Exorbitant Privilege Gained and Lost: Fiscal Implications

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Exorbitant Privilege

- Exorbitant privilege = advantage that the U.S. enjoys as the world's safe asset issuer.

- Gourinchas, Rey, and Sauzet (2019): *"Being the hegemon confers a specific ability to issue large amounts of nominally safe liabilities (dollar securities), which are happily absorbed by the rest of the world. Thus, the view is that, in case of a deficit, the United States does not have to take restrictive measures, so that the dollar is not an impartial means of international exchange. This is the essence of the exorbitant privilege."*

- How to weigh this exorbitant privilege against the growing concern about fiscal sustainability in the U.S. and other countries?

- This paper: turn to historical evidence

Looking Back

▶ We study three centuries of fiscal history and estimate the fiscal backing of the Dutch, U.K., and U.S. government debt.

▶ There is a unique hegemon who has a monopoly on the supply of safe assets (Farhi and Maggiori, 2018).

  ▶ When a country plays this role, its government debt enjoys a lower yield relative to other sovereign debt.

▶ Our paper: fiscal valuation exercise

  ▶ The hegemon issues more government debt than what is warranted by its own fiscal fundamentals, even after we account for seigniorage revenues from convenience yields.

  ▶ When the hegemon's relative fundamentals deteriorate, this extra fiscal capacity is eventually withdrawn—exorbitant privilege lost.

Britannia Ruled the Bond Market before WW-I

- ▶ U.K. had quasi-monopoly as world's safe asset supplier in 19th century

  - ▶ London was the world's financial center and gilts accounted for more than half of the world's traded securities in 1815
  - ▶ Gilts traded at much lower yields (Hall, Payne, Sargent, and Szőke, 2021)
  - ▶ According to our estimate of the fiscal backing of the U.K. government debt, in the two centuries before WW-I, **only 3/4 of U.K. debt was backed by future surpluses**

- ▶ During the Interbellum years, U.K. in fiscal crisis:

  - ▶ U.K. abandoned the gold standard at the start of WW-I, briefly returned to it in 1925, only to permanently abandon it in 1931
  - ▶ Financial repression during and after WW-I; restructuring of U.K. debt
  - ▶ Gilts started trading at higher yields than foreign bonds

- ▶ After WW-II, the U.K. yielded its leading position to the U.S.

  - ▶ U.K. debt no longer earned convenience yields
  - ▶ U.K. debt **more than fully backed by future surpluses**

Meanwhile...

- ▶ Before WW-I, the U.S. had to finance its debt at a much higher rate than the U.K.
    - ▶ U.S. government debt was **more than fully backed by future surpluses**

- ▶ Reflecting the reversal of fortunes, after the WW-II, the U.S. became the world's safe asset issuer.
    - ▶ Its debt enjoyed a significant convenience yield relative to other bonds
    - ▶ The market value of its debt **far exceeded its fiscal backing**

Related Literature

- **Fiscal capacity of the government** (Bassetto and Cui, 2018; Blanchard, 2019; Furman and Summers, 2020; Mehrotra and Sergeyev, 2021; Mian, Straub, and Sufi, 2021; Brunnermeier, Merkel, and Sannikov, 2022; Liu, Schmid, and Yaron, 2020; Reis, 2021) - Jiang et al. (19,20,21,22,23a,23b)

- **Special role of the dollar** as the reserve currency and the U.S. as the world's safe asset supplier (see Gourinchas and Rey, 2007; Caballero, Farhi, and Gourinchas, 2008; Caballero and Krishnamurthy, 2009; Maggiori, 2017; He, Krishnamurthy, and Milbradt, 2018; Farhi and Maggiori, 2018; Gopinath and Stein, 2018; Krishnamurthy and Lustig, 2019; Choi, Kirpalani, and Perez, 2022; Mukhin, 2022)

- Special role for **Treasurys providing insurance**: (Bassetto and Cui, 2018; Chien and Wen, 2019; Angeletos, Collard, and Dellas, 2020; Brunnermeier, Merkel, and Sannikov, 2022; Reis, 2021)

- U.S. Treasurys are **expensive relative to other bonds** (Krishnamurthy and Vissing-Jorgensen, 2012; Bai and Collin-Dufresne, 2019; Fleckenstein, Longstaff, and Lustig, 2014; Du, Im, and Schreger, 2018; Jiang, Krishnamurthy, and Lustig, 2021; Koijen and Yogo, 2019)

Measuring Fiscal Backing

Pricing the Entire Government Bond Portfolio

▶ Government debt is backed by current and future primary surpluses

  ▶ Government budget constraint:

  $$D_t = Q_{t-1}^1 + \sum_{h=1}^{H} Q_{t-1}^{h+1} P_t^h \quad = \quad T_t - G_t + \sum_{h=1}^{H} Q_t^h P_t^h$$

  ▶ Iterate forward on budget constraint + impose no-arbitrage on each bond
  $P_t^h = \mathbb{E}_t \left[M_{t,t+1} P_{t+1}^{h-1} \right]$, then:

  $$D_t = \mathbb{E}_t \left[\sum_{j=0}^{T} M_{t,t+j} (T_{t+j} - G_{t+j}) \right] + \mathbb{E}_t \left[M_{t,t+T} D_{t+T} \right]$$

  ▶ Define Fiscal Backing (FB) as the EPDV of primary surpluses

  $$FB_t = \mathbb{E}_t \left[\sum_{j=0}^{\infty} M_{t,t+j} T_{t+j} \right] - \mathbb{E}_t \left[\sum_{j=0}^{\infty} M_{t,t+j} G_{t+j} \right] = P_t^T - P_t^G$$

  ▶ $FB = D_t$ under TVC $\mathbb{E}_t \left[M_{t,t+T} D_{t+T} \right] \to 0$ as $T \to \infty$ (Jiang et al. 24)

Campbell-Shillerized Measurement of Fiscal Backing

▶ Fiscal backing = PV(Surpluses)

$$FB_t = P_t^T - P_t^G = T_t \exp(pd_t^T) - G_t \exp(pd_t^G),$$

where $pd_t^T = \log(P_t^T / T_t)$ and $pd_t^G = \log(P_t^G / G_t)$.

▶ Log-linearize the tax and spending claim return equations and iterate forward:

$$
\begin{aligned}
pd_t^T &= \frac{\kappa_0^T}{1 - \rho_T} + \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_T^{j-1} \Delta \log T_{t+j} \right] - \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_T^{j-1} r_{t+j}^T \right], \\
pd_t^G &= \frac{\kappa_0^G}{1 - \rho_G} + \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_G^{j-1} \Delta \log G_{t+j} \right] - \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_G^{j-1} r_{t+j}^G \right],
\end{aligned}
$$

where ρ_T, ρ_G, κ_0^T, κ_0^G depend on the mean of their respective log p/d ratios

Measuring Fiscal Backing at Steady State

▶ Steady-state *FB* relative to GDP Y:

$$\frac{FB}{Y} = \frac{T}{Y}\exp(pd_0^T) - \frac{G}{Y}\exp(pd_0^G),$$

$$pd_0^T = -\frac{(y_0^\$(1) + yspr_0^\$ + rp_0^T) - (x_0 + \pi_0)}{1 - \rho_T} + \frac{\kappa_0^T}{1 - \rho_T},$$

$$pd_0^G = -\frac{(y_0^\$(1) + yspr_0^\$ + rp_0^G) - (x_0 + \pi_0)}{1 - \rho_G} + \frac{\kappa_0^G}{1 - \rho_G}.$$

▶ Determinants:

1. Steady-state surplus: $\frac{T}{Y} - \frac{G}{Y}$
2. *Discount rate component* of pd_0: the short rate ($y_0^\$(1)$), the yield spread ($yspr_0^\$$), and the risk premium (rp_0^i)
3. *Cash flow component* of pd_0: GDP growth ($x_0 + \pi_0$), since T and G are co-integrated with output

Upper Bound on Steady-State Fiscal Backing

- We expect $rp_0^T \geq rp_0^Y \geq rp_0^G$. Why?

  - At business cycle frequency, spending/GDP is counter-cyclical and tax/GDP is pro-cyclical: $\beta(T_{t+1}) \geq \beta(Y_{t+1}) \geq \beta(G_{t+1})$. More so after WW-II.
  - In long run, tax and spending are cointegrated with output: $\beta(T_{t+\infty}) = \beta(Y_{t+\infty}) = \beta(G_{t+\infty})$.

- Assuming $rp_0^T = rp_0^Y = rp_0^G$ then delivers an **upper bound** on Fiscal Backing:

$$\frac{FB}{Y} \leq \underbrace{\frac{1}{(y_0^{\$}(1) + yspr_0^{\$} + rp_0^Y) - (x_0 + \pi_0)}}_{\exp(pd_0^Y)} \left(\frac{T}{Y} - \frac{G}{Y} \right) \equiv FB^{UB}$$

1. Countries with higher GDP growth x_0 and lower real rates $y_0^{\$}(1) - \pi_0$ have higher pd_0^Y and FB (Blanchard, 2019)

2. Countries with higher risk premium rp_0^Y and slope of the yield curve $yspr_0^{\$}$ have lower pd_0^Y and FB

Measuring the GDP Risk Premium
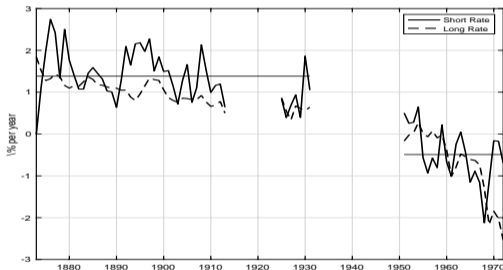
▶ Risk premium on GDP claim is risk premium on total wealth portfolio

▶ Total wealth return commonly proxied as the unlevered stock return

▶ Implementation: leverage is 0.46 in U.K. and 0.56 in U.S.

	equity RP vs Rf	corporate bond RP vs Rf	LT bond vs Rf	unlevered equity RP vs. Rf	unlevered equity RP vs. LT bond
	United Kingdom				
1870-2020	5.64%	1.45%	0.96%	3.68%	2.73%
1946-2020	7.89%	2.27%	1.53%	5.42%	3.88%
	United States				
1870-2020	6.33%	1.35%	0.69%	3.51%	2.82%
1946-2020	7.56%	1.79%	1.45%	4.49%	3.80%

▶ Based on this evidence, we fix GDP risk premium vs. LT bond, rp_0^Y, at 3% per year

What About Convenience Yields?

▶ Measure convenience yields from CIP violations in govt. bond markets.

▶ During gold standard, interest rate differentials are violations of CIP

Average of 15 countries on gold standard vs. U.K. Source: Jordà-Schularick-Taylor Macrohistory database.

▶ Gilts earned a convenience yield λ_0 of 100 basis points per year in 1873–1931

Upper Bound on Fiscal Backing at Steady State

▶ With seigniorage revenue from convenience yields (Jiang et al 2024),

$$D_t = \mathbb{E}_t\left[\sum_{j=0}^{\infty} M_{t,t+j} T_{t+j}\right] + \mathbb{E}_t\left[\sum_{j=0}^{\infty} M_{t,t+j} D_{t+j}(1 - e^{-\lambda_{t+j}})\right] - \mathbb{E}_t\left[\sum_{j=0}^{\infty} M_{t,t+j} G_{t+j}\right]$$
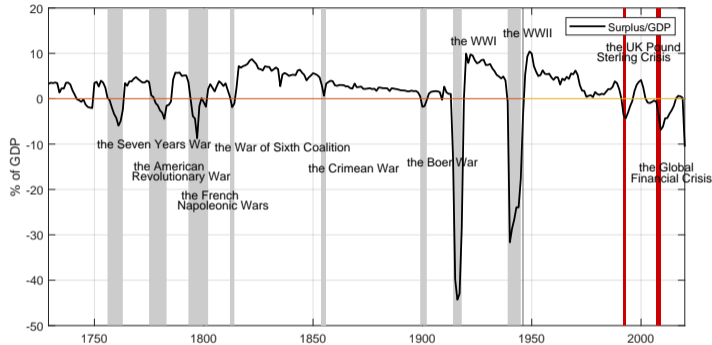
▶ Upper bound

$$\frac{FB}{Y} \leq \frac{1}{(y_0^\$(1) + yspr_0^\$ + rp_0^Y) - (x_0 + \pi_0)}\left(\frac{T}{Y} + \frac{Seign}{Y} - \frac{G}{Y}\right)$$

▶ Seigniorage revenue $Seign = \lambda \times D$: convenience yield times debt outstanding

▶ U.K. seigniorage revenue averages 0.34% of GDP for 1729–1946

U.K. Primary Surpluses

Pre-WWI: Barro-Gallatin tax smoothing for wars (Barro, 1979; Aiyagari, Marcet, Sargent, and Seppälä, 2002)

▶ Consistent primary surpluses in peacetime and temporary, large deficits in wartime

▶ Primary surpluses are 2.38% on average and acyclical w.r.t. business cycles

Steady-State Fiscal Backing Pre-WW-I

	UK:1729-1914	US: 1793-1914
x_0	1.58	4.08
π_0	0.16	0.77
$y_0^\$$	3.67	4.50
$\exp(pd_0^Y)$	20.68	39.06
s_0	2.39	0.46
λ_0	0.69	0
Seign. / Y	0.29	0
FB/Y	55.73	17.79
D/Y	86.45	11.91
FB/D	64.46	149.30

Dynamic Measure of Fiscal Backing

▶ Allow for dynamics in (i) expected tax revenue and spending growth rates, and (ii) in the expected return on the GDP claim

▶ Dynamics of Fiscal Backing governed by:

$$\frac{FB_t}{Y_t} = \frac{T_t}{Y_t} \exp(pd_0^T + CF_t^T - DR_t^T) - \frac{G_t}{Y_t} \exp(pd_0^G + CF_t^G - DR_t^G)$$

$$CF_t^T = \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_T^{j-1} \Delta \log T_{t+j} \right], \qquad DR_t^T = \mathbb{E}_t \left[\sum_{j=1}^{\infty} \rho_T^{j-1} r_{t+j}^T \right]$$

▶ Use VAR to construct cash flow and discount rate terms

$$\boldsymbol{z}_t = \boldsymbol{\Psi} \boldsymbol{z}_{t-1} + \boldsymbol{u}_t,$$

  ▶ State $\boldsymbol{z_t}$ includes inflation, short rate, yield spread, real GDP growth, stock dividend/GDP growth and level, stock p/d ratio, tax/GDP growth and level, spending/GDP growth and level
  ▶ Impose cointegration between spending, taxes and output

▶ Regime shift: we estimate separate VARs for pre-WW-II and post-WW-II samples.

U.K. and U.S. Fiscal Backing Pre-WW-II
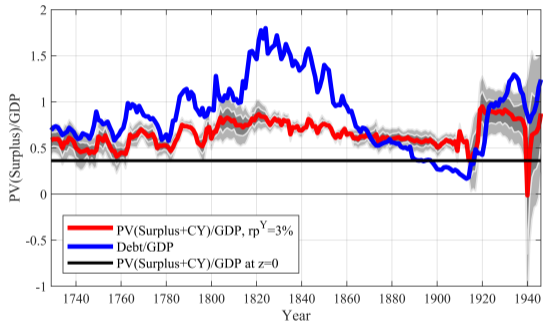
(a) U.K.
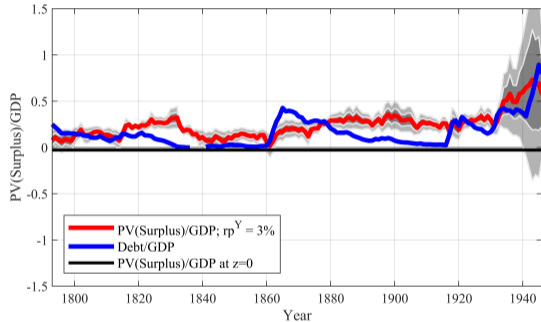
(b) U.S.

▶ Robustness: consolidation of colonial government balance sheets strengthened our conclusion.

UK Commonwealth

Average Fiscal Backing Pre-WW-I and Pre-WW-II

Table: Pre-WW-I

	UK:1729–1914	US: 1793–1914
$\exp(pd_0^Y)$	20.68	39.06
s_0	2.39	1.97
λ_0	0.69	0
Seign. $/\,Y$	0.29	0
FB/Y	61.41	20.28
D/Y	86.45	11.91
FB/D	71.04	170.22
$\rho(FB/Y, D/Y)$	0.70	0.13

Table: Pre-WW-II

	UK:1729–1946	US: 1793–1946
$\exp(pd_0^Y)$	22.28	49.17
s_0	1.28	3.41
λ_0	1.00	0
Seign. $/\,Y$	0.34	0
FB/Y	65.01	24.17
D/Y	87.06	16.53
FB/D	74.67	146.22
$\rho(FB/Y, D/Y)$	0.63	0.62

Average Fiscal Backing Pre-WW-I and Pre-WW-II

Table: Pre-WW-I

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FB/D	74.67	146.22
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U.K. and U.S. Fiscal Backing: Post-WW-II
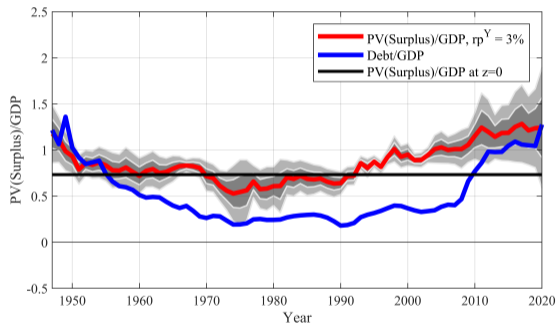
(a) U.K.
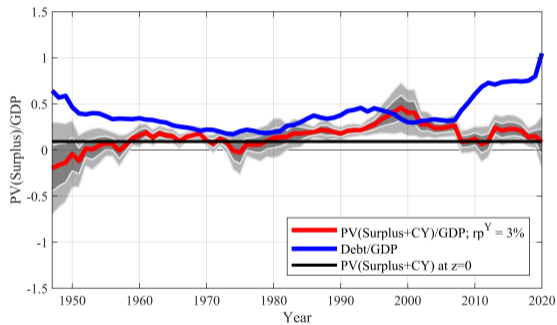
(b) U.S.

U.S. and U.K. Fiscal Backing After WW-II

	UK:1947-2020	US: 1947-2020
λ_0	0	0.56
Seign./Y	0	0.11
	Steady-state at $z = 0$	
FB/Y	73.31	9.23
FB/D	137.24	23.04
	Sample Averages	
FB/Y	85.88	14.72
D/Y	53.42	40.09
FB/D	160.77	36.73
$\rho(FB/Y, D/Y)$	0.77	-0.06

Privilege Gained and Lost: The Dutch Experience

- The provincial governments of the Dutch Republic had local monopoly as safe asset suppliers in 17th and part of 18th century
  - Financial revolution: Dutch provinces issue bonds, tapping into new investor base of emerging upper class (C't Hart, 1993; Schultz and Weingast, 2003)
  - Amsterdam was the world's financial center. Dutch Florin was reserve currency
  - Political participation by debtholders: more fiscal discipline (North and Weingast, 1989)
  - Yields on annuities issued by Holland 1.5% lower than those on British consols
- After 1815, fiscal crisis in the Netherlands
  - Wars lost
  - Debt overhang and restructuring
  - World's financial center moved to London

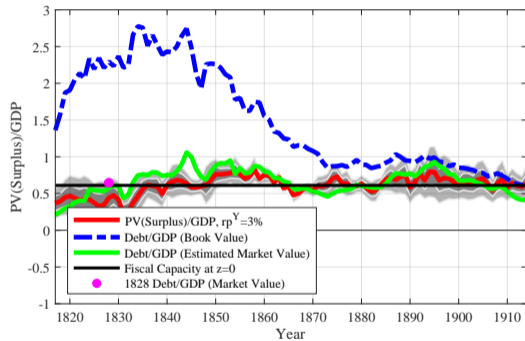# The Dutch Experience: 17th/18th Century vs. 19th Century

	1601 − 1794 Province of Holland	1817 − 1914 The Netherlands
λ_0	1.5	0
Seign./Y	2.38	0
	Steady-state at $z = 0$	
FB/Y	61.58	61.06
	Sample Averages	
FB/Y	71.30	60.56
D/Y	118.89	65.72
FB/D	59.97	92.15
$\rho(FB/Y, D/Y)$	0.94	0.64

The Dutch Experience: Costly Debt
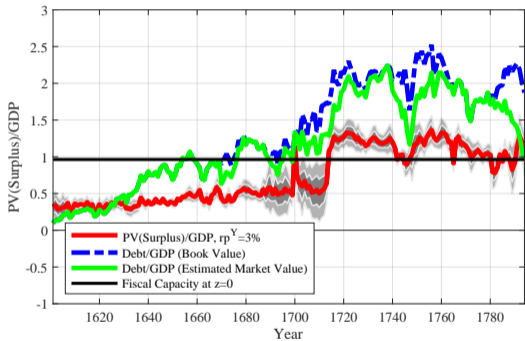
(a) Holland

(b) Netherlands

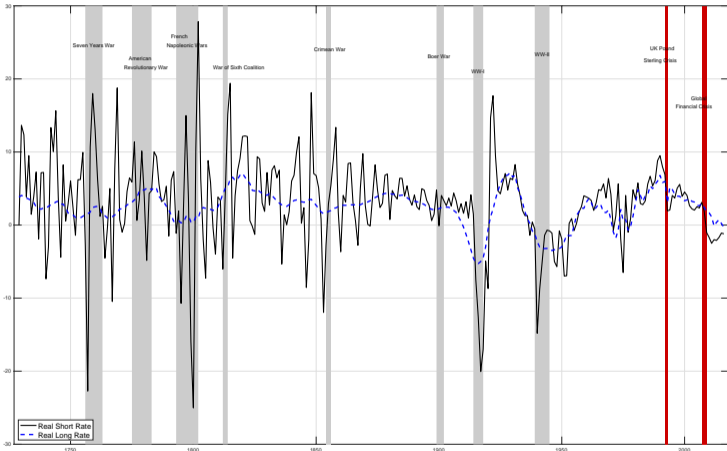Market value of debt falling after 1800. Debt restructuring after 1815.

Summary

► Investors concentrate extra fiscal backing to the world's safe asset supplier beyond what is warranted by its fundamentals.

► When the safe asset supplier's relative fundamentals deteriorate, that extra fiscal backing is withdrawn by bond investors who then focus only on the country's fundamentals.
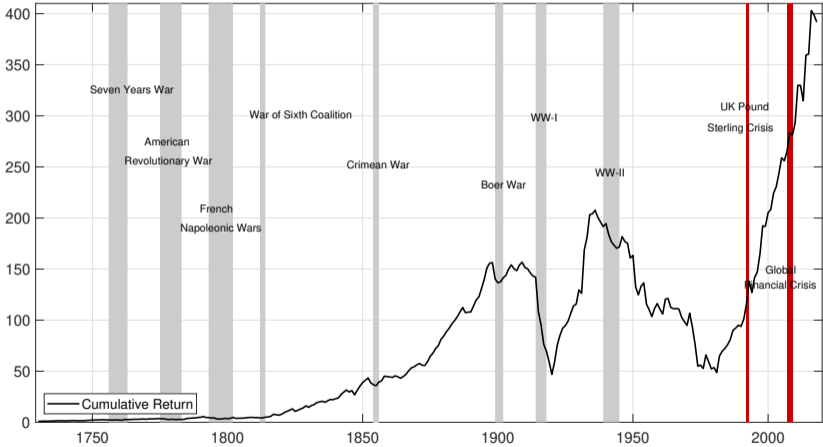
U.K. Market Value of Debt/GDP

Figure axes: % of GDP (y-axis, 0 to 3) vs years (x-axis, 1750 to 2000)

Labels on chart:
- the War of Sixth Coalition
- the WW-II
- the French Napoleonic Wars
- the American Revolutionary War
- the UK Pound Sterling Crisis
- the Crimean War
- the WW-I
- the Seven Years War
- the Boer War
- the Global Financial Crisis

Legend:
— Marketable Debt (Ellison-Scott)
- - - Marketable +NonMarketable (Bank of England)
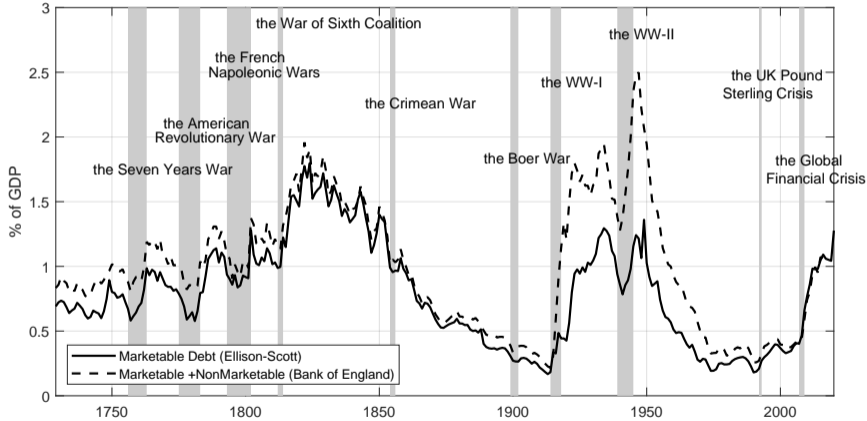
U.K. Real Rates: 1729 – 2020
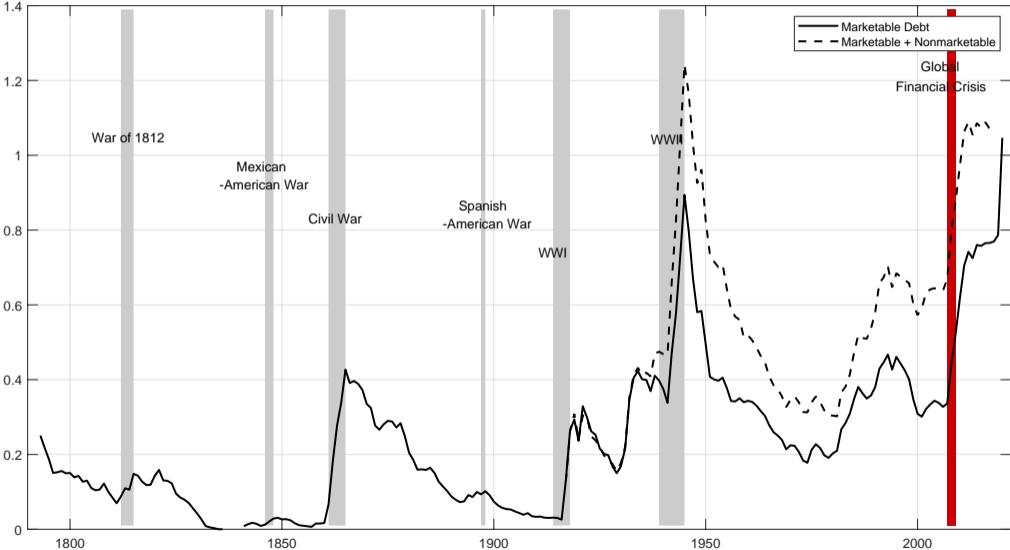
U.K. Cumulative Real Return: 1729 – 2020
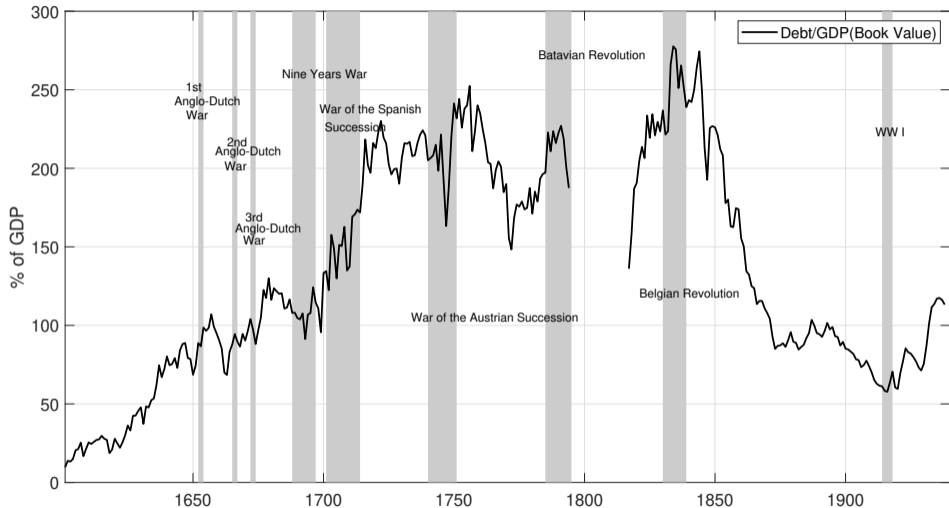
U.K. Commonwealth

Figure: Fiscal Capacity: Consolidating Colonial Government Finance
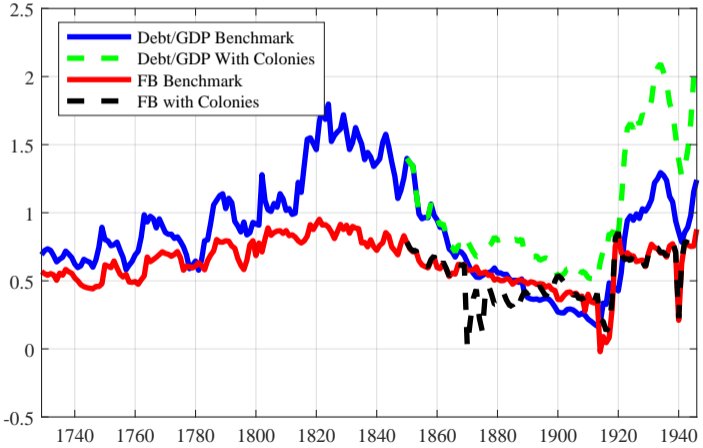
The Market Value of Outstanding Debt to GDP in U.S.

The Book Value of Outstanding Debt to GDP

Book value of debt issued by the province of Holland from 1601 to 1794 and the central Dutch government over the sample period from 1817–1914.
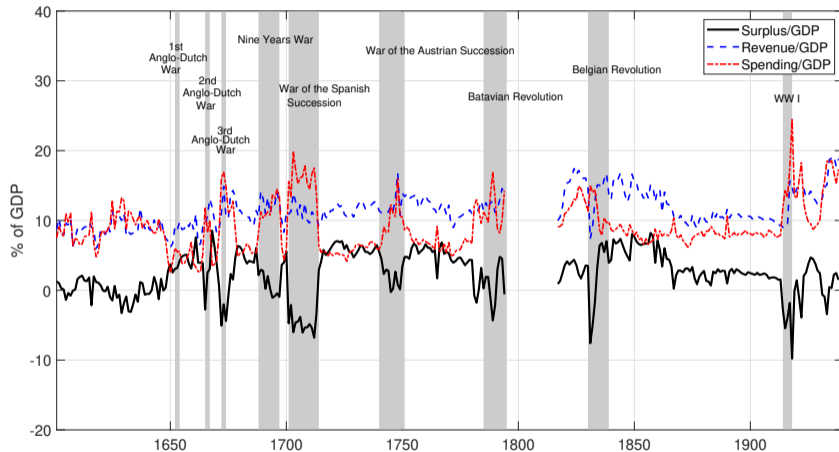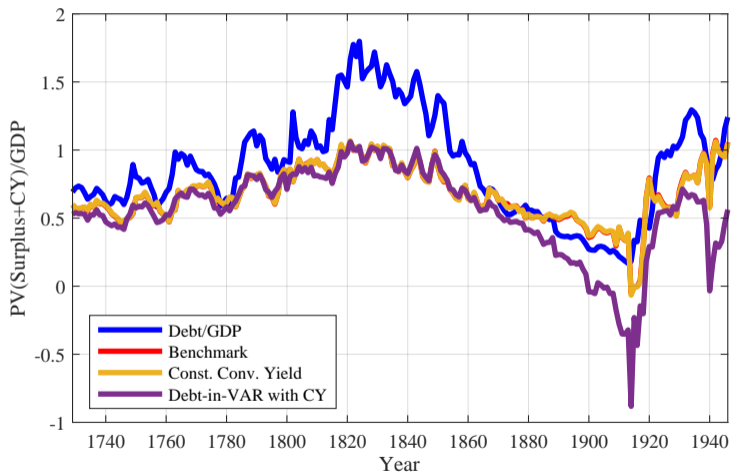
Dutch Fiscal Cash Flows

Figure: Fiscal Capacity with Convenience Yields: U.K. 1729 – 1946

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