) was the *only* debt-reducing channel — both surprise inflation and primary balances were negative
- **Monetary channel:** once central bank liabilities are included, post-2008 contributions rise materially across all three countries

Conclusion

The coming great repression?

The historical template

- High debt burdens
- Political constraints on consolidation
- Restricted capital mobility
- Coordinated fiscal-monetary policy

Today

- Debt at peacetime highs
- Fragmented politics, weak coalitions
- Capital relatively open, but restrictions under active consideration
- Central bank balance sheets expanded

The instruments are already partially deployed:

- *Fiscal channel*: Basel III zero risk weights and LCR requirements create captive demand without new legislation
- *Monetary channel*: post-QE reserves put remuneration policy front and center

References

References (selected)

- Abbas, Belhocine, ElGanainy, and Horton (2011)
- Arslanalp, Eichengreen, and Tsuda (2014)
- Graf von Luckner, Meyer, Reinhart, and Trebesch (2024)
- Jordà, Schularick, and Taylor (2017)
- Mauro, Romeu, Binder, and Zaman (2015)
- Piketty and Zucman (2014)
- Reinhart and Sbrancia (2015)
- Reis (2025); Payne and Szoeki (2025)

Annex

A.1. Glossary

Glossary of Algebraic Notation: Agents and demand shifters

Symbol	Definition
$i \in \{b, h\}$	Investor type: b = commercial banks, h = households
$j \in \{g, c\}$	Asset type: g = government bonds, c = private corporate assets
ω	Index for individual agents within an investor type
$\zeta_j^i(\omega)$	Total taste shifter for investor ω of type i toward asset j
$\tilde{\zeta}_j^i(\omega)$	Idiosyncratic taste shock, Fréchet distributed
$\bar{T}_j^i$	Time-invariant structural demand shifter for asset j by investor type i
$\tilde{T}_j^i$	Time-varying regulatory demand shifter; the financial repression term
θ^i	Fréchet shape parameter governing the elasticity of substitution for investor type i

A.1. Glossary

Glossary of Algebraic Notation: Asset holdings and balance-sheet stocks

Symbol	Definition
B_t	Total gross nominal government debt
B_t^b	Government bonds held by commercial banks
B_t^h	Government bonds held by households
B_t^{cb}	Government bonds held by the central bank
B_t^{pub}	Government debt held outside the state: $B_t - B_t^{cb}$
R_t	Interest-bearing central bank reserves
C_t	Currency in circulation
L_t	Consolidated nominal liabilities: $B_t^{pub} + C_t + R_t$
L_t^c	Bank loans to non-financial corporations
D_t	Bank deposits
I_t^h	Household equity claims on corporations
K_t	Corporate physical capital

A.1. Glossary

Glossary of Algebraic Notation: Asset holdings and balance-sheet stocks (cont.)

Symbol	Definition
W_t	National wealth
A_t^b	Total commercial bank assets: $L_t^c + B_t^b + R_t$
A_t^h	Total household assets: $W_t + B_t^h$
A_t^{cb}	Total central bank assets

A.1. Glossary

Glossary of Algebraic Notation: Portfolio shares, indicators, and returns

Symbol	Definition
s_g^i	Share of government bonds in total assets of investor i
s_c^i	Share of private assets in total assets of investor i : $1 - s_g^i$
s_g^h	Household benchmark portfolio share: B_t^h/A_t^h
$s_g^{b,F}$	Bank government bond share under the fiscal perimeter: B_t^b/A_t^b
$s_g^{b,M}$	Bank reserve share under the monetary perimeter: R_t/A_t^b
$s_g^{b,FM}$	Consolidated bank public-sector share: $(B_t^b + R_t)/A_t^b$
$\ln \tilde{s}_g^i$	Log-odds of the government bond share: $\ln[s_g^i/(1 - s_g^i)]$
FR^F	Fiscal repression indicator: $\ln s_g^{b,F} - \ln s_g^h$
FR^M	Monetary repression indicator: $\ln s_g^{b,M} - \ln s_g^h$
FR^{FM}	Consolidated repression indicator: $\ln s_g^{b,FM} - \ln s_g^h$

A.1. Glossary

Glossary of Algebraic Notation: Portfolio shares, indicators, and returns (cont.)

Symbol	Definition
R_j^e	Gross expected return on asset j : $1 + r_j^e$
r_g^e, r_c^e	Net expected returns on government bonds and private corporate assets
$r_t^B, r_t^{B,free}$	Observed and counterfactual ex-ante real sovereign rates
r_t^D	Deposit rate
i_t^B, i_t^R	Nominal rates on publicly-held government debt and central bank reserves

A.1. Glossary

Glossary of Algebraic Notation: Macroeconomic aggregates and debt decomposition

Symbol	Definition
Y_t	Nominal GDP
g_t	Real GDP growth rate
g_t^Y	Nominal GDP growth rate: $(1 + g_t)(1 + \pi_t) - 1$
π_t	Inflation rate measured with the GDP deflator
π_t^e	Expected inflation formed at $t - 1$: $E_{t-1}\pi_t$
d_t^{pub}	Publicly-held government debt ratio: B_t^{pub}/Y_t
ℓ_t	Consolidated liability ratio: L_t/Y_t
ϱ_t	Reserve ratio: R_t/Y_t
c_t	Currency ratio: C_t/Y_t
pb_t	Primary balance scaled by GDP
cb_t	Net central bank purchases of government debt scaled by GDP
h_t	Haircuts from debt restructuring scaled by GDP

A.1. Glossary

Glossary of Algebraic Notation: Macroeconomic aggregates and debt decomposition (cont.)

Symbol	Definition
sf_t	Stock-flow adjustment scaled by GDP
no_t	Net central bank operations scaled by GDP
FR_t	Financial repression contribution: $(r_t^B - r_t^{B,free})d_{t-1}^{pub}$
ζ^i	Share of government debt held by creditor i in the source data

A.2. Derivation of the Financial Repression Measure

Start from the portfolio share expression

$$s_g^i = \frac{\left(\bar{T}_g^i \tilde{T}_g^i R_g^e\right)^{\theta^i}}{\left(\bar{T}_g^i \tilde{T}_g^i R_g^e\right)^{\theta^i} + \left(\bar{T}_c^i R_c^e\right)^{\theta^i}}$$

Define the log-odds representation

$$\ln \tilde{s}_g^i \equiv \ln \frac{s_g^i}{1 - s_g^i}$$

$$\ln \tilde{s}_g^i = \theta^i \left[\ln \bar{T}_g^i - \ln \bar{T}_c^i + \ln \tilde{T}_g^i + \ln R_g^e - \ln R_c^e \right]$$

This maps the nonlinear portfolio share into an expression that is linear in the policy shifter and relative returns.

A.2. Derivation of the Financial Repression Measure

Take first differences

$$\Delta \ln \tilde{s}_g^i = \theta^i \Delta \ln \tilde{T}_g^i + \theta^i (\Delta \ln R_g^e - \Delta \ln R_c^e)$$

Using $\Delta \ln R_j^e \approx \Delta r_j^e$:

$$\Delta \ln \tilde{T}_g^i = \frac{\Delta \ln \tilde{s}_g^i}{\theta^i} - (\Delta r_g^e - \Delta r_c^e)$$

Assume households are not repressed

$$\Delta \ln \tilde{T}_g^h = 0$$

Subtract the household expression from the bank expression

$$\Delta \ln \tilde{T}_g^b = \Delta \ln \tilde{s}_g^b - \Delta \ln \tilde{s}_g^h - (\theta^b - \theta^h) (\Delta r_g^e - \Delta r_c^e)$$

Financial repression is the residual shift in banks' relative demand for government bonds after netting out household behavior and relative-return movements.

A.3. Debt Decomposition (Publicly-Held Government Debt)

Step 1: Define publicly-held debt

$$B_t^{pub} = B_t - B_t^{cb}$$

Step 2: Nominal debt accumulation

$$B_t^{pub} = (1 + i_t^B)B_{t-1}^{pub} - PB_t - CB_t - H_t + SF_t$$

$$CB_t \equiv \Delta B_t^{CB} - i_t^B B_{t-1}^{CB}$$

Step 3: Scale by GDP

$$Y_t = Y_{t-1}(1 + g_t)(1 + \pi_t) = Y_{t-1}(1 + g_t^Y)$$

$$\Delta d_t^{pub} = \frac{i_t^B - g_t^Y}{1 + g_t^Y} d_{t-1}^{pub} - pb_t - cb_t - h_t + sf_t$$

This is standard debt accumulation, but for debt held by the public rather than total debt.

A.3. Debt Decomposition (Publicly-Held Government Debt)

Step 4: Add and subtract the free-market rate and expected inflation

$$\Delta d_t^{pub} = \frac{1}{1 + g_t^Y} \left[(r_t^{B,free} - g_t) - (\pi_t - \pi_t^e) + (r_t^B - r_t^{B,free}) \right] d_{t-1}^{pub} - pb_t - cb_t - h_t + sf_t$$

Interpretation

- $(r_t^{B,free} - g_t)d_{t-1}^{pub}$: real interest-growth effect
- $(\pi_t - \pi_t^e)d_{t-1}^{pub}$: surprise inflation
- $(r_t^B - r_t^{B,free})d_{t-1}^{pub}$: financial repression

A.3. Debt Decomposition (Publicly-Held Government Debt)

Step 5: cumulative decomposition over T periods

$$\begin{aligned} d_T^{pub} - d_0^{pub} \approx & \sum_{t=1}^T \frac{(r_t^{B,free} - g_t)d_{t-1}^{pub}}{1 + g_t^Y} - \sum_{t=1}^T \frac{(\pi_t - \pi_t^e)d_{t-1}^{pub}}{1 + g_t^Y} \\ & + \sum_{t=1}^T \frac{(r_t^B - r_t^{B,free})d_{t-1}^{pub}}{1 + g_t^Y} - \sum_{t=1}^T pb_t - \sum_{t=1}^T cb_t \\ & - \sum_{t=1}^T h_t + \sum_{t=1}^T sf_t \end{aligned}$$

Publicly-held debt is split into: real interest-growth, surprise inflation, financial repression, fiscal consolidation, central bank purchases, haircuts, and stock-flow adjustments.

A.4. Debt Decomposition (Consolidated Balance Sheet)

Step 1: consolidated liabilities net of intra-state holdings

$$L_t \equiv B_t^{pub} + C_t + R_t$$

Step 2: nominal law of motion

$$L_t = (1 + i_t^B)B_{t-1}^{pub} - PB_t - H_t + SF_t + (1 + i_t^R)R_{t-1} + C_{t-1} + NO_t$$

$$NO_t \equiv \Delta R_t + \Delta C_t + i_t^B B_{t-1}^{CB} - i_t^R R_{t-1} - \Delta B_t^{CB}$$

Step 3: scale by GDP

$$\Delta \ell_t = \frac{i_t^B - g_t^Y}{1 + g_t^Y} d_{t-1}^{pub} - pb_t - h_t + sf_t + \frac{i_t^R - g_t^Y}{1 + g_t^Y} \varrho_{t-1} + \frac{-g_t^Y}{1 + g_t^Y} c_{t-1} + no_t$$

A.4. Debt Decomposition (Consolidated Balance Sheet)

Step 4: identify inflation and repression terms

$$\begin{aligned}\Delta \ell_t \approx & \frac{1}{1 + g_t^Y} \left[(r_t^{B,free} - g_t) - (\pi_t - \pi_t^e) + (r_t^B - r_t^{B,free}) \right] \ell_{t-1} \\ & + \frac{-i_t^B}{1 + g_t^Y} c_{t-1} + \frac{i_t^R - i_t^B}{1 + g_t^Y} \varrho_{t-1} - pb_t - h_t + sf_t + no_t\end{aligned}$$

New consolidated channels

- Seigniorage on currency
- Seigniorage on reserves
- Monetary operations

Under consolidation, surprise inflation erodes the full nominal liability stock ℓ_{t-1} , not just publicly-held government debt.

A.4. Debt Decomposition (Consolidated Balance Sheet)

Step 5: cumulative consolidated decomposition

$$\begin{aligned}\ell_T - \ell_0 \approx & \sum_{t=1}^T \frac{(r_t^{B,free} - g_t)\ell_{t-1}}{1 + g_t^Y} - \sum_{t=1}^T \frac{(\pi_t - \pi_t^e)\ell_{t-1}}{1 + g_t^Y} \\ & + \sum_{t=1}^T \frac{(r_t^B - r_t^{B,free})\ell_{t-1}}{1 + g_t^Y} + \sum_{t=1}^T \frac{-i_t^B c_{t-1} + (i_t^R - i_t^B)\varrho_{t-1}}{1 + g_t^Y} \\ & - \sum_{t=1}^T pb_t - \sum_{t=1}^T h_t + \sum_{t=1}^T sf_t + \sum_{t=1}^T no_t\end{aligned}$$

Relative to the publicly-held decomposition, central bank purchases drop out mechanically, while seigniorage and monetary-operations channels become explicit.