

Complications for the United States from International Credits: 1913-1940*

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Abstract

World War I complicated US monetary, debt management, and tax policies. To finance the war, the US Treasury borrowed \$23 billion from US citizens and lent \$12 billion to 20 foreign nations. What began as foreign loans by the early 1930s had become gifts. For the first time in US history, the Treasury managed a large, permanent peacetime debt.

Keywords— Debt management, foreign credits, risk-free yields, income tax rates

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Money is the worst of all contrabands. . . . I know of nothing that would do more to prevent war than an international agreement that neutral nations would not loan to belligerents. Secretary of State William Jennings Bryan to President Woodrow Wilson, August 10, 1914

The granting of foreign credit is a first step toward the establishment of an aggressive foreign policy Adams (1887, p. 25)

And forgive us our debts, as we forgive our debtors. Matthew 6:12, King James Bible.

We are going into war upon the command of gold. Senator George Norris. Speech before the Senate, April 4, 1917. 65th Cong., 1st Session.

It is the instigators of this war who deserve to bear this lead weight of billions. Let them drag it through the decades to come, not us. Dr. Karl Helfferich, Secretary of State for the Treasury, 20 August 1915 speech before the Reichstag.

1 Introduction

In 1914, the US was a net *debtor* to foreigners. But twenty seven years earlier in 1887, the American economist Henry Carter Adams had forecast that US economic growth and falling returns on US securities would transform the US into a net foreign *creditor* and that that would threaten George Washington's "true policy to steer clear of permanent alliance with any portion of the foreign world."

It lies altogether within the range of possibilities that the city of New York, like the cities of London and Paris, should become a storehouse of capital to which the sovereigns of petty states may resort to fill their depleted treasuries. This tendency is fraught with danger to the policy of isolation thus far maintained by the United States, and it becomes an important question, what attitude this country should assume with regard to the interests of those who place their funds beyond the control of American law. One of two policies must be declared, nor ought the nation to be permitted to drift in this matter. Either citizens of this Republic should know that money placed in foreign bonds is at their own risk, or they should prepare themselves to see questions of foreign

policy become much more important than they now are. It seems, then, from whichever point of view we consider the question, that the United States can not reasonably expect to avoid political complications sure to come with an extension of international credits; and it is on this account desirable that the Federal Government should present a clearly formulated policy, upon which the public may rely. Adams (1887, pp. 37-38)

We do not know whether Professor Woodrow Wilson had read Henry Carter Adams's 1887 book, but we do know that Secretary of State Williams Jennings Bryan conveyed the essence of Adams's message to President Wilson in an August 10, 2014 letter that we reproduce in appendix C. President Wilson rejected Secretary Bryan's advice to prohibit US citizens from lending to belligerents. Instead, in 1914 Wilson recommended but did not compel US citizens to be "impartial in thought as well as in action." American banks and other investors ignored Wilson's advice and bought billions of dollars of UK and French government bonds from those governments' American agent, J.P. Morgan and Co. J.P. Morgan also served as sole agent for the British and French governments when they purchased billions of dollars of war supplies from US producers.

When war began in August 1914, the UK was a net creditor to the United States. During the war, the UK government forced its citizens to exchange their US securities for British sovereign debt, then used those securities as collateral for sovereign UK bonds sold to American citizens. By the late fall of 1916 the UK government had nearly exhausted that collateral. Therefore, on November 27, 1916 at the urging of President Wilson, who by then had reconsidered his rejection of Secretary Bryan's August 2014 advice, the Federal Reserve Board publicly advised US citizens not to buy more British or French government debt.¹ Some UK citizens and civil servants including John Maynard Keynes welcomed the Federal Reserve Board's message because they were then using the UK government's financial distress to strengthen their recommendation that the UK seek a "peace without victory."²

But hawkish British and German government officials looked past what they interpreted as only the temporary setback that the November 27 Federal Reserve memorandum had given to British credit in America and focused instead on what they recognized as the decisive interest that Henry Carter Adams had identified in 1887: US private creditors of the UK and French governments and the US export producers who had benefited from

¹See Link (1965, p. 202), Meyer (2006, p. 422), and Tooze (2014, p. 51).

²See Skidelsky (1983).

those credits wanted Entente victory. Opponents of peace without victory in both the UK and Germany pointed to those American interests. Hawkish Germans argued that, because American private creditors had lent so much to Entente governments, the US would soon enter the war on the Entente side, whether or not Germany began unrestricted submarine warfare.³ Germany resumed unrestricted submarine war on February 1, 1917, and the US entered the war on April 6, 1917. The US thus failed to “avoid political complications sure to come with an extension of international credits” foretold by Henry Carter Adams in 1887.⁴

2 Complications from international credits

Before the US entered the war on April 6, 1917, it was private US bond holders who had lent to the British and French governments. Afterwards, it was the US government. On April 24, 1917, President Wilson signed the First Liberty Loan Act. It authorized the Treasury to borrow up to \$5 billion and to purchase up to \$3 billion of Entente and allied debts. Britain and France soon refinanced their short-term debts to private US citizens by borrowing from the US government, which in turn borrowed from US citizens.⁵ Congress eventually passed three more Liberty Loan Acts and one Victory Loan Act. Table 1 describes features of the Liberty Loan bonds. By making them convertible, Congress insured purchasers of First and Second Liberty Loan bonds against risk that interest rates would rise. Purchasers of these bonds had the option to convert them at par into new bonds with the same maturity date and call provisions as their original loan but with the coupon rate and tax provisions of subsequent issues. Higher later coupon rates did indeed induce many owners of First and Second Liberty Loan bonds to exercise those conversion options. Of the nearly \$2 billion in First Liberty Bonds sold, about \$560 million were converted into higher coupon-paying bonds. Of the nearly \$4 billion Second Liberty Bonds sold, nearly all were ultimately converted.⁶

Between 1917 and 1920, the US War and Navy departments spent \$20 billion and the Treasury extended \$9.5 billion in loans to Britain, France, Italy, and eight other allies of

³Tooze (2014) documents this concurrence of self-confirming beliefs.

⁴Schuker (1988) describes many of these complications and their consequences.

⁵In June 1918, roughly \$1.75 billion in private loans to Britain and France remained outstanding.

⁶The conversion rate was lower for the First Liberty Bonds because conversion to a higher coupon bond also meant a less favorable tax treatment.

	Coupon Rate	Issue Date	Call Date	Maturity Date	Convertible?	Issued (billions)
First Liberty Loan	$3\frac{1}{2}$	Jun 1917	Jun 1932	Jun 1947	yes [†]	\$2.0
Second Liberty Loan	4	Nov 1917	Nov 1927	Nov 1942	yes [†]	3.8
Third Liberty Loan	$4\frac{1}{4}$	May 1918		Sep 1928	no	4.2
Fourth Liberty Loan	$4\frac{1}{4}$	Oct 1918	Oct 1933	Oct 1938	no	7.0
Victory Liberty Loan [‡]	$3\frac{3}{4}, 4\frac{3}{4}$	May 1919	Jun 1922	May 1923	no	4.5
						\$21.4

Table 1: Liberty and Victory Loans

[†]If the Treasury issued a new series of bonds at a higher interest rate prior to the end of the war, investors in the First and Second Liberty Loans could exchange their bonds at par for new bonds with the maturity date and call provisions of their original series but with the coupon rate and tax exemptions of the subsequent series. There was no limit to the number of times holders of the First Liberty Loan could exercise this option, but holders of the Second Liberty Loan could exercise this option only once.

[‡] The Victory Liberty Loan paid a $3\frac{3}{4}$ coupon per annum if the coupon payments were exempt from federal income taxes; otherwise, this loan paid a $4\frac{3}{4}$ coupon per annum.

Entente countries.⁷ After that, the Treasury extended credits to an even larger group of countries in order to finance US sales of surplus war materials and US relief supplies to Europe.⁸ By December 1922, a total of 20 nations owed the Treasury \$11.8 billion (\$10.1 billion in principal and \$1.7 billion in interest in arrears). The face value of those foreign loans represented 52 percent of privately-held US federal debt and 16 percent of US GDP in 1922.

Table 2 summarizes a network of international debts and credits that had emerged at the end of the War and that framed political questions that would preoccupy statesmen and citizens for the next 15 years. Should debts be paid? By whom? Should price levels and exchange rates of currencies in which loans were denominated be adjusted to redistribute resources between creditors and debtors within and across countries? Should governments discriminate between domestic and foreign creditors?

During the war, both German and French finance ministers had answered the who-should-pay question. The German finance minister assured the Reichstag that the “lead

⁷Through the Liberty Loan Acts, credits were granted to Belgium, Cuba, Czechoslovakia, France, Great Britain, Greece, Italy, Liberia, Rumania, Russia and Serbia.

⁸The nine countries granted just post-war credits were Armenia, Austria, Estonia, Finland, Hungary, Latvia, Lithuania, Nicaragua, and Poland.

Debtor	To USA	To Britain	To France	Total
Belgium	\$172	\$422	\$535	\$1,129
France	1,970	1,683		3,653
Great Britain	3,696			3,696
Greece		90	155	245
Italy	1,031	1,855	75	2,961
Jugoslavia (Serbia)	11	92	297	400
Portugal		61		61
Roumania		78	220	298
Russia	187	2,472	955	3,614
Total	\$7,067	\$6,753	\$2,237	\$16,057

Table 2: Inter-Allied Indebtedness at the Armistice in millions of dollar.

Source: War Debt Supplement, *The Economist*, November 12, 1932, page 2.

weight of billions” would be carried by Germany’s enemies.⁹ Meanwhile, the French finance minister assured the French parliament that *France’s* enemies, not Germany’s, would service French war bonds.

With more foresight, a war time French finance minister could have said that the burden of paying French war bonds would fall either on France’s enemies or on its foreign *friends* or maybe on its domestic creditors and tax payers. Deciding would preoccupy Europeans and Americans from the time of Armistice on November 11, 1918 until the trough of the world depression 1933. Failed improvisations postponed a permanent settlement until 1933. In 1919, John Maynard Keynes had urged immediate agreement to what would ultimately be the disposition of postwar international loans and reparations.¹⁰ Keynes said that the US should write down its loans to the UK, France, and Italy in exchange for their accepting smaller reparations from Germany. Keynes said that would reset national balance sheets in ways that would foster reconstruction of international monetary and trading systems. It is true that in 1922 Congress established the World War Foreign Debt Commission to write down and reschedule outstanding Treasury credits to foreign governments, but not until 1933 would governments accept the comprehensive adjustments that Keynes had recommended in 1919. By then a fragile monetary and trading system assembled in the 1920s had collapsed because it had depended on what turned out to be too optimistic assumptions about both macroeconomic growth and politically sustainable fiscal-monetary

⁹See the speech by Karl Helfferich cited by Taylor (2013, ch. 2, Loser Pays All).

¹⁰See Keynes (1920, 1922), Tooze (2014, pp. 295-299), and Clarke (2017, chs. 11-13).

policies.

3 Purpose and organization

This paper constructs a quantitative account of Henry Carter Adams’s “political complications sure to come with an extension of international credits” by the US during World War I, the absence in 1914 of “a clearly [US] formulated policy, upon which the public may rely,” outcomes brought by the absence of such a policy, and their consequences for US federal monetary and fiscal arrangements in the 1920s and 1930s.¹¹ We apply an accounting framework described in appendix A.¹² We work in the Davis Dewey (1912) tradition of spotlighting objects in government budget constraints and balance sheets. These objects frame financial questions created by Adams’s “political complications” and our answers to them: How large were the US government credits extended to foreign governments during the war? How big were the promised and realized federal income streams generated by these credits and how did those quantities compare with interest payments on federal debts issued during the War? How did defaults, reschedulings, and repudiations of foreign credits, and fluctuations in rates of growth of GDP, nominal interest rates, inflation, and primary federal government budget surpluses contribute to the evolution of the federal debt to GDP ratio?

Although we focus mainly on the period during and after World War I, we also compare outcomes with those from a period of similar length during and after the US Civil War. The Civil War experience set precedents that US policy makers naturally consulted during and after World War I.^{13,14} Two 1913 reformations of the US fiscal-monetary infrastructure distinguished the situations confronting Congress during the Civil War and World War I: the Federal Reserve System, and the 16th amendment to the US constitution and a Revenue Act of 1913 that authorized a federal income tax. The US used both of these

¹¹The phrases in quotes are again from Adams (1887, pp. 37-38).

¹²We use some of the data on prices and quantities of all bonds issued by the US government from 1776 to 1940 that have been collected and organized by Hall et al. (2017).

¹³President Wilson’s Treasury Secretary and son-in-law William Gibbs McAdoo sought to borrow in a more orderly way than he thought the Union had managed during the Civil War. McAdoo (1931, p. 373) said that he “did not get much in the way of inspiration or suggestion from a study of the Civil War, except a pretty clear idea of what not to do.” For example, rather than improvising 19 separate securities as the Union had during the Civil War, McAdoo convinced Congress to finance the war mostly by sequentially issuing five securities.

¹⁴Hall and Sargent (2014) compare fiscal aspects of the Civil War with those in the War of 1812 and the War for Independence.

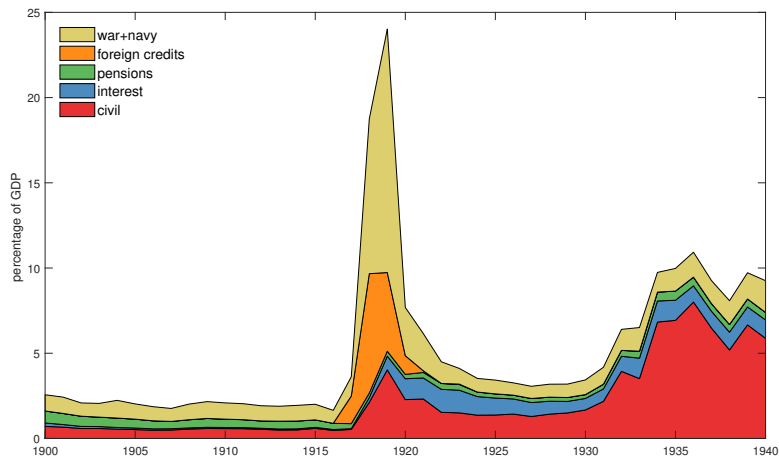


Figure 1: US Federal Expenditures by Types as Percents of GDP

new institutions to help finance World War I. By way of contrast, the US entered the Civil War without a federal income tax and without either a central bank or a national banking system. Although Civil War Congresses levied a federal income tax and constructed a new National Monetary System, it took time to get the administrative machinery up and running. The US entered World War I with a Federal Reserve system and a federal income tax ready to go, having only to choose monetary policy actions and set income tax rates within established institutions.¹⁵

4 Debts, credits, values, and returns

4.1 Overview

Figures 1, 2, and 3 set the scene.¹⁶ Figure 1 shows the big rise in military expenditures as well the granting of large foreign credits during the war. The war brought a permanent rise in federal expenditures as a fraction of GDP. Figure 2 shows that federal revenues as a

¹⁵As part of his critical analysis of the way the Union had financed the Civil War, Adams (1887, pp.134-135) observed that “it is easier to raise the rate of existing taxes than to establish a new system of duties. From this it follows that the germ of a war policy lies back in the treasury policy of ordinary times.” He recommended that “... the permanent system should be so adjusted as to respond quickly to any change in rates imposed, and this can be easily done by fixing the ordinary rate of taxation below the maximum revenue rate.” Adams (1887, p. 132) performed an interesting counterfactual experiment in which he estimated the consequences for Union finances of having had immediate access to revenue sources that the Congress established only during the war.

¹⁶Bassetto and Galli (2017) provide an information theoretic answer to the question “Is Inflation Default?”

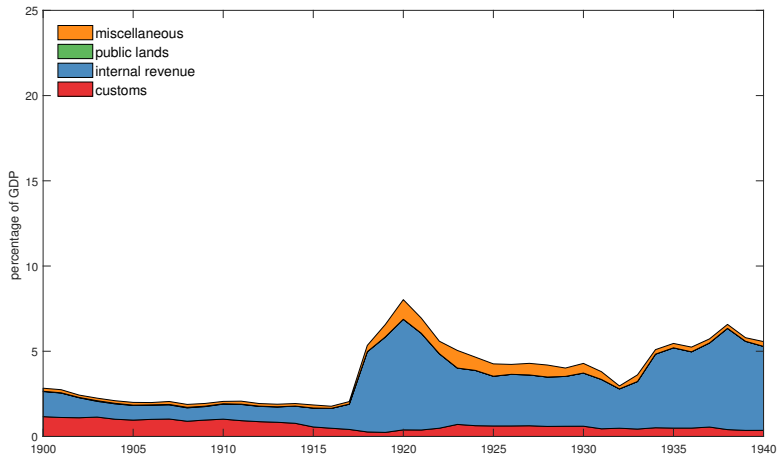


Figure 2: US Federal Revenues by Types as Percents of GDP

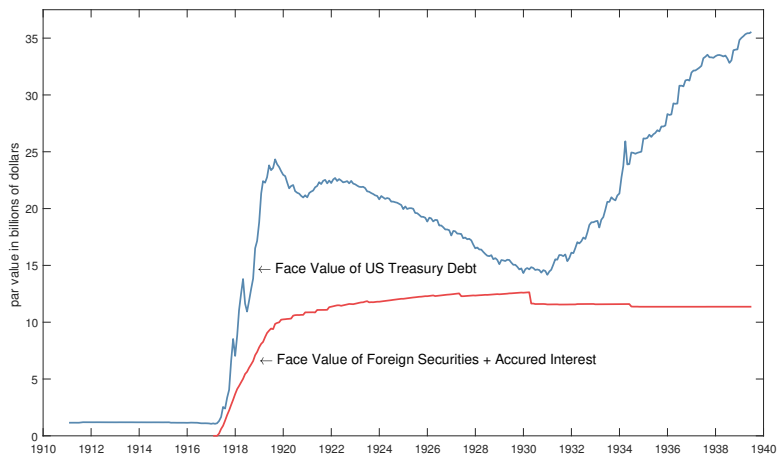


Figure 3: Face Value of US Treasury Debt and Face Value of Foreign Securities Held by the Treasury (including accrued interest)

US Treasury debt excludes securities held in US government accounts and by the Federal Reserve.

fraction of GDP shares that post war permanent rise, and that while revenues rose during the war, they rose much less than expenditures. That discrepancy gave rise to the war time growth of federal government debt depicted in figure 3.¹⁷ The book values in figure 3 show that during the war the US Treasury borrowed large amounts and that it also lent large sums to European combatants.¹⁸ Book values indicate that net US government indebtedness was actually substantially less than the gross amount depicted in figure 3 because large fractions of outstanding US Treasury bonds were “backed” by claims on foreign governments. How much “backing” those credits would in fact put behind US Treasury bonds, and how much relief they would bring the US taxpayers who were ultimately responsible for servicing those bonds, would depend on how faithfully those foreign debtors honored their obligations to the US Treasury. In the end, they would pay only small fractions of what they had promised, but it would take a long time for all parties to accept that.

We want to know how accurately the book values in figure 3 approximate market values.¹⁹ Figure 4 shows that book and market values of outstanding Treasury bonds approximate each other pretty well. This need not have occurred and is a consequence of the way that the Treasury managed its debt in light of market interest rates. In section 7, we describe how we use prices and quantities of individual bonds to measure the total market value of Treasury debt.

4.1.1 Returns

Figures 5 and 6 show two ways of depicting nominal and real returns on the Treasury bond portfolio. Figure 5 shows annual nominal and real net returns, while figure 6 shows the real and nominal outcomes of purchasing \$100 of the bond portfolio in January 1917 and continually reinvesting proceeds in a rebalanced portfolio of Treasury securities. Figure 6 reveals how US price level movements influenced real returns.

4.1.2 Price level movements

In figure 3, both federal debts and foreign credits are denominated in US dollars, so the US price level shaped the value of those debts and credits in terms of goods and services.

¹⁷However, during the war a sizeable fraction of the interest bearing federal debt was owned by the Federal Reserve System. Please see the third paragraph of subsection 5.1.

¹⁸President Wilson called them associates, not allies.

¹⁹Distinguishing between book and market values of government debt is a theme of Dias et al. (2014) and Hall and Sargent (2011).

Figure 7 indicates that the logarithm of the US price level rose especially rapidly after the US entered the War in 1917, then showed a sharp drop in 1920-21 and a larger and longer one from 1929 to 1933 that nevertheless left the price level in 1933 23% above its prewar level. These price level movements coincided with European combatants leaving the gold standard during the war, their postwar implementations of monetary experiments that replaced precious metal monies with paper monies,²⁰ and subsequent modifications and terminations of those experiments carried out during the depression of the 1930s.²¹ The US, which imperfectly but nominally remained on the gold standard during the war,²² shared a 1920-21 price level drop with European countries that were then deciding at what rates to exchange their currencies for gold, politically charged decisions that would redistribute wealth among domestic private creditors and their domestic debtors. UK domestic creditors who owned pound-denominated claims on the UK government earned high real returns when the UK restored convertibility of the pound to gold at the prewar par of 4.80 dollars per pound in April 1925, while domestic creditors of the French government who owned franc-denominated claims fared badly when France ultimately resumed convertibility of the franc to gold at 20% of its pre war value. The period of slowly rising US prices from 1922 to 1929 in figure 7 coincided with the UK's success in temporarily establishing an international "gold exchange standard" that decreased monetary demands for gold by making IOUs denominated in British pounds a reserve currency for British Empire Dominions and colonies and much of Europe as well.

4.1.3 Nominal versus real returns

While reschedules, defaults, and repudiations shaped dollar values of the US Treasury's *credits*, US inflation shaped real values of those credits and also of the US Treasury's debts. By affecting both the price level movements in figure 7 and the US government debt and credit dynamics in figures 3, US and foreign monetary-fiscal policies influenced the rate of return outcomes summarized in figures 5 and 6. Figure 5 shows nominal and real one-period returns on a value-weighted re-balanced portfolio of US treasury bonds, while figure 6 shows cumulative nominal and real values coming from continually reinvesting in that portfolio,

²⁰These experiments were designed to reap the gains in efficiency and stability price level stability promised by David's Ricardo 1816 proposal for a well managed paper currency; see Ricardo (1816, p. 35).

²¹Rothbard (2002) contains an imaginative account of these experiments.

²²The US embargoed exports of gold for much of 1914, 1918, and 1919.

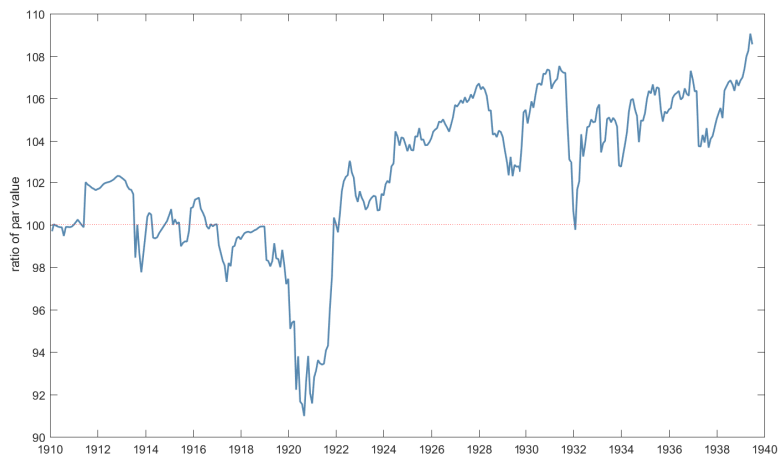


Figure 4: Ratio of Market Value to Par Value of Privately Held US Treasury Debt

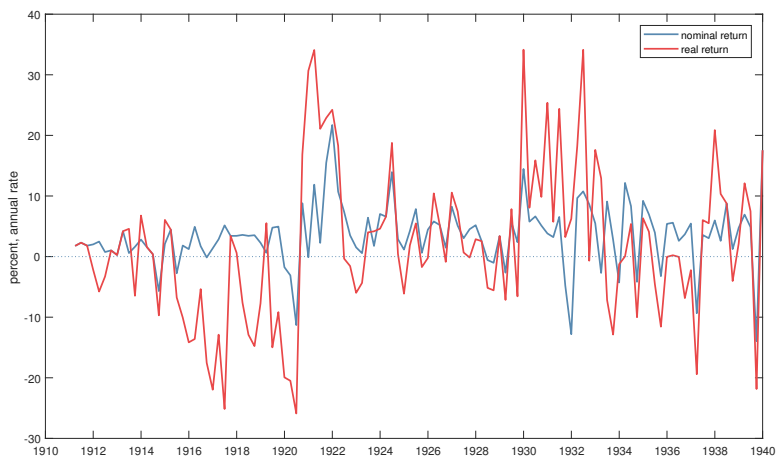


Figure 5: Nominal and Real Returns on the US Treasury's Bond Portfolio.

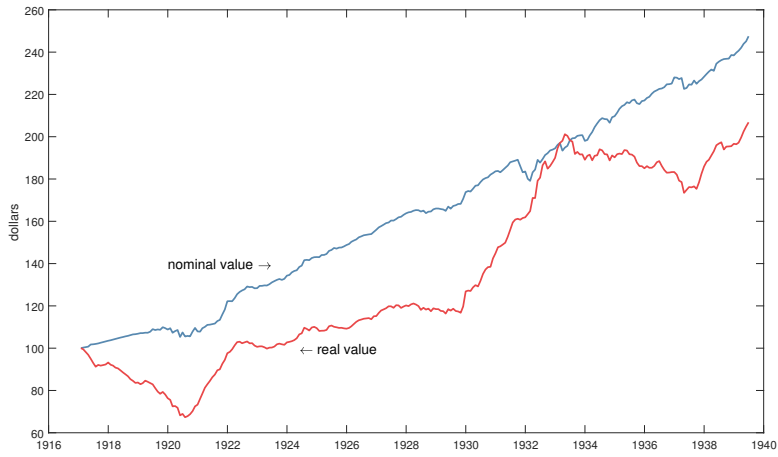


Figure 6: Nominal and Real Values of \$100 invested in January 1917 in US Treasury's Bond Portfolio

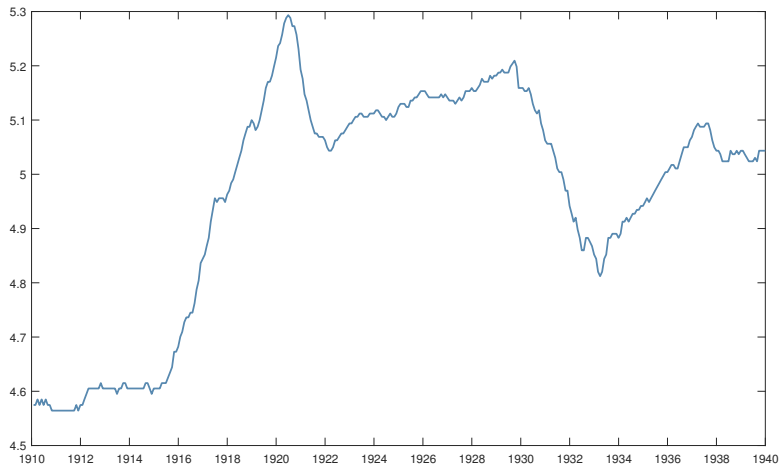


Figure 7: Natural Log of US Price Level

Source: NBER, Indicator m04051

starting with an initial investment of \$100 on January 1, 1917.²³ Figure 6 reveals that the 1920-21 price level drop brought that real value back to its initial value after the war-time inflation had reduced it by 1/4. Creditors of the US government earned high real returns from 1929 to 1933 and low ones from 1933 to 1937.

5 Comparison with Civil War

During the 1920s and 1930s in both the US and in Europe, the distinction between nominal and real returns on government bonds was on the minds of policy makers and bond holders. For example, Treasury Secretary Andrew Mellon wrote:

The real value of the dollar, that is, its value in terms of goods it will purchase, does not remain constant. The experience with our Civil War debt was that we borrowed a 54-cent dollar and repaid an 85-cent dollar (using the 1860 value as the base) or, in other words, we paid back in value \$3 for every \$2 we borrowed. Using 1913 as a base, our present war debt was borrowed on a 51-cent dollar, and to-day the dollar is worth 66 cents. If the appreciation of the dollar continues – and such has been fiscal history after other great wars – then the longer we postpone payment the more in real value we will have to pay. Mellon (1926, p. 7)

Like Secretary McAdoo before him,²⁴ Secretary Mellon sought lessons from the Union’s fiscal and monetary policies during the US Civil War.

Figure 8 compares the logarithm of the US price level during and after World War I with a period of the same length during and after the US Civil War. The US price level had returned nearly to its prewar level twenty years after the start of the Civil War in 1861; twenty years after the US had entered World War I in 1917, the price level was still 63% above its 1914 level. But in 1933, the same gold standard discipline that had pushed the price level to its prewar value after the Civil War seemed to be driving back it toward its pre-World War I level.²⁵ The Roosevelt administration did not want the wealth

²³The nominal value at time t is $100 \times \prod_{s=1917:1}^t (1 + r_{s,s+1})$, where $r_{s,s+1}$ is the nominal net return on the portfolio between month s and $s + 1$. The real value at time t is $100 \times \prod_{s=1917:1}^t \frac{1+r_{s,s+1}}{1+\pi_{s,s+1}}$, where $\pi_{s,s+1}$ is the inflation rate between month s and $s + 1$. Thus, the real value is reported in units of January 1917 dollars.

²⁴See footnote 13 above.

²⁵See Wood (2009).

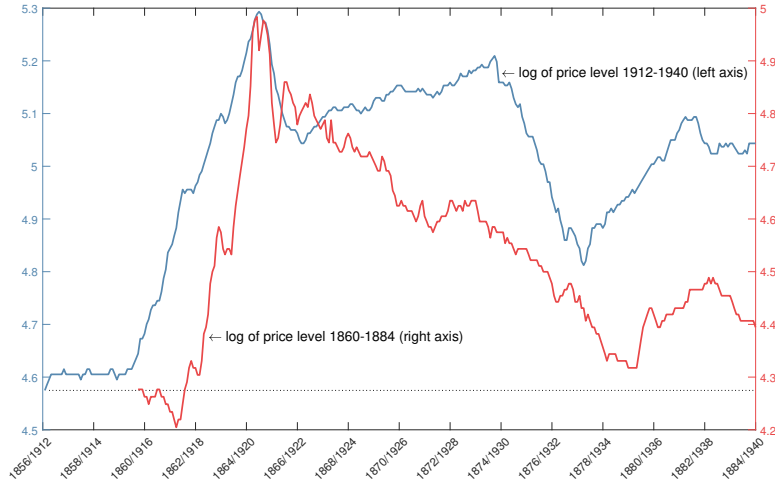


Figure 8: Natural Log of US Price Level During and After Two Wars

The ticks on the x-axis correspond to August for the 1856 to 1884 period and January for the 1912 to 1940 period.

redistributions that would have brought, so it pursued a policy designed to restore the price level to its 1928 or 1929 level.²⁶

There were important differences in international and domestic monetary arrangements across the two post war episodes compared in figure 8. During the US Civil War, the UK remained on the gold standard while the United States left it and made a paper currency called the greenback a legal tender and unit of account in which the log price levels in figure 8 are recorded. After 1862 and before the US Treasury returned to gold in 1879 by promising to trade one greenback dollar for one gold dollar, one gold dollar traded for more than one greenback dollar. By way of contrast, during and after World War I, it was the UK and other European countries that had abandoned the gold standard and the US that until 1933 more nearly remained on gold.²⁷ Europe’s leaving gold lowered the relative price of gold by decreasing world demand for gold for monetary uses; that changed the price of gold relative to most goods and services, and that in turn exported inflation from Europe to the US.²⁸ The UK temporarily restored the pound to its prewar exchange rate in 1925, but then left the gold standard permanently in September 1931. By December 1931, one

²⁶Milton Friedman (1975, p. 75) argued that “departing from gold was not necessary” for Roosevelt to pursue the price level that he sought through monetary policy. Friedman noted that Viner (1933) had argued that the US could engineer inflation without raising the price of gold above \$20.67 an ounce. See Buchanan and Tideman (1975) for alternative views about Roosevelt’s actions about the gold standard.

²⁷Again, the US embargoed exports of gold for much of 1914, 1918, and 1919.

²⁸Hawtrey (1919) described the workings of this mechanism during monetary disturbances in France and the UK from 1789 to 1821.

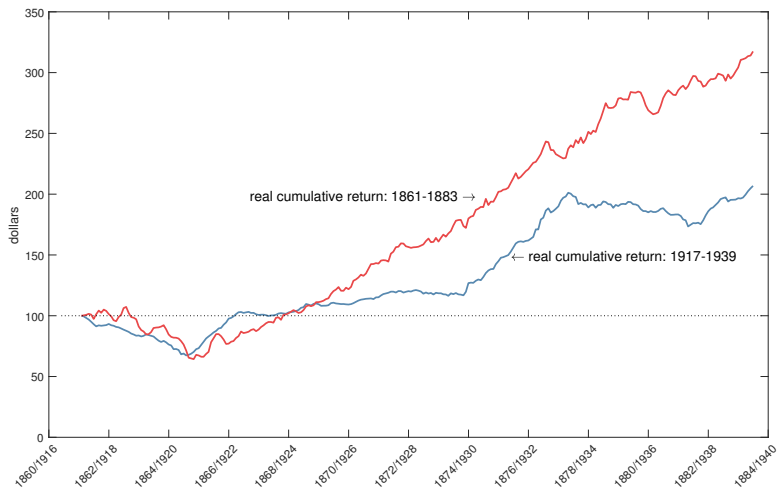


Figure 9: Real Values of \$100 invested in January 1861 and January 1917 in US Treasury's Bond Portfolio



Figure 10: Real Returns on Treasury Portfolio During and After Two Wars, Annual by Fiscal Year

UK pound had fallen from its value of \$4.87 in August 1931 to about \$3.7.

Figure 9 compares real rates of return on the US government bond portfolio across the post Civil War and the post WWI periods.²⁹ US Treasury creditors suffered similar cumulative real losses during both wars, and although they enjoyed cumulative gains after both wars, they fared better 20 years after the Civil War than they did 20 years after World War I. Comparing the log price levels in figure 8 with the cumulative real returns in figure 9 indicates how price level movements helped award bond holders bigger cumulative real returns after the Civil War than after World War I. Not wanting to let the price level sink to its pre World War I level, the Roosevelt administration promoted a monetary policy that aimed to restore the price level to its 1929 level.³⁰ Because he rejected international restrictions on US monetary policy, in late June 1933, President Roosevelt directed the US delegation to the London Economic Conference not to assist international efforts temporarily to stabilize the exchange rate of the US dollar for currencies of France, the UK, and other countries. Appendix E reproduces Roosevelt’s “bombshell message” to the conference in which he criticized temporary measures and instead advocated ones designed permanently to restore the economic fundamentals on which a gold standard rests.³¹ For President Roosevelt, those fundamentals included balanced national government budgets.

Figure 10 shows annual real returns on the Treasury bond portfolio during and after the Civil War and World War I. While it conveys less information than figure 9, approximating as it does the time derivative of that figure, figure 10 helps to identify years after each war in which a declining price level boosted real returns, and years after World War I in which a rising price level depressed real returns.

The immense growth of US government debt during World War I shown in figure 1 is an arithmetic consequence of the discrepancy between the federal government expenditure path shown in figure 1 and the total federal government revenue path shown in figure 2.

²⁹See footnote 23 for an explanation of how we computed the real value of the post-WWI portfolio. The real value of \$100 invested in January 1861 is computed in a like manner and is reported in January 1861 dollars.

³⁰That was the policy advocated by the Committee for the Nation to Rebuild Prices and Purchasing Power that influential businessmen organized in January 1933. See Rothbard (2002, p. 297). Rothbard tells how Irving Fisher transferred residual monies to the Committee for the Nation from the defunct Stable Money League that he had formed in 1921 to promote price level targeting.

³¹Notice Roosevelt’s “specious fallacy” pun about commodity (specie) standards. Notice also how Roosevelt distinguished temporary from permanent policy actions, a distinction that 45 years later would become an important aspect of rational expectations macroeconomics. Rothbard (2002, p. 307) and Ferguson (1989, pp. 28–29) detected advisers who helped Roosevelt to formulate his policy and to write the “bombshell message” to the London Conference explaining it.

US World War I finance bears tell-tale signs of a Barro-Gallatin recommendation to finance net-of-interest deficits during a war with increases in government debt, then after a war to run net-of-interest surpluses just sufficient to service the war-enlarged government debt.³² In this respect, the deficit during the depression in the 1930s exhibits fiscal features of a war.³³ Figure 1 shows what appears to be a permanent increase in the level of non-interest government expenditures after the War, even before the onset of the depression in 1930. A permanent increase in federal government expenditures also occurred during the Civil War.

5.1 Financial repression and assistance

During and after the Civil War, the Union forced the newly chartered national banks to buy Union bonds (see Dewey (1912)). During World War I, although it extended some short-term credit to the Treasury, the Federal Reserve Banks did not buy bonds directly from the Treasury. Instead, they lent large sums to banks belonging to the Federal Reserve system by discounting loans that those banks secured with Liberty Loans as collateral. In that way, the Fed engineered substantial increases in the monetary base that helped finance the War. Figures 11 and 12 show the effects of these and other operations during the War as well as an unwinding of the Fed's balance sheet after the War, especially during the 1920-1921 recession and the associated world-wide downward movements in price levels that occurred then.

The Federal Reserve supported the Treasury in several ways. It directly purchased certificates of indebtedness from the Treasury. The governors of Reserve Banks organized and led committees in each district to sell Treasury bonds. The Federal Reserve supported a program of "borrow and buy" that encouraged individual investors to finance purchases of Liberty Loans by borrowing from their local banks, which could then discount those loans at the Fed's discount window. The New York Fed was designated as the Treasury's fiscal agent for bond sales. The Fed also lent at preferred discount rates to banks purchasing Treasury certificates of indebtedness. The Fed lent to member banks at a preferred discount rate if the proceeds were used to purchase Liberty and Victory bonds that the Fed accepted

³²See the 1807 report of the Secretary of Treasury authored by Gallatin (1837) and Barro (1979) for a more formal treatment. For an analysis of the Barro tax smoothing model and its relationship to consumption smoothing models and other tax smoothing models, see <https://lectures.quantecon.org/py/smoothing.html>.

³³Presidents Hoover and Roosevelt both pronounced rousing analogies between fighting wars and fighting depressions.

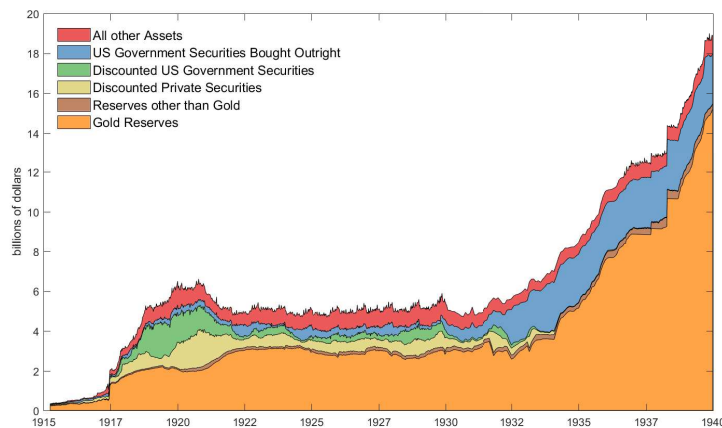


Figure 11: Federal Reserve Assets

Source: Board of Governors of the Federal Reserve System (1915-1940).

as collateral.

The Fed's balance sheet summarized in figures 11 and 12 shows that through these operations the Fed temporarily monetized over a billion dollars of Treasury securities (note the war time increase in both bills discounted in figure 11 and the increase in Federal Reserve notes in figure 12). This means that during the War, a substantial amount of the Treasury debt in figure 3 was not held by the public but by the Fed. Figure 13 shows time series of pertinent money market rates that determined spreads on these portfolio operations. During the subscription period for the First Liberty Loan from May 15 to June 15, 1917, member banks could borrow from the New York Fed at 3 percent to buy bonds at par that paid 3.5 percent coupons. As the four Liberty Loan bond drives and the Victory Loan bond drive progressed and as coupon rates on Treasury bonds increased, so did the New York Fed's preferred discount rate; but it always remained below the coupon rates and market yields of newly issued Treasury securities. Those spreads motivated US citizens to finance purchases of Treasury bonds by borrowing from banks.

Friedman and Schwartz (1963) describe how Treasury officials persuaded the Federal Reserve to keep interest rates low in order to help the Treasury sell Victory Loan bonds and how that led the Fed belatedly to administer excessive interest rate increases that they say worsened the sharp 1920-1921 downturn in real economic activity in the US. While figure 13 shows how the Fed increased rates during this period, our attention is also drawn to the substantial unwinding of the Fed's indirect holdings of Treasury securities reflected

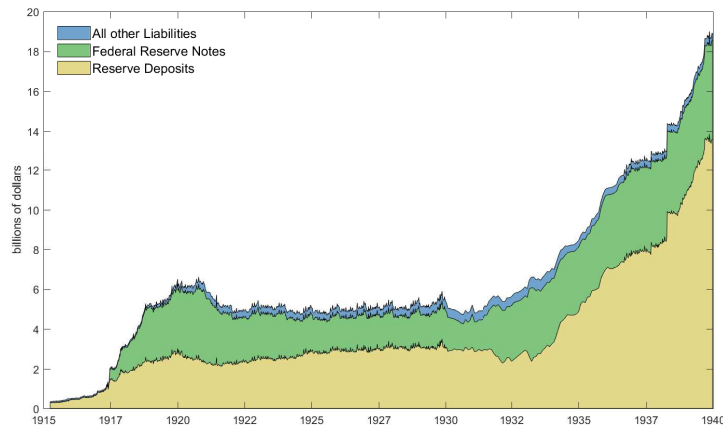


Figure 12: Federal Reserve Liabilities

Source: Board of Governors of the Federal Reserve System (1915-1940).

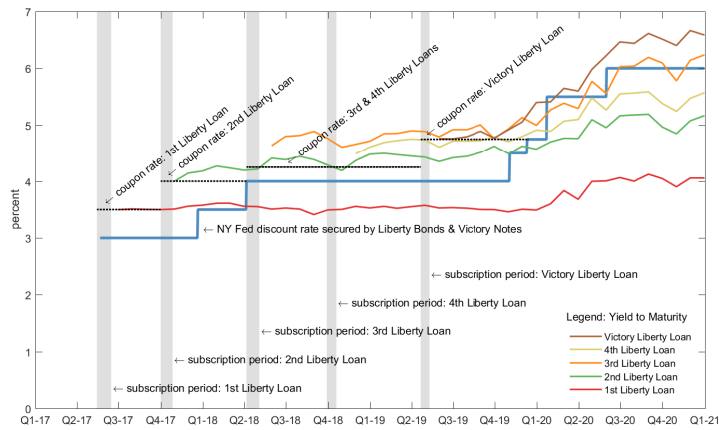


Figure 13: New York Fed Discount Rates Secured by Liberty and Victory Loans, Yields on Liberty and Victory Loans, and Coupon Rates for Liberty and Victory Loans

in two salient quantities of figures 11 and 12, namely, bills discounted and Federal Reserve Notes, respectfully. The substantial 1920-21 decrease in the US price level apparent from figure 7 set the stage for the high real returns on Treasury securities in the 1920s displayed in figure 5.

6 Foreign credits

We don't know market values of the foreign credits depicted in figure 3 because these inter-governmental obligations were not marketable.³⁴ But a sequence of defaults, reschedulings, and repudiations eventually drove plausible estimates of the discounted values of prospective payment streams to the US government below the book values of those foreign credits.³⁵ Figure 14 reports three time series that summarize original book values (the blue line), renegotiated book values (the red line), and what these payment streams would have been worth if there had been perfect foresight (the green line). Thus, in place of observed market values, the green line shows the present value of what *ex post* were the continuation flows of actual payments to the Treasury at each date. The blue line shows original book values before a sequence of Treasury write-downs of those book values following a sequence of reschedulings in the early and mid 1920s, recorded as the red line in figure 14. The red line tracks our estimates of what would have been the market values of claims to those promised flows had these flows been risk-free and had the claims to them been traded. We formed these estimates by valuing promised flows of payments to the Treasury by the Hicks-Arrow prices of risk-free claims that we inferred from market prices of the Treasury's own securities.³⁶ Because it uses Hicks-Arrow prices for risk-free claims, the red line undoubtedly overstates what those credits would have traded for had they been marketable.

Figure 15 is a counterpart to figure 6. It shows nominal and real values of \$100 initially invested in the Treasury's portfolio of foreign credits with earnings being

³⁴This section is intended to complement and supplement the account of Schuker (1988).

³⁵The Treasury and the World War Foreign Debt Commission recognized these haircuts implicit in the renegotiated payment schedules. In Appendix D we reproduce a table from United States World War Foreign Debt Commission (1927, p. 443) reporting the present values of the rescheduled repayments using constant discount rates by country. Depending on the discount rate used, the aggregate haircut, as measured by the Commission's own calculations, ranged from 1/4 to 1/2.

³⁶Appendix B describes how we inferred Hicks-Arrow prices from market prices and quantities of Treasury bonds.

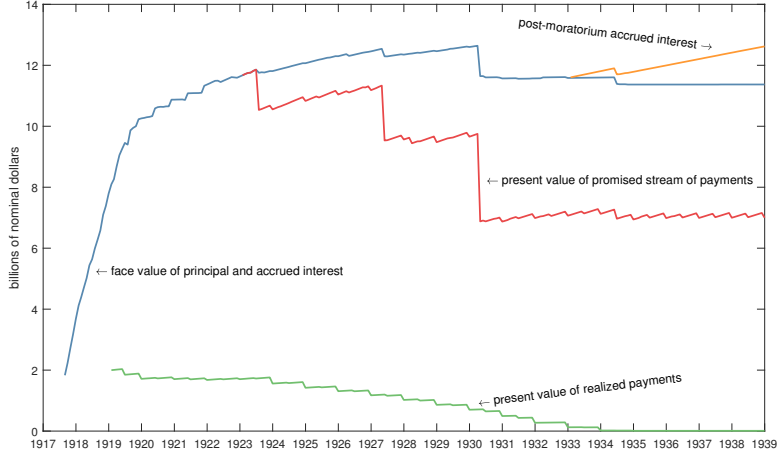


Figure 14: Face Values and Capitalized Values of Promised and Realized Flows from Foreign Credits

continuously reinvested in the portfolio.³⁷ Figures 14 and 15 confirm that ultimately the foreign credits extended by the US to combatants during World War I failed to provide much “backing” behind the Treasury bonds issued to finance those credits. *Ex post*, those credits turned out mostly to be gifts.

To indicate the burden that the failure of these foreign credits to pay off imposed on the American taxpayer, we report in figure 16 the annual flows of earnings that would have flowed from the capitalized values in figure 14 as percentages of annual official Treasury interest payments. The blue line reports the implied annual cash flow from the total principal of foreign credits amortized at 5 percent, the original interest rate on Treasury loans to foreign governments. The red line reports the renegotiated promised repayments. Even after the rescheduling, these promised repayments represented roughly 30 percent of official reported interest payments. Two back-of-the-envelope calculations put magnitudes

³⁷The nominal value at date t is

$$100 \times \prod_{s=1919:12}^t (1 + r_{s,s+1}),$$

where $r_{s,s+1}$ is the nominal return on the portfolio between months s and $s + 1$. The real value at date t is

$$100 \times \prod_{s=1919:12}^t \frac{1 + r_{s,s+1}}{1 + \pi_{s,s+1}},$$

where $\pi_{s,s+1}$ is the inflation rate between months s and $s + 1$. Thus, the real value is reported in December 1919 dollars. Prior to President Hoover’s debt moratorium in 1932, we computed the discounted value of the stream of promised payments; after the moratorium, we computed the perfect foresight discounted value of the stream of actual future payments.

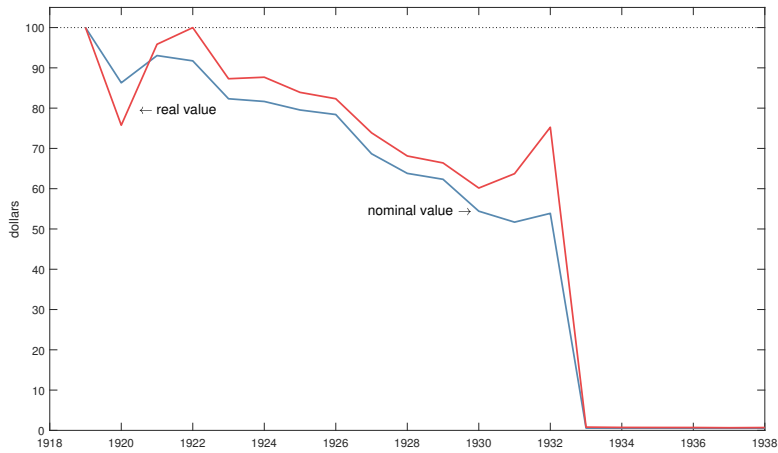


Figure 15: Nominal and Real Values of \$100 invested in December 1919 in the foreign credits owed to the US Treasury

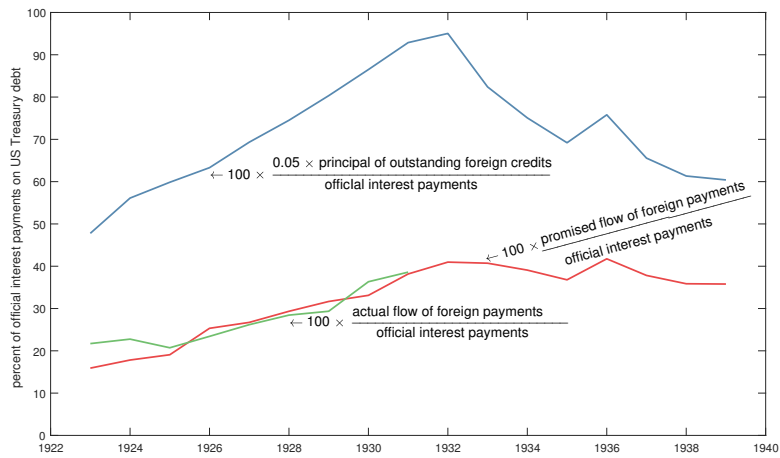


Figure 16: Promised Flows of Payouts from Foreign Credits as Percents of Official Interest Payments on US Treasury Debt

of the reschedulings into perspective:

1. In 1930 the Allies were scheduled to make \$218 million payments to the US; without the reschedulings the Allies would have had to pay five percent of the outstanding principal, \$544 million. This \$326 million reduction in payments amounted to \$2.67 per person in the US at a time when US per capita income was \$748.

To translate this reduction from dollars to tax rates, note that in 1929 Treasury proposed and Congress passed a temporary tax cut³⁸ that reduced tax rates on individual incomes by 1 percentage point³⁹ and reduced the tax rate on corporate income from 12 percent to 11 percent. The Treasury estimated that this tax reduction would “with reasonable accuracy” decrease income tax revenue by \$160 million per year, which equaled half the difference between the pre-haircut and post-haircut payment flows that we have estimated.⁴⁰

2. The difference between the pre- and post-haircut payment flows was about 4/10 of 1% of GDP. The Treasury raised about 2% of GDP using the personal income tax with total federal revenue being roughly 5% of GDP.

From 1925 to 1931 the top marginal tax rate was 25%. To increase revenue from 2% to 2.4% of GDP, Treasury would have had to raise rates by 20 percent (assuming no reduction in the tax base). Assuming a parallel shift in the tax schedule, the top marginal rate would have had to rise to 30%.

7 Prices and quantities

This section describes how we have transformed information in US Treasury accounts to match concepts in macroeconomic theory. We describe concepts appearing figures 3 and 4 that report total government debts and in figures 5 and 6 that report real and nominal returns on government debt. We link these concepts to decompositions of representations of government budget constraints that appear in government accounts and in macroeconomic theories. Appendix A describes an accounting framework that tells relationships among objects in play. Among these objects for each date t are:

³⁸Joint Resolution of Congress, No. 133, approved by President Hoover on December 16, 1929.

³⁹That is, the tax rates of 1.5 percent on the first \$4,000 of taxable income, 3 percent on the next \$4,000, and so on ... were reduced to 0.5 percent on the first \$4,000 of taxable income, 2 percent on the next \$4,000, and so on.

⁴⁰See page 24 of the 1929 *Annual Report of the Secretary of the Treasury on the State of the Finances*.

- a list of bonds $i = 1, \dots, I_t$.
- for each bond i , a price p_i^t , a list of promised future coupons payments $c_{i,t+j}^t, j = 1, \dots, J(i)$, and a book value that takes the form of principal payment $b_{i,t+J(i)}^t$ that the government promises to pay when the bond matures at $t + J(i)$.
- a list of Hicks-Arrow prices $\{q_{t+j}^t\}_{j=0}^{J(t)}$ telling the number of dollars that at time t exchange for a government promise to pay one dollar at time $t + j$.⁴¹
- a Hicks-Arrow-Debreu pricing equation $p_i^t = \sum_j q_{t+j}^t c_{i,t+j}^t + q_{t+J(i)}^t b_{i,t+J(i)}^t$ that links the price of each bond at time t to the present value of its coupon stream and principal.
- sums over bonds of promised coupons $c_{t+j}^t = \sum_i c_{i,t+j}^t$ and sums over bonds of promised principals $b_{t+j}^t = \sum_i b_{i,t+j}^t$ that, when added, form the stream of payments $s_{t+j}^t = c_{t+j}^t + b_{t+j}^t, j = 1, \dots, J(t)$ that at t the government has promised. (The notation s_{t+j}^t is intended to connote “strips.”)
- A stream $\{y_t\}$ of Treasury net earnings from credits to foreign governments, a stream subject to defaults, renegotiations, repudiations, and extensions of more credits.
- A sequence of estimates $\{C_t\}$ of the discounted present value of the continuation of the earnings stream $\{y_t\}$

Appendix A uses these concepts to explain discrepancies between objects that in the US Treasury accounts and in macroeconomic models bear the same names. For example, the Treasury measures total government debt by face or book value $\sum_j b_{t+j}^t$, while the object in a typical government budget constraint of macroeconomic theory is the market value $\sum_j q_{t+j}^t s_{t+j}^t$. Figure 4 plots their ratio, which stays as close to unity as it does as a result of a conjunction of the Treasury’s debt management policy – its choice of a division of $\{s_{t+j}^t\}$ sequences between $\{c_{t+j}^t\}$ and $\{b_{t+j}^t\}$ sequences – and realized values of the bond yields that represent the Hicks-Arrow vector $\{q_{t+j}^t\}$ at each date in the manner described in appendix A. Figure 17 documents that the undiscounted sum of future coupons promised $\sum_j c_{t+j}^t$ has sometimes been nearly as large as the sums $\sum_j b_{t+j}^t$ that the Treasury reports as its debt at time t . The Treasury and Federal Reserve jointly decide the division of Treasury obligations to the public between these two sums when they conduct “debt management” and “open market” operations.

⁴¹Ljungqvist and Sargent (2018, ch. 8) provide definitions and analysis of Arrow date-state prices.

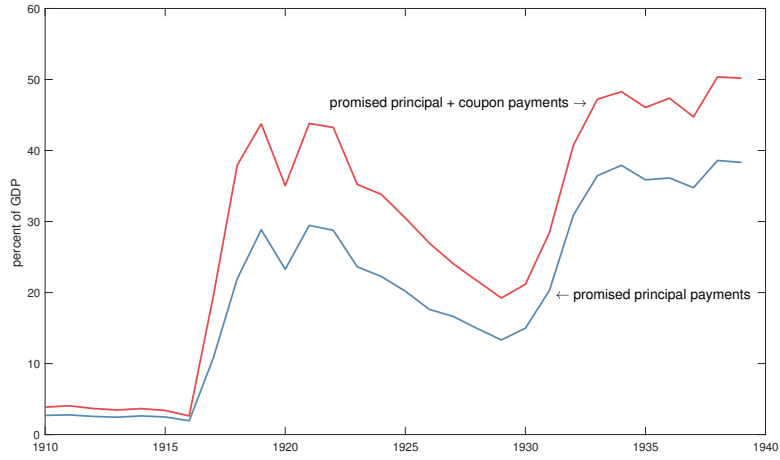


Figure 17: Total Principal $\sum_{j=1}^{n_t} b_{t+j}^t$ and Principal + Coupons $\sum_{j=1}^{n_t} b_{t+j}^t + \sum_{j=1}^{n_t} c_{t+j}^t$ as Percents of GDP

Privately Held US Treasury debt. It excludes debt held in US government accounts and by the Federal Reserve.

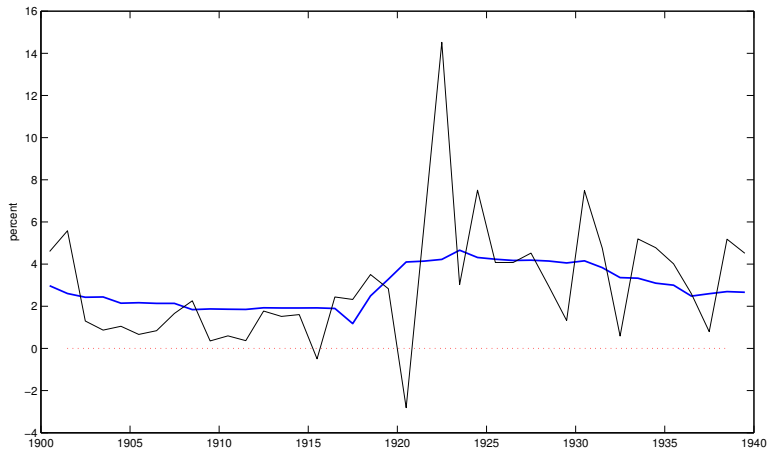


Figure 18: Nominal Returns (thin black) and Official Net Interest Payments (thick blue) as Percents of the Par Values of Debt, Annual by Fiscal Year

US Treasury and macroeconomic theoretic accounts also differ in the quantities to which they attach the word “interest.” These different quantities answer different questions. The Treasury interest concept measures total coupon payments coming due at time t . That quantity helps to inform “cash-management” policy because it estimates a component of the total cash payments that the Treasury is obligated to pay at t . The macroeconomics interest concept is the net rate of return – nominal or real – that the Treasury pays on a value-weighted portfolio of its outstanding bonds. Figure 18 compares time series instances of these two concepts. That the nominal return on the government bond portfolio in figure 18 is more volatile than the Treasury’s measure of interest payments reflects fluctuations in market interest rates and capital gains on the Treasury’s bond portfolio that are intermediated through the Hicks-Arrow prices $\{q_{t+j}^t\}$. For details, please see our discussion of equation (15) in appendix A.

8 Post World War I Tax Policy

Congress repeatedly raised income tax rates during WWI, with rates at the top bracket eventually reaching more than 75%. Figure 19 graphs marginal income tax rates for several years between 1918 to 1925 and shows tax rate reductions after the War. In his first Annual Report in 1921, Secretary of Treasury Andrew Mellon made what later would be called a “supply-side” case for lowering income tax rates. He argued that the high tax rates at the upper bracket discouraged initiative, diverted savings into tax-exempt state and local bonds, and discouraged investors from realizing capital gains. In several subsequent Annual Reports, Mellon observed that increases in top marginal tax rates coincided with decreases in the number individual returns filed that reported incomes over \$300,000. Table 3, reproduced from Mellon’s 1924 Report, shows that as the marginal tax rate at the top bracket climbed from 15% in 1916 to more than 70% in 1920, the number of tax returns that reported incomes over \$300,000 fell from 1,296 to 395, with a corresponding drop in total income reported at the top bracket from \$992 million to \$246 million even while total personal income rose from \$6 billion to \$23 billion over this period. Mellon’s supply side arguments persuaded Congress to cut tax rates. As shown in figure 19, by 1925, Congress had reduced the top marginal income tax rate to 25%. The 1925 income tax rate structure allowed the federal government to collect about 2% of GDP from the income tax. See table 4.

The cuts in tax rates appear to have worked as Mellon had reckoned. For five income

Year	income tax, maximum rate	Total amount of net income returned	number of returns of net income in excess of \$100,000	net income returned by those returning in excess of \$100,000	Percent (5) is of (3)	number of returns of net income in excess of \$300,000	net income returned by those returning in excess of \$300,000	Percent (8) is of (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1916	15%	\$6,298,577,620	6,633	\$1,856,187,710	29.47	1,296	\$992,972,986	15.77
1917	67	13,652,383,207	6,664	1,606,516,153	11.77	1,015	731,372,153	5.36
1918	77	15,924,639,355	4,499	990,239,425	6.22	627	401,107,868	2.52
1919	73	19,859,491,448	5,526	1,169,553,048	5.89	679	440,011,589	2.22
1920	73	23,735,629,183	3,649	727,004,763	3.06	395	246,354,585	1.04
1921	73	19,577,212,528	2,352	463,003,351	2.37	246	153,534,305	0.78
1922	58	21,336,212,530	4,031	892,747,680	4.18	537	365,729,746	1.71

Table 3: Tax returns of those with net income in excess of \$100,000 and \$300,000, as compared with total of all net incomes returned, for the calendar years in which the tax accrues

Source: *Annual Report of the Secretary of the Treasury*, 1924, page 9.

	Revenue		percent	Per
	nominal	1929 dollars	of GDP	Capita
1914	\$71,381,275	\$126,187,950	0.20%	\$1.27
1915	80,201,759	141,052,991	0.21	1.40
1916	124,937,253	201,144,280	0.25	1.97
1917	359,681,228	480,603,700	0.60	4.65
1918	2,838,999,894	3,229,220,995	3.74	30.89
1919	2,600,762,735	2,575,206,107	3.32	24.51
1920	3,956,936,004	3,382,350,985	4.48	31.77
1921	3,228,137,674	3,089,273,651	4.39	28.46
1922	2,086,918,465	2,131,718,146	2.84	19.37
1923	1,678,607,428	1,684,507,630	1.97	15.05
1924	1,842,144,418	1,845,376,251	2.12	16.17
1925	1,760,537,824	1,720,365,825	1.94	14.85
1926	1,982,040,089	1,918,211,679	2.04	16.34
1927	2,224,992,800	2,194,250,240	2.33	18.43
1928	2,173,952,557	2,173,952,557	2.23	18.04

Table 4: Revenue from Individual and Corporate Income Taxes

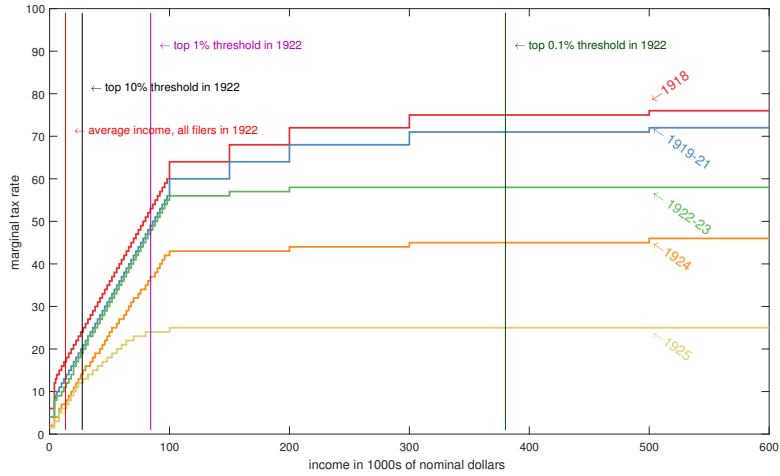


Figure 19: Marginal Income Tax Rates: 1918 to 1925

Source: The tax schedules are from Tax Foundation (2013). The income thresholds are from Piketty and Saez (2003).

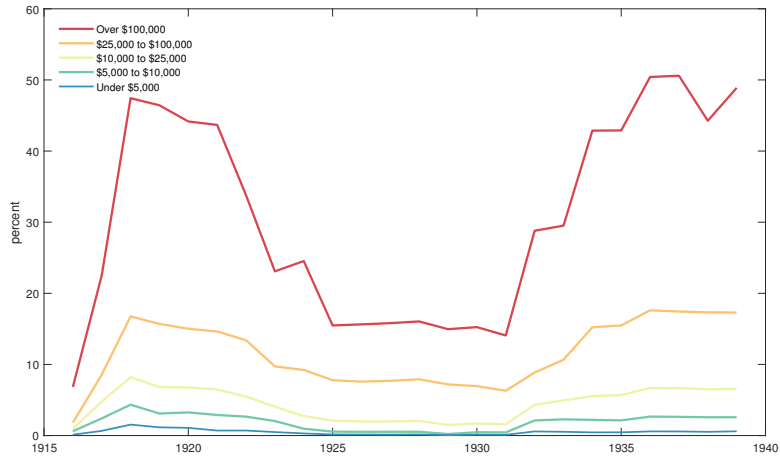


Figure 20: Average Tax Rate Paid by Income Groups

Source: United States Internal Revenue Service (1920-1940)

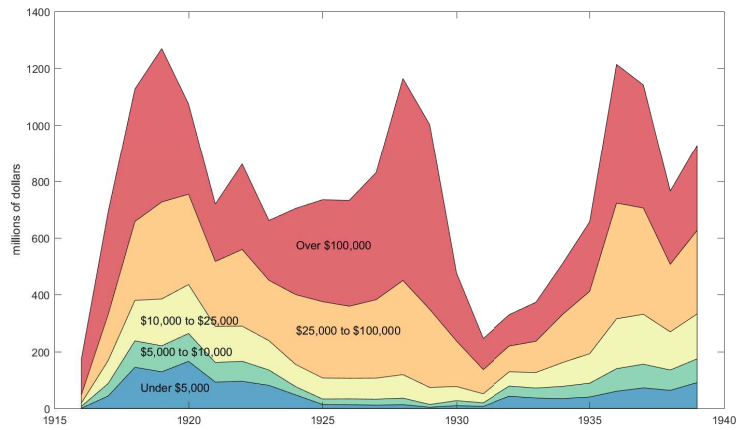


Figure 21: Individual Income Tax Revenues Paid by Income Groups

Source: United States Internal Revenue Service (1920-1940)

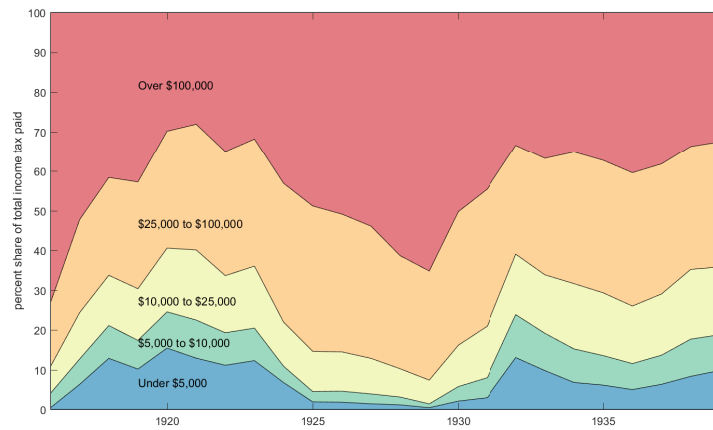


Figure 22: Shares of Income Taxes Paid by Income Groups

Source: United States Internal Revenue Service (1920-1940)

groups, figures 20, 21, and 22 report income tax revenues paid by individuals as percentages of their personal incomes, as totals, and as shares of total income. Between 1918 and 1922, individuals reporting incomes over \$100,000 paid an average of 43.1% of their income in taxes and 35.5% of all income taxes. During the period of the Mellon tax cuts, from 1923 to 1931, individuals reporting incomes over \$100,000 paid only 17.1% of their income in income taxes, but the income tax revenues that they paid rose from \$200 million in 1921 to \$450 million in 1927 and to over \$700 million in 1928. Further, their share of total income taxes paid rose to 50%.

8.1 Income tax rate changes near start of the depression

In 1931, Congress raised income tax rates across the board, returning marginal tax rates on upper income taxpayers to pre-1925 levels. Those rate increases helped raise total revenues from the individual income tax by a factor of four from 1931 to 1936. But despite the sharp increase in taxes on the high income taxpayers, the increased tax burden fell disproportionately on lower income groups; between 1932 and 1939, individuals reporting incomes over \$100,000 paid 42.3% of their income in taxes, but their share of income taxes paid fell back to 36.6%.

9 Post World War I debt management

Figure 3 shows that privately held US Treasury debt peaked in August 1919 at \$24.3 billion. By December 1930 it had fallen to \$14.2 billion, a reduction of over 40% that took place through a steady reduction of nearly \$1 billion per year.⁴² Figure 23 shows that the average maturity of the federal debt rose during the war, but steadily declined afterwards.⁴³

World War I left Congress a debt management challenge. In October 1919, the US Treasury had \$26.2 billion in debts and a repayment schedule that would require it to pay \$4.5 billion when the Victory Loans came due in May 1923 (roughly 5% of GDP), \$4.0 billion in 1928 when the Third Liberty Loan came due, and then relatively little until 1938. Figure 24 shows that the four Liberty and Victory Loans comprised 80% of federal debt in 1920. Thus, financing the war with these medium-term bonds brought “echo effects” when

⁴²In the 11 years after the peak level of debt, the reduction had been only 25%.

⁴³After the Civil War, the Congress *lengthened* the average maturity of the debt. And as chair of the World War Foreign Debt Commission, Secretary Mellon presided over an increase in the average maturity of the foreign debt owed to the US.

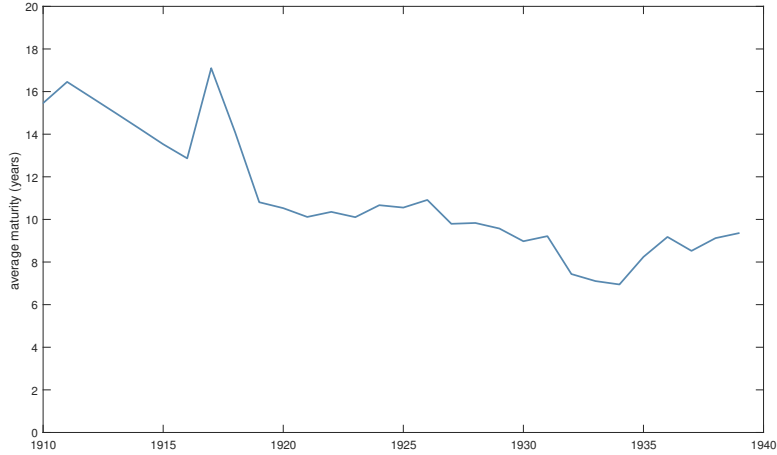


Figure 23: Average Maturity of Privately Held US Treasury Debt

large quantities of debt matured at a small set of dates.⁴⁴

Between 1920 and 1928 Secretary Mellon rescheduled the Victory Liberty Loan and Third Liberty Loan by replacing long term bonds with issues of a set of standardized new short-term securities: term notes and certificates of indebtedness. Mellon also refinanced the Second Liberty Loan. Figure 25, which reports our estimates of Treasury strip sequences $\{s_{t+j}^t\}$ for two dates show both the echo effects and the effects of Mellon’s refinancing operations on continuation sequences of strips.

We credit these refinancing operations to Mellon rather than to Congress because World War I brought a significant change in the assignment of authority over debt management. Before World War I, Congress designed each federal bond and typically specified the purposes for which the proceeds could be spent. That first changed with the Second Liberty Bond Act of 1917, which began a twenty year process during which the Congress delegated virtually complete authority for bond design to the Treasury. And starting with the Second Liberty Bond Act of 1917, Congress allowed the Treasury to issue bonds not tied to specific projects or designated expenditures.⁴⁵

⁴⁴There is an active theoretical literature on optimal maturity structures of government debt. Faraglia et al. (2014), Bhandari et al. (2017a,b), and Aguiar et al. (2016) survey and contribute theories of the optimal maturity structure of government debt in settings that disarm the maturity-structure-is-irrelevant Modigliani-Miller theorems that prevail in complete markets models. Faraglia et al. (2014) and Bhandari et al. (2017a,b) focus on (time-inconsistent) Ramsey plans in incomplete markets settings. Aguiar et al. (2016) studies Markov perfect plans in which debt dilution opportunities induce governments to issue only short term debt along an equilibrium path.

⁴⁵See Garbade (2012) and Hall and Sargent (2015) for details.

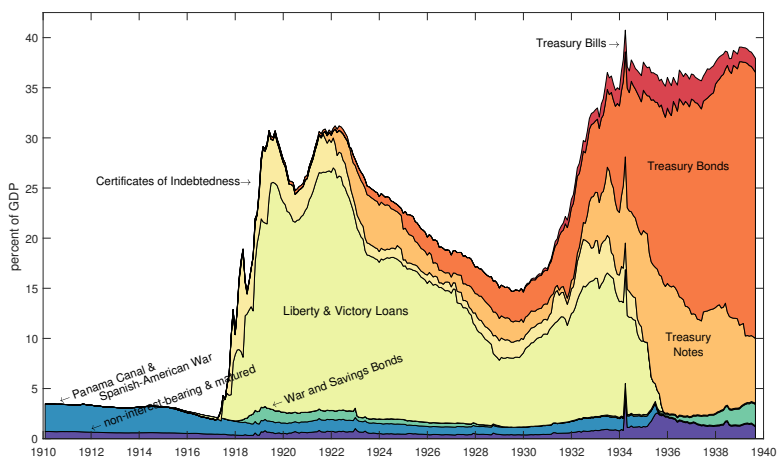


Figure 24: Privately Held US Treasury Debt

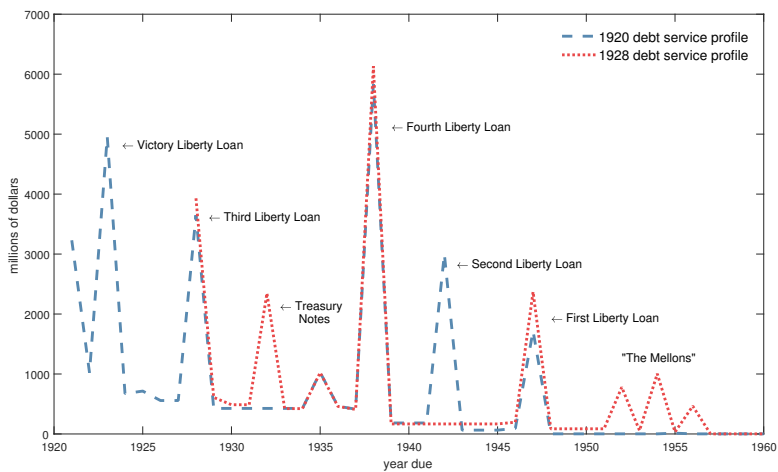


Figure 25: Debt Service Profiles: 1920 and 1928

Note: “The Mellons” were six long term bonds issued between 1922 and 1928. Four were used to refinance the Victory Loans and the Second and Third Liberty Loans.

10 Evolution of Treasury debt to GDP ratio

We use the government's consolidated budget constraint to decompose the evolution of the interest-bearing debt-GDP ratio into contributions made by nominal returns paid on Treasury securities of different maturities, GDP growth, inflation, Federal Reserve purchases and sales of Treasury securities, and net earning on the Treasury's foreign credits.⁴⁶ Using notation presented in Appendix A, let Y_t be real GDP and v_t the real value of a dollar (i.e., the inverse of the price level) at time t . Let B_t be the market value of privately held Treasury debt⁴⁷ and C_t be our estimate of the market value of foreign credits owed to the Treasury. Dividing each side of (21) by nominal GDP, $\frac{Y_t}{v_t}$, and rearranging terms yields:

$$\begin{aligned} \frac{v_t(B_t - C_t)}{Y_t} - \frac{v_{t-1}(B_{t-1} - C_{t-1})}{Y_{t-1}} &= \sum_{j=1}^{n_t} r_{t-1,t}^j \frac{v_{t-1}B_{t-1}^j}{Y_{t-1}} - r_{t-1,t}(\pi_{t-1,t} + g_{t-1,t}) \frac{v_{t-1}B_{t-1}}{Y_{t-1}} \\ &- \sum_{j=1}^{n_t} g_{t-1,t} \frac{v_{t-1}(B_{t-1}^j - C_{t-1})}{Y_{t-1}} - \sum_{j=1}^{n_t} \pi_{t-1,t} \frac{v_{t-1}(B_{t-1}^j - C_{t-1})}{Y_{t-1}} \\ &- \frac{v_t f_t}{Y_t} + \frac{v_t(G_t - T_t)}{Y_t} - \frac{v_t(M_t - M_{t-1})}{Y_t} - \frac{v_t d_t M_{t-1}}{Y_t} \end{aligned} \quad (1)$$

where $r_{t-1,t}^j$ is the nominal return on a j -period zero coupon bond between $t-1$ and t ; $r_{t-1,t}$, denotes the value-weighted net nominal return on Treasury bonds; $g_{t-1,t}$ denotes growth in real GDP; and $\pi_{t-1,t}$ denotes inflation. The primary deficit, $G_t - T_t$ is the difference between total government spending and tax revenues. As described in equation (20) in appendix A, f_t in the net one-period payout to the Treasury from $t-1$ to t on the Treasury's portfolio of foreign credits, C_{t-1} . We let M_t denote the part of high powered money that is secured by collateral in the form of Treasury securities at time t (please see section 5.1 and figures 11 and 12 again), and we let d_t denote the discount rate on loans that the Federal Reserve makes to the public for the purpose of purchasing Treasury securities.

Among the terms in equation (1), we have independent measures of the market value of the Treasury debt, B_t ; the present value of the promised stream of foreign payments, C_t ; government spending and tax collections, $G_t - T_t$; the stock of Federal Reserve credit secured by Treasury securities, M_t ; real GDP, Y_t ; and the inverse of the price level v_t . Appendix A

⁴⁶The calculations here are based on formula (6) of appendix A and are *ex post* in contrast to the *ex ante* calculations of Hilscher et al. (2017).

⁴⁷This means that we have subtracted from the total market values the values of securities held by Federal Reserve Banks and US government agencies.

tells how we computed f_t by taking into account the credits extended to the allies during and immediately after the war and then tracking annual payments and repayments and also by imputing capital losses to prospective payouts as a result of reschedulings, defaults, and repudiations.⁴⁸

10.0.1 Data sources

We used the formula $B_t = \sum_j q_{t+j}^t s_{t+j}^t$ described in section 7 to compute the market value of Treasury debt B_t . Data for promised payments streams $\{s_{t+j}^t\}_j$ at times t are from Hall et al. (2017). We inferred Hicks-Arrow price vectors $\{q_{t+j}^t\}_j$ at each date t from the prices and quantities of individual bonds at each date recorded in Hall et al. (2017) by a method described in appendix B.⁴⁹ We obtained data on government spending and revenues comprising the “primary” or net-of-interest deficit $G_t - T_t$ from issues of the *Annual Report of the Secretary of the Treasury on the State of the Finances*. We constructed estimates of the value of foreign credits C_t by discounting the continuation streams of scheduled payments $\{y_{t+j}\}_j$ country-by-country at each date t using the same zero-coupon yield curves that we used to price the Treasury debt.⁵⁰ We took into account changes in the promised flow of payments arising from renegotiations and repudiations. Notably, we assumed that market participants recognized in 1932 that President Hoover’s moratorium on all reparations and war debt payments would be permanent. Individual country repayment schedules are reported in United States World War Foreign Debt Commission (1927). To compute foreign payouts, f , we collected records of the inter-allied payments from various issues of the *Annual Report of the Secretary of the Treasury*. Our measure of Federal Reserve Credit M_t is the sum of discounted bills secured by government obligations and government securities owned outright by the Federal Reserve.⁵¹ The discount rate d_t is the New York Fed discount rate for loans secured by Liberty bonds and Victory Loan on December 31 of year

⁴⁸The terms in equation (1) leave a residual. This residual will include any mis-measurement of the government’s accounts, approximation errors in our accounting, and changes in the value the government’s other assets (e.g., the gold stock, its vast land holdings, the nation’s railroads, ...) that we omit in our analysis.

⁴⁹Also see footnote 69 of appendix A.

⁵⁰By not adding risk-premia to these rates to account for what were at various times doubtful prospects that these prospective amounts would be paid, we know that we overstate the value of these foreign claims. This fact affects the timing of the “foreign payments” line in figure 27 but not its main features and not its beginning and ending values.

⁵¹These assets are recorded in the Federal Reserve balance sheets reported each month in Board of Governors of the Federal Reserve System (1915-1940).

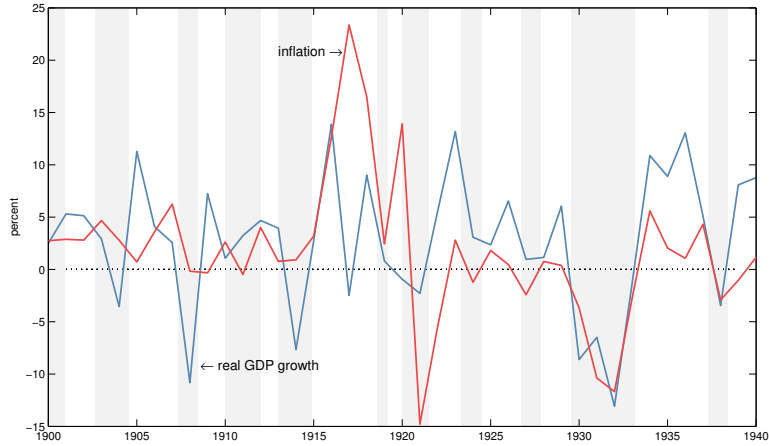


Figure 26: Real GDP Growth and Inflation Measured by the GDP Deflator

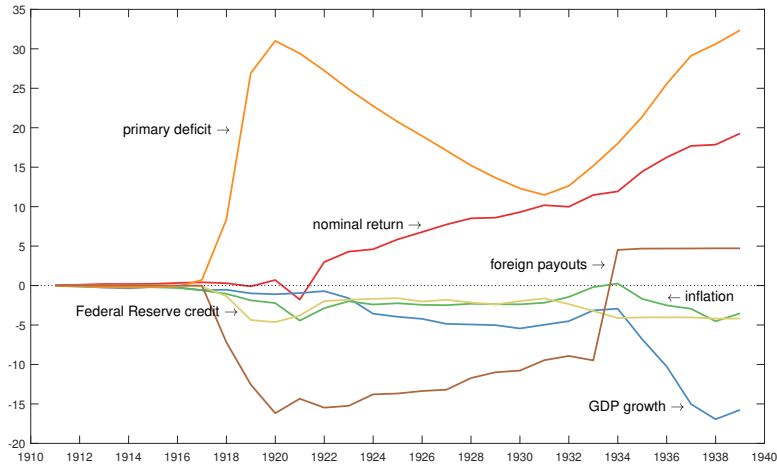


Figure 27: Cumulative Sum of the Components of the Change in the Ratio of the Debt net of Foreign Credits to GDP

t .⁵²

For various values of t and τ , table 5 reports our decompositions of debt-GDP increments $\frac{v_t(B_t - C_t)}{Y_t} - \frac{v_{t-1}(B_{t-1} - C_{t-1})}{Y_{t-1}}$ into components attributable to (i) nominal interest payments, (ii) GDP growth, (iii) inflation, (iv) the primary deficit, (v) net payouts on Treasury owned foreign credits, (vi) Federal Reserve Credit, (vii) payments to the Fed, (viii) the cross term and (ix) the residual. Table 5 further decomposes contributions of nominal interest payments, GDP growth, and inflation by maturity.

Table 5 and figure 27 reveal the following patterns in the ways that the US borrowed,

⁵²See pages 6-7 of Board of Governors of the Federal Reserve System (1922).

repaid, grew, deflated, and inflated, and paid its way toward higher or lower net-debt/GDP ratios:

1. Prior to the US entry into the war, from 1910 to 1916, the net-debt/GDP ratio fell from 3.16 to 2.13. Of this 1.03% drop
 - (a) 0.54 was due to real GDP growth
 - (b) 0.54 was due to inflation
2. During the war period from 1916 to 1918, the increase in the net-debt/GDP ratio from 2.13 to 12.92 was driven by large primary deficits. The extension of foreign credits offset a little less than half of these deficits. Negative nominal returns to bondholders, robust real GDP growth, a burst of inflation, and support from the Federal Reserve also mitigated the impact of these deficits on the net-debt/GDP ratio. The strong GDP growth and high inflation are apparent in figure 26. The negative nominal returns are evident in figures 5 and 6.
3. From 1918 to 1931, primary surpluses more than offset high nominal returns to bond holders. Further the rescheduling of the foreign credits lowered their value so that the contribution of foreign payoffs adds to the net-debt/GDP ratio during this period. Further the decline in the price level during the 1920 helped to push up the net-debt/GDP ratio

From 1931 to 1938 the large increase in the net-debt/GDP ratio is driven by large fiscal deficits and the writing off of the foreign credits following the Hoover debt moratorium in 1931. With a few exceptions, payments on allied war debt to the US stopped in 1933.⁵³

Evidently, most of the impacts of nominal returns, GDP growth, and inflation on the debt to GDP ratio came via their effects on bonds with maturities greater than 5 year. During most of the period under consideration, the average maturity of the debt generally exceeded 8 years (see figure 23) since most the debt consisted of long term bonds like the Liberty Loans. See figures 24 and 25. Over the entire period from 1910 to 1938, contributions to changes in the debt to GDP ratio coming from nominal returns to bondholders were mostly offset by GDP growth and inflation.

⁵³The prior year representatives from Great Britain, Germany and France met in Lausanne, Switzerland to formulate a plan reducing both the German reparation payments and the Allied war debts to the US. The US Senate rejected that debt reduction plan in December 1932, so the WWI foreign credits and the accumulated interest in arrears remain on the US Treasury's books today.

Period	1910- 1913	1913- 1916	1916- 1918	1918- 1923	1923- 1931	1931- 1938	1910- 1938
<u>Debt/GDP[†]</u>							
start	3.16	2.58	2.13	12.92	12.70	10.35	3.16
end	2.58	2.13	12.92	12.70	10.35	37.65	37.65
change	-0.58	-0.45	10.80	-0.23	-2.34	27.30	34.50
<u>Contributions</u>							
Nominal Return [‡]							
all maturities	0.13	0.22	-0.51	4.70	5.38	9.29	19.21
$j \leq 1$	0.01	0.01	0.02	0.63	0.43	0.48	1.60
$2 \leq j \leq 4$	0.02	0.03	-0.01	0.81	1.02	2.14	4.01
$j \geq 5$	0.10	0.18	-0.53	3.26	3.92	6.67	13.61
Real GDP Growth [‡]							
all maturities net fc	-0.32	-0.22	-0.41	-2.58	-0.95	-11.40	-15.88
$j \leq 1$	-0.01	-0.01	-0.14	-0.66	-0.23	-1.76	-2.81
$2 \leq j \leq 4$	-0.02	-0.04	-0.20	-1.26	-0.65	-3.11	-5.27
$j \geq 5$	-0.30	-0.18	-0.75	-3.41	-1.06	-5.03	-10.72
foreign credits	–	–	0.67	2.74	0.99	-1.50	2.91
Inflation [‡]							
all maturities net fc	-0.12	-0.42	-1.26	-0.53	0.96	-2.13	-3.51
$j \leq 1$	-0.00	-0.01	-0.27	-0.11	0.32	-0.01	-0.08
$2 \leq j \leq 4$	-0.01	-0.05	-0.42	-0.07	0.36	-0.57	-0.77
$j \geq 5$	-0.11	-0.36	-1.81	-0.54	1.60	0.03	-1.18
foreign credits	–	–	1.24	0.19	-1.32	-1.58	-1.48
Primary Deficit	-0.19	0.97	26.22	-4.17	-10.13	19.73	32.42
Foreign Payouts	–	–	-12.55	-1.24	4.87	13.64	4.72
Federal Reserve Credit	–	-0.12	-4.25	2.69	-0.66	-1.84	-4.18
Payments to Fed	–	–	-0.04	-0.68	-0.37	-0.33	-1.43
Cross Term	0.01	-0.03	1.87	0.48	0.09	0.08	2.49
Residual	-0.06	-0.85	1.75	1.09	-1.53	-0.13	0.27

Table 5: Contributions to Changes in the Debt-net-Foreign-Credits to GDP Ratio

All contributions are shares of GDP.

[†] Treasury debt is its end-of-year market value net of foreign credits, holdings of the Federal Reserve and government accounts, and the balance in the Treasury.

[‡] Treasury debt is decomposed into three groups: claims maturing within one year, $j \leq 1$; claims maturing between two and four years, $2 \leq j \leq 4$; claims maturing in five years or more, $j \geq 5$.

11 Epilogue: more complications

Section 5 described how in 1933 President Roosevelt followed Irving Fisher's advice by adopting policies designed to redistribute wealth from creditors to debtors by increasing the price level. The Roosevelt administration's efforts in that direction were dwarfed by fiscal-monetary policies that more than a decade earlier had created the German hyperinflation of 1921-1923.⁵⁴ Germany had financed only a small fraction of WWI by borrowing from foreigners; instead, a substantial fraction was financed by Germans who purchased German government securities. By ultimately increasing the price level in November 1923 to approximately twelve orders of magnitude of the 1913 price level (i.e., 10^{12} in scientific notation), the German fiscal-monetary authorities defaulted on virtually all of its domestic debt.⁵⁵

But the 1919 Versailles Treaty imposed foreign debts on Germany in the form of uncertain and large reparations payments due in gold to the victors of the War, especially France and the UK. The German hyperinflation of 1922-23 was an outcome of efforts by reparations creditors, especially France, to force Germany to tax its citizens and suppress its government expenditures to make enough "fiscal space" for Germany to service its reparations obligations. France threatened to occupy the Ruhr valley and seize factories and mines unless Germany paid reparations payments due in 1922. Germany did not pay. In January 1923, France carried out its threat by invading the Ruhr and then operating Ruhr factories and mines. The German government responded with a "passive resistance" in which it printed German marks to pay German workers not to work for the French. By the fall of 1923, printing presses were financing over 95% of the Weimar Republic's federal expenditures.

The German hyperinflation ended with a bargain among German government authorities, German reparations creditors, the Reparations commission, and US bankers and government officials that rescheduled German reparations obligations, rearranged German monetary-fiscal institutions and policies in ways designed to protect central bank independence, and brokered an international loan to the German federal government. The Dawes Plan organized a substantial 1924 Reparation Loan to the Reich.⁵⁶ Under the terms of

⁵⁴For descriptions and accounts of the German hyperinflation, see Sargent (1982) and Taylor (2013). See Schuker (1988) for a description of President Roosevelt's ambivalent attitude about protecting the interests of American creditors in Germany.

⁵⁵A concomitant effect was a huge redistribution from German domestic private creditors to German domestic private debtors.

⁵⁶In 1919 and 1920, there had been substantial transfers to Germany by residents of the UK, US, and

the Dawes loan, offered by a consortium of banks led by J.P. Morgan & Co, the German Republic borrowed \$200 million from private lenders for 25 years at 7%; \$110,000,000 or roughly half of the total was sold to US investors. Along with this loan, the Dawes Plan rescheduled reparation payments in ways that reduced them in the short term. The plan placed the Reichsbank under international supervision and German fiscal affairs under the supervision of an Agent General for Reparations of the Allied Reparations Commission.

For five or six years, the Dawes plan succeeded in easing Germany's financial distress and converting Germany into an attractive location for foreign investment, particularly from American savers. From 1924 to 1930, Germany became the largest European recipient of American private lending; and the US became Germany's largest creditor, with the US holding over 40% of all German external loans.⁵⁷ From 1924 to 1930 American investment banks publicly offered 135 dollar denominated bonds issued by German government entities and dozens of privately-offered loans for an aggregate par value exceeding \$1.2 billion. Figure 28 plots as a blue line the implied quantity outstanding for the 148 of these bonds listed in Kuczynski (1927, 1932). By June 1931, US banks held \$500 million in short-term loans owed by Germans, comprising half of all US bank lending to Europe.⁵⁸ Additional short-term credits, primarily in the form of commercial credits by American firms, brought the total quantity of German debt to US private creditors to over \$2,000 million by 1931.

US lenders extended loans to both German public and private entities. For 135 publicly offered and 13 privately offered loans listed in Kuczynski (1927, 1932), table 6 divides German borrowers into eight sectors and reports the distribution of loans among them. The only loans to the German Republic (i.e., the federal government) were the Dawes Loan of 1924 and the Young Loan of 1930. Most foreign lending to Germany instead went to Germany's states, provinces, cities, and industrial firms. Reparations payments were the responsibility of the German Republic. The German Republic encouraged commercial borrowing: after all, if default loomed, the Weimar government could argue that non-reparations public and commercial debts should be paid before reparations. By binding US *private* creditors to the prosperity of German economy, German officials hoped to align American interests with Germany's and thereby drive a wedge between the interests of US private creditors and reparations creditors. It might not have been polite to say things like

other countries speculating on a recovery of what they thought of the German mark. John Maynard Keynes was among them. Some estimates of the funds transferred to Germany by the failures of those investments are as large as \$3.5 billion. See Taylor (2013, ch. 14, Boom).

⁵⁷See Table 2 Klug (1993, p. 6).

⁵⁸See Board of Governors of the Federal Reserve System (1943, p. 585).

Borrower	Number of Loans	Dollar Amount Offered in US	Percent of Total
German Republic	2	\$208,250,000	16
States	16	144,375,000	11
Provinces, Counties and Municipalities	19	101,420,000	8
Public Utilities	40	257,548,000	20
Industrial Corporations	35	246,968,500	19
Credit and Saving Institutions	22	263,500,000	20
Other	10	64,515,000	5
Religious and Welfare Organization	4	13,000,000	1
Total	148	\$1,299,576,500	

Table 6: Distribution by Sector of German Bonds Issued in the United States: 1924-1932

This table reports the par value of the loans listed by Kuczynski (1927, 1932) decomposed by sector. Since some of the principal was repaid, this does not represent the total outstanding.

this in public, but German Foreign Minister Gustav Stresemann did. In 1925, he remarked: “One must simply have enough debts; one must have so many debts that, if the debtor collapses, the creditor sees his own existence jeopardized.”⁵⁹ Of course, that would pit the interests of American private creditors against those of owners of US Treasury debt who had expected US Treasury’s debt to be backed by its holdings of foreign credits to former WWI allies, which in turn were ultimately backed by German reparations payments.

American isolationists and populists asserted that American advocates of “cancellationist” measures wanted to protect the interests of international bankers and European reparations creditors at the expense of American taxpayers. The *New York American*, criticized “the campaign of international bankers to squeeze, cajole, wheedle Uncle Sam into cancelling the thousands of millions of dollars owed the United States Treasury by European nations” and warned its readers that “international bankers, to protect their own private investments overseas, want the U.S. to cancel the foreign war debts.”⁶⁰

Were those accusations justified? Not entirely. First, the \$2 billion that German borrowers owed US investors was a small fraction of the \$12 billion the Allies owed to the US Treasury. Second, American creditors to Germany were also US taxpayers. We have incomplete information about the identities of American creditors, but we do know that

⁵⁹See Tooze (2014, p. 465).

⁶⁰September 15, 1932. The *New York American* was a Hearst newspaper with masthead slogans “America First” and “An American paper for the American people”.

most German bonds sold to Americans were issued in small denominations. For example, the Dawes Reparation Loan – officially named the German External Loan, 7% Bonds of October 1924 – consisted of bonds in denominations of \$1000, \$500, and \$100, indicating that these bonds were sold to small investors. Using records from 24 American Bond Houses, J.P. Morgan & Co. partner Dwight W. Morrow (1927) estimated that 91% of buyers of Dawes loan bonds purchased less than \$5,000 worth; and that these small buyers purchased 53.6% of the total offering. Further, in the 1950s, the commission that settled claims of American owners of Germany dollar-denominated bonds processed 40,620 separate claims.⁶¹ This evidence suggests that many retail purchasers of these bonds were individuals rather than banks and other financial firms.

11.0.1 Credits recognized to be gifts

During the late 1920s, the Federal Reserve raised interest rates in attempts to rein in sharp rises in US stock prices. Higher US interest rates increased the attractiveness of investing in US bonds while also making it more costly for heavily indebted countries like Germany to service their debts to the US. So US foreign lending declined sharply soon thereafter and international capital flows slowed to a trickle. Germany and several South American countries defaulted. There occurred a global financial crisis.

On June 20, 1931, President Hoover proposed a temporary debt moratorium that applied to war credits as well as reparations, but it did not go into effect until the winter when Congress approved it. In December 1932, when the temporary moratorium expired, reparations stopped. Germany stopped making payments on the Dawes and Young loans, though these bonds continued to be traded on US markets well into World War II, albeit at deep discounts.^{62,63} See figure 29. France repudiated its WWI credits due to the US, but the UK did not, so negotiations with the UK continued although UK payments to the US had stopped. The US continued to seek compensation for its World War I credits to allies,

⁶¹See Hartman and Skaupy (1957, p. 448).

⁶²Meanwhile, through a clever German government program designed by Reichsbank President Hjalmar Horace Greeley Schacht, German firms purchased roughly 1/3 of Germany's dollar-denominated debts at heavily discounted prices between 1932 and 1940. These transactions are recorded in German Registration Office for Foreign Debt (1932-1940) and discussed in Klug (1993) and Tooze (2006, ch. 3).

⁶³After World War II, Germany resumed payments on these bonds. At the London Debt Conference of 1953, principals of the American tranches of the Dawes and Young loans were refinanced at 5.5% and 5.0%, respectively, with their maturity dates being extended to 1969 and 1980, respectively. Interest in arrears was refinanced into 20 year bonds paying 3%. See United Nations (1959, Annex I, p. 96). Holders of outstanding German commercial and municipal debts covered by the agreement had their claims written down to 38% of their 1931 level. See Klug (1993, p. 54) and Guinnane (2004).

but only Finland continued to make its full scheduled payments after the moratorium.⁶⁴

After all this, between 1918 and 1940, in exchange for the over \$12 billion in loans, credits, and accrued interest on the US Treasury's books, the Treasury received \$2.86 billion in remittances (\$2.11 billion labeled interest and \$777 million labeled principal) from the Allies. The U.K. made \$2.19 billion in payments (\$464 million in principal and \$1.72 billion in interest) on the \$4.7 billion the UK government owed the US Treasury, while France paid only \$486 million (\$226 million in principal and \$260 million in interest) on the \$4.2 billion that the government of France owed the US Treasury.

⁶⁴In the second half of 1933, Czechoslovakia, Great Britain, Greece, Italy, Latvia and Lithuania made partial payments.

With the exception of a postponement in 1941 and 1942, Finland continued to meet its scheduled obligations – even in 1943 and 1944 when it was allied with Germany. After 1949, the US Treasury dedicated Finland's debt payments to finance educational exchanges between the US and Finland. Finland made its final payment in 1977.

Greece made partial payments on its debt until 1942. Then in 1964 Greece agreed to an 80 year repayment schedule at 2 percent interest. Greece remains current on this loan. Its last installment is due on November 17, 2048.

Hungary also made partial payments during the 1930s and early 1940s. In 1977, it paid the US Treasury over \$4 million to become current on its obligations. Hungary repaid its debt in full in the early 1980s. The final payments were used to finance cultural exchanges between the two countries.

Together the debts of Finland, Greece, and Hungary were less than 4/10 of 1 percent of the total indebtedness of foreign governments to the United States arising from World War I.

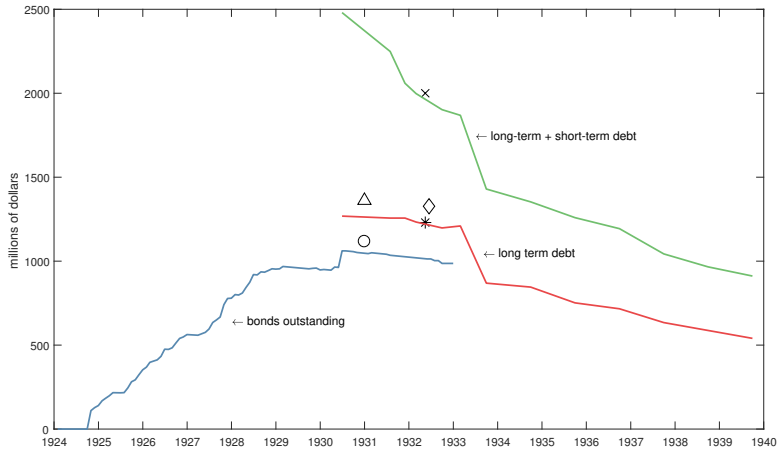


Figure 28: Private US Lending to Germany

The blue line, labeled “bonds outstanding,” reports the par value outstanding for 135 publicly-placed and 13 privately-placed dollar-denominated bonds issued in the US and listed in Kuczynski (1927, 1932). For this set of bonds, the quantity outstanding on December 31, 1930 is \$1,047 million. However, data from other sources suggest that we have an incomplete list of privately placed bonds; further, we are missing secondary market purchases of German bonds placed in foreign countries.

The series “long-term debt” (red line) and “long-term+short term” (green line) are computed from Table 5: *German External Debt, Excluding Reparations* of Klug (1993). We assume that US shares of German external short-term debt and long-term debt remain fixed at 31.8% and 49.3%, respectively. We convert RM into dollars at the rate 0.2382 \$/RM.

The ○ reports quantity outstanding of long-term portfolio investments (\$1,117 million) in December 1930. The △ reports the sum of long-term portfolio and direct investments outstanding (\$1,361 million) in December 1930. Both figures are from Table 1 of Klug (1993). Also see Dickens (1931, Table 4); Dickens reports that for December 1930 the quantity outstanding of long-term portfolio investments is \$1,177 million, and the sum of long-term portfolio and direct investments outstanding is \$1,421 million.

The * reports US long-term credits outstanding (\$1,230 million) in May 1932. The × reports the sum of long-term and short-term credits outstanding (\$2,000 million) in May 1932. Both of these figures are reported in Table 2 of Klug (1993).

The ◇ is the quantity outstanding of German bonds issued in the United States, June 1932 (\$1,327 million) reported in Table 2 of Klug (1993).

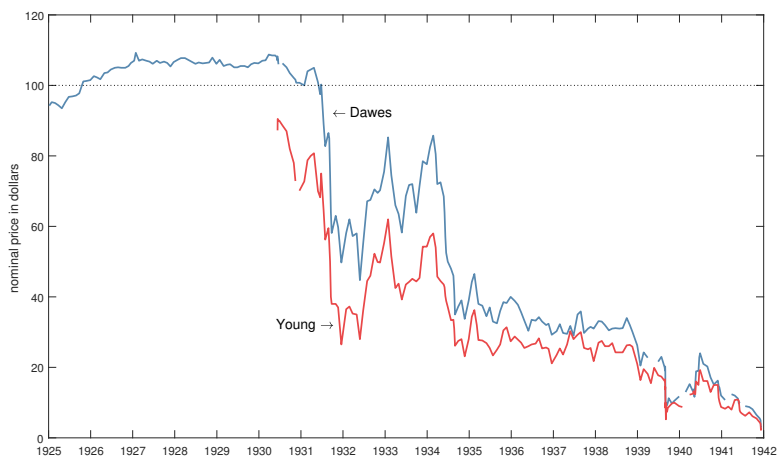


Figure 29: US Prices of the Dawes and Young Loans

A Accounting Framework

This appendix compares accounting systems used by the US Treasury and macroeconomic theory.

A.1 Government budget constraint

We want to represent the government budget constraint as it appears in macroeconomic models. Let $B_{t-1} = \sum_{j=1}^n B_{t-1}^j$ be the total nominal value of interest bearing government debt at $t-1$, where B_{t-1}^j is the nominal value of zero coupon bonds of maturity j at $t-1$. Let $r_{t-1,t}^j$ be the net *nominal* return between $t-1$ and t on nominal zero-coupon bonds of maturity j . The government budget constraint at time t is

$$B_t = r_{t-1,t} B_{t-1} + B_{t-1} + (G_t - T_t) - (M_t - M_{t-1}) \quad (2)$$

or

$$B_t = \sum_{j=1}^n r_{t-1,t}^j B_{t-1}^j + B_{t-1} + (G_t - T_t) - (M_t - M_{t-1}), \quad (3)$$

where G_t is the dollar value of government purchases, T_t is the dollar value of taxes net of transfers, M_t is the stock of non-interest bearing government debt called base money, and the equality

$$\sum_{j=1}^n r_{t-1,t}^j B_{t-1}^j = r_{t-1,t} \sum_{j=1}^n B_{t-1}^j \quad (4)$$

implicitly defines the value-weighted net nominal return $r_{t-1,t}$ on interest-bearing nominal government bonds from $t-1$ to t . In section A.5 we modify (2) to account for foreign credits.

Let Y_t be real GDP at t , p_t be the price level, $v_t = p_t^{-1}$ be the real value of a dollar, and $v_t B_t$ be the real value of interest bearing government debt to the public. The government budget constraint (2) or (3) and simple algebra tell how a net nominal return $r_{t-1,t}$, a net inflation rate $\pi_{t-1,t}$, a net growth rate in real GDP $g_{t-1,t}$, a net rate of increase in base money $\mu_{t-1,t}$, and a real primary deficit $\text{def}_t = v_t(G_t - T_t)$ contribute to the evolution of the government interest bearing debt-GDP ratio:

$$\frac{v_t B_t}{Y_t} = (r_{t-1,t} - \pi_{t-1,t} - g_{t-1,t}) \frac{v_{t-1} B_{t-1}}{Y_{t-1}} + \frac{\text{def}_t}{Y_t} + \frac{v_{t-1} B_{t-1}}{Y_{t-1}} - (\mu_{t-1,t} - \pi_{t-1,t} - g_{t-1,t}) \frac{M_{t-1}}{Y_{t-1} p_{t-1}}. \quad (5)$$

To bring out consequences of interest rate risk and the maturity structure of the debt for the evolution of the debt-GDP ratio, we refine equation (5) to recognize that the government pays different nominal one-period returns on the dollar denominated IOUs of different maturities that comprise B_t :

$$\begin{aligned} \frac{v_t B_t}{Y_t} &= \sum_{j=1}^n r_{t-1,t}^j \frac{v_{t-1} B_{t-1}^j}{Y_{t-1}} - (\pi_{t-1,t} + g_{t-1,t}) \frac{v_{t-1} B_{t-1}}{Y_{t-1}} + \frac{v_{t-1} B_{t-1}}{Y_{t-1}} \\ &+ \frac{\text{def}_t}{Y_t} - (\mu_{t-1,t} - \pi_{t-1,t} - g_{t-1,t}) \frac{M_{t-1}}{Y_{t-1} p_{t-1}} \end{aligned} \quad (6)$$

Equation (6) distinguishes contributions to the growth of the debt-GDP ratio that depend on debt maturity j from those that don't: $\pi_{t-1,t}$ and $g_{t-1,t}$ don't depend on j and operate on the *total* real value of debt last period; but the nominal returns $r_{t-1,t}^j$ depend on maturity j and operate on the real values of the corresponding maturity j components B_{t-1}^j .

A.2 US government accounts

The Treasury measures government debt and interest payments differently than do macroeconomists. The official accounts measure government debt by the total par value of outstanding promises, while the macroeconomist's budget constraint is cast in terms of market values.

To understand how the Treasury's measure of government debt is related to the market value of debt, we bring in information about bonds' coupons, principals or par values, and prices of (presumably risk-free) promises to future dollars. In the tradition of macro finance, we use Hicks-Arrow prices of future-dated claims. Let time be discrete so that $t \in \{0, \pm 1, \pm 2, \dots\}$. Let the market price q_{t+j}^t be the number of dollars at time t that buys a risk-free claim to a dollar at time $t + j$. The superscript t denotes the date at which the price is quoted, while the subscript $t + j$ refers to the date at which a promise to pay is to be fulfilled. At any date t , let there be a list of market prices $\{q_{t+j}^t\}_{j=0}^{n_t}$, where n_t is the maximum horizon over which the government has promised payments.⁶⁵ (Appendix B describes how we infer the Hicks-Arrow prices from a collection of bond prices and associated promised payment streams.) We set $q_t^t = 1$ to express that a dollar today costs one dollar today.⁶⁶ For $j \geq 1$, the price q_{t+j}^t is related to the yield to maturity ρ_{jt} for

⁶⁵When the government has issued perpetual *consols*, $n_t = \infty$.

⁶⁶We also assume that $q_{t-j}^t = 1$ for $j \geq 1$ to express that a claim to a dollar does not expire at its maturity date.

j -period risk-free zero-coupon bonds by

$$q_{t+j}^t = \frac{1}{(1 + \rho_{jt})^j}.$$

The gross nominal return on a j -period zero coupon bond from time t to $t + 1$ is

$$\frac{q_{t+j-1}^{t+1}}{q_{t+j}^t} = (1 + r_{t,t+1}^j)$$

where $r_{t,t+1}^j$ is the net nominal return. The net return equals the yield only for $j = 1$.

At time t the government promises to pay s_{t+j}^t dollars at times $t + j$, $j = 1, 2, \dots, n_t$. We interpret s_t^t as currency or base money.⁶⁷ For $j \geq 1$, promised payments consist of coupons c_{t+j}^t and terminal or principal payments (also known as par values) b_{t+j}^t :

$$s_{t+j}^t \equiv c_{t+j}^t + b_{t+j}^t. \quad (7)$$

These are sums over all outstanding bonds of coupon and principal components associated with each bond. The market value of interest bearing government debt at time t is

$$\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t, \quad (8)$$

which states that the total value of government debt is the sum of a collection of prices times quantities.⁶⁸

The Treasury defines government debt at time t as the sum of par values of outstanding debt

$$\sum_{j=1}^{n_t} b_{t+j}^t, \quad (10)$$

⁶⁷We assume that $\left(\frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}}\right) = 1$ for $j = 0$ so that $r_{t-1,t}^0 = 0$.

⁶⁸In situations in which the payout stream is uncertain, a possible pricing theory is instead

$$\sum_{j=1}^{n_t} q_{t+j}^t \tilde{s}_{t+j}^t \tilde{\pi}_{t+j}^t, \quad (9)$$

where $\{\tilde{s}_{t+j}^t\}$ is a promised payout stream and $\{\tilde{\pi}_{t+j}^t\}$ is a sequence of fractions of promised payouts that a representative risk-neutral investor expects will actually be paid.

which differs from the market value of government debt

$$\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t = \sum_{j=1}^{n_t} q_{t+j}^t (c_{t+j}^t + b_{t+j}^t)$$

for two reasons:

- It neglects promises to pay coupons

$$\sum_{j=1}^{n_t} c_{t+j}^t;$$

and

- The book value given by equation (10) fails to multiply future principal payments of b_{t+j}^t by multiplying them by market prices q_{t+j}^t .

The first omission causes the official Treasury concept (10) to understate the market value of debt, while the second omission makes it overstate it. This means that the official measure of government debt $\sum_{j=1}^{n_t} b_{t+j}^t$ can either exceed or fall short of the market value $\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t$.

We can represent the macroeconomist's budget constraint (2) or (3), as⁶⁹

$$\sum_{j=0}^{n_t} q_{t+j}^t s_{t+j}^t = \sum_{j=0}^{n_{t-1}} q_{t+j-1}^t s_{t+j-1}^{t-1} + (G_t - T_t), \quad (11)$$

The left side of (11) is the value of government debt in period t , while the first term on the right side is the value of payments that the government had promised at time $t - 1$ evaluated at time t prices q_{t+j}^t . Equation (11) states that the value of the government debt changes between times t and $t + 1$ because

1. Prices of time $t + j$ promises s_{t+j}^{t-1} to time $t + j$ dollars change from q_{t+j}^{t-1} to q_{t+j}^t .
2. The government pays off or reschedules some components of its promised payments, contributing to deviations of s_{t+j}^t from s_{t+j}^{t-1} for some j 's.
3. The government runs a net-of-interest nominal deficit or surplus at date t .

⁶⁹To recognize that budget constraint (12) is equivalent with (6), use the definitions and approximation $q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} = B_{t-1}^j$, $B_{t-1} = \sum_{j=1}^n B_{t-1}^j$, $M_t = s_t^t$, $\left(\frac{v_t}{v_{t-1}} \frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}} \frac{Y_{t-1}}{Y_t} - 1 \right) \approx r_{t-1,t}^j - \pi_{t-1,t} - g_{t-1,t}$.

It is enlightening to rewrite equation (11) as

$$\begin{aligned} \sum_{j=0}^{n_t} q_{t+j}^t s_{t+j}^t &= \sum_{j=0}^{n_{t-1}} \left(\frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}} \right) q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + (G_t - T_t) \\ &= \sum_{j=0}^{n_{t-1}} q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + \sum_{j=1}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + (G_t - T_t). \end{aligned} \quad (12)$$

The second term on the right side of the second line of equation (12) measures time t nominal net returns on the time $t - 1$ nominal government debt:

$$\sum_{j=1}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} \quad (13)$$

So equation (12) expresses the nominal value of government debt in period t as the sum of the value of government debt yesterday, net nominal returns on last period's debt, and the government deficit $G_t - T_t$.

A.3 Interest reported by the Treasury

The net nominal interest payments defined in expression (13) are not what the US Treasury reports. Instead, it reports a different notion of interest, namely:

1. Before 1929:

$$c_t^{t-1}$$

2. After 1929:

$$c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1} \quad (14)$$

where $b_{1,t}^{t-1}$ is the par value of pure discount one-period treasury bills issued at $t - 1$. So what the Treasury reports as interest consists of coupons on longer maturity bonds plus the net yield on one-period zero-coupon Treasury bills (these have existed only since 1929).

To relate the government's post 1929 definition of nominal interest payments to the theoretical concepts in a standard macroeconomic formulation like (11), we first introduce the decomposition $b_t^{t-1} = b_{1,t}^{t-1} + b_{-1,t}^{t-1}$ where $b_{-1,t}^{t-1}$ is the par (or principal) values of bonds with initial maturities exceeding one period that fall due at time t . (Here we follow game theorists in using the subscript -1 to mean "not 1", which in the present context means

“not a treasury bill.”) We use this decomposition to accommodate how the US Treasury accounts for interest on Treasury bills. Then note that $q_t^t = 1$ and rewrite the standard macroeconomic government budget constraint (12) as

$$\begin{aligned} \sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t &= c_t^{t-1} + b_t^{t-1} + \sum_{j=2}^{n_t-1} \left(\frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}} \right) q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + (G_t - T_t) \\ &= c_t^{t-1} + b_{1,t}^{t-1} + b_{-1,t}^{t-1} + \sum_{j=2}^{n_t-1} (1 + r_{t-1,t}^j) q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + (G_t - T_t). \end{aligned} \quad (15)$$

The second and third terms on the second line of the right side of equation (15) decompose principal payments into those attributable to maturing one-period pure discount bonds $b_{1,t}^{t-1}$ and to maturing longer term bonds $b_{-1,t}^{t-1}$. Rewrite the right side of equation (15) as $\sum_{j=2}^{n_t-1} q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + (G_t - T_t)$ plus

$$\underbrace{c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}}_{\text{official interest}} + \underbrace{(1 - r_{t-1,t}^1) b_{1,t}^{t-1} + b_{-1,t}^{t-1}}_{\text{cash to pay principal due}} + \underbrace{\sum_{j=2}^{n_t-1} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1}}_{\text{capital gains}}$$

The first term is what the Treasury records as interest payments. The second term constitutes repayments of principal at time t . We can interpret the sum of the first and second terms of the above sum as expressing cash that the Treasury must have at time t in order to “service” its debt, meaning to pay coupons plus principal due at time t .⁷⁰ The third term measures capital gains or losses on longer term government debt held from $t-1$ to t . These capital gains are included in the macroeconomic concept of interest on the government debt but are neglected in the official concept.

A.4 Pricing risky payouts

For the purpose of interpreting data on earnings from foreign credits owed the Treasury, we extend the above asset pricing formulas in the tradition of Arrow and Debreu to handle risk.⁷¹ Let $s_t \in \mathbf{S}$ be the time t value of a state variable governed by a finite state Markov chain. Let $s^t = [s_0, s_1, \dots, s_t]$ be a history of the state. We suppose that the government

⁷⁰Tables 1.5 and 1.7 of IMF (2014) report what the IMF calls Gross Financing Needs of all member countries for the coming years. This is the sum of our first and third terms.

⁷¹See Ljungqvist and Sargent (2018, ch. 8) for background and notation close to what we use here.

owns risky foreign credits paying a history-contingent payout stream $y_t(s^t)$, $t = 0, 1, \dots$ of time t dollars. We suppose that the price of one dollar at time $t + j$ at history s^{t+j} in terms of time t , Markov state s_t dollars is $a_{t+j}^t(s^{t+j}|s_t)$ (here a is for Arrow). If markets were to reopen at each date t , prices at different dates would be related by

$$a_{t+j}^t(s^{t+j}|s_t) = a_{t+1}^t(s_{t+1}|s_t)a_{t+j}^{t+1}(s^{t+j}|s_{t+1}), \quad j = 2, 3, \dots \quad (16)$$

Prices q_{t+j}^t of risk-free claims to dollars are related to prices of history-contingent claims by

$$q_{t+j}^t \equiv q_{t+j}^t(s_t) = \sum_{s^{t+j}|s_t} a_{t+j}^t(s^{t+j}|s_t), \quad (17)$$

where the sum over $s^{t+j}|s_t$ denotes all histories s^{t+j} passing through Markov state s_t . Given prices a , we can compute prices of risk-free dollars recursively from

$$\begin{aligned} q_{t+1}^t &= \sum_{s_{t+1}} a_{t+1}^t(s_{t+1}|s_t) \\ q_{t+j}^t &= \sum_{s_{t+1}} q_{t+j}^{t+1}(s_{t+1})a_{t+1}^t(s_{t+1}|s_t), \quad j = 2, 3, \dots \end{aligned} \quad (18)$$

The second equation of (18) comes from the no-arbitrage condition that states that the price at time t of a sure dollar at time $t + j$ equals the cost of buying at time t all one-period ahead s_{t+1} -contingent claims on a dollar at time $t + 1$, and then buying at time $t + 1$ in the realized Markov state s_{t+1} a risk-free claim on a dollar at time $t + j$.

A.5 Foreign credits

The value of a history-contingent stream of payments $\{y_t(s^t)\}$ at time t is

$$C_t = \sum_{j \geq 1} \sum_{s^{t+j}|s_t} a_{t+j}^t(s^{t+j}|s_t)y_{t+j}(s^{t+j}), \quad (19)$$

where $y_{t+j}(s^{t+j})$ implicitly depends on the history of foreign credits extended at times t and earlier in a way that we now describe.

Let f_t be the one-period net payout from the portfolio of credits C_{t-1} from $t - 1$ to t , including the time t coupon or repayment and capital gains or losses from revaluations and

reschedulings:

$$f_t = y_t(s^t) + \sum_{j \geq 1} \sum_{s^{t+j}|s_t} a_{t+j}^t(s^{t+j}|s_t) y_{t+j}^t(s^{t+j}) - \sum_{j \geq 1} \sum_{s^{t-1+j}|s_{t-1}} a_{t+j}^{t-1}(s^{t-1+j}|s_{t-1}) y_{t-1+j}^{t-1}(s^{t-1+j}). \quad (20)$$

The first term in the formula for f_t is the time t payoff at history s^t . The difference between the second and third terms is the capital gain or loss on C_{t-1} ; it is the change in the continuation value of the credit stream $\{y_{t+j}(s^{t+j})\}$ due to changes in continuation history contingent prices and the change in the continuation stream itself due to the realization of s_t . We can use parts of the state s_t to represent situations in which there occur restructurings or repudiations that reduce continuation streams. When the foreign lending program starts, the second term is equal to the initial size of the credits and the third term is zero.

When the Treasury owns foreign credits, we modify (2) to be

$$(B_t - C_t) = r_{t-1,t} B_{t-1} - f_t + (B_{t-1} - C_{t-1}) + (G_t - T_t) - (M_t - M_{t-1}). \quad (21)$$

Equation (21) indicates how lower income from government foreign credits increases the amount that the Treasury must finance.

In the government accounts, the extension of foreign credits is included in government spending. Thus, if in period t , the government borrows \$1 and lends it to a foreign government, G_t , f_t , B_t , and C_t each increase by \$1.

B Inferring Hicks-Arrow prices

In the notation of appendix A, suppose that at time t we observe prices on M government bonds. Let p_i^t be the price of bond i and let $[s_{i,t+1}^t \ s_{i,t+2}^t \ \cdots \ s_{i,t+J}^t]$ be the payments stream associated with that bond. Then the time t bond price is related to the Hicks-Arrow prices $\{q_{t+j}^t\}_{j=1}^J$ by⁷²

$$p_i^t = \sum_{j=1}^J q_{t+j}^t s_{i,t+j}^t.$$

Suppose that we observe the bond prices $p_i^t, i = 1, \dots, M$ and the associated payments streams $[s_{i,t+1}^t \ s_{i,t+2}^t \ \cdots \ s_{i,t+J}^t]$, how can we back out Hicks-Arrow prices at time t ?

First some notation streamlining. We assume that we are studying a particular date t , so we occasionally suppress the superscript t to simplify notation. Thus, now let $p_i, i = 1, \dots, M$ be the price at time t of a risk-free bond promising a stream of payments $[s_{i,t+1} \ s_{i,t+2} \ \cdots \ s_{i,t+J}]$ at time t . We are especially interested in situations in which $M < J$ so that the number of bonds is less than the horizon of coupon payments for at least some of the bonds. Let $q' = [q_{t+1} \ q_{t+2} \ \cdots \ q_{t+J}]$ be a vector of Hicks-Arrow prices at time t . We allow imprecision by assuming that p, q and s are linked by

$$\begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ p_M \end{bmatrix} = \begin{bmatrix} s_{1,t+1} & s_{1,t+2} & \cdots & s_{1,t+J} \\ s_{2,t+1} & s_{1,t+2} & \cdots & s_{2,t+J} \\ \vdots & \vdots & \cdots & \vdots \\ s_{M,t+1} & s_{1,t+2} & \cdots & s_{M,t+J} \end{bmatrix} \begin{bmatrix} q_{t+1} \\ q_{t+2} \\ \vdots \\ q_{t+J} \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \vdots \\ \epsilon_M \end{bmatrix}$$

or

$$p = Sq + \epsilon \tag{22}$$

where ϵ is a mean zero vector of measurement errors in bond prices that is orthogonal to S and that satisfies

$$E\epsilon\epsilon' = V.$$

We proceed in two steps. Step 1 imposes a hard version of a simple parametric model of the pure discount yield curve, while step 2 imposes a soft version by using the step 1 outcome as a Bayesian prior toward which to regularize a set of Arrow-Hicks prices viewed

⁷²If bond holders expect only fractions of promises to pay a stream $[s_{i,t+1}^t \ s_{i,t+2}^t \ \cdots \ s_{i,t+J}^t]$ will be honored, then the Hicks-Arrow price q_{t+j}^t can be interpreted as the product of an expected fraction to be paid times the price of a risk-free claim to the promised amount, say \tilde{q}_{t+j}^t . With a risk-averse representative investor, the appropriate expected fraction would pertain to a risk-adjusted probability measure.

as regression coefficients.

Step 1. At time t , we assume that the yield (to maturity) on a j period pure discount bond is approximately

$$r_{t,t+j} \equiv -\frac{\log q_{t+j}}{j} = \alpha_{0,t} + \alpha_{1,t}j + \alpha_{2,t}j^2$$

where $\alpha_{0,t}, \alpha_{1,t}, \alpha_{2,t}$ are Litterman-Scheinkman ‘level, slope, curvature’ parameters for date t .⁷³ Then we approximate $\{q_{t+j}\}_{j=1}^J$ by

$$q_{t+j} = \exp\left(-(\alpha_{0,t} + \alpha_{1,t}j + \alpha_{2,t}j^2)j\right). \quad (23)$$

Substituting formula (23) for each q_{t+j} at time t into equation (22) leads to a nonlinear least squares regression equation in the three unknown parameters $\alpha_{0,t}, \alpha_{1,t}, \alpha_{2,t}$. Denote the estimates $\hat{\alpha}_{0,t}, \hat{\alpha}_{1,t}, \hat{\alpha}_{2,t}$.

Step 2. We can regard the outcome of step 1 as providing prior information about the Hicks-Arrow prices with which we want to augment (22) regarded as a linear regression equation in the J unknown regression parameters $\{q_{t+j}\}_{j=1}^J$. We express the prior information as

$$q_{t+j} \approx \exp\left(-(\hat{\alpha}_{0,t} + \hat{\alpha}_{1,t}j + \hat{\alpha}_{2,t}j^2)j\right), \quad j = 1, \dots, J \quad (24)$$

and give content to the approximation operator \approx by assuming that

$$r = Rq + u \quad (25)$$

where r is a $J \times 1$ vector whose j th entry is $\exp(-(\hat{\alpha}_{0,t} + \hat{\alpha}_{1,t}j + \hat{\alpha}_{2,t}j^2)j)$, R is a $J \times J$ identity matrix, and u is a mean zero random vector that is orthogonal to ϵ and that satisfies

$$Euu' = U.$$

We apply the following Theil-Goldberger mixed estimator to estimate the Hicks-Arrow price vector q ⁷⁴

$$\hat{q} = (S'V^{-1}S + R'U^{-1}R)^{-1}(S'V^{-1}p + R'U^{-1}r) \quad (26)$$

⁷³See Litterman and Scheinkman (1991).

⁷⁴See Theil and Goldberger (1961). See Shiller (1973) for an application to distributed lag estimation that is in the spirit of our application here.

and we can also make use of the following estimated coefficient variance matrix

$$(S'V^{-1}S + R'U^{-1}R)^{-1}. \tag{27}$$

B.1 Tuning

The formulas simplify if we restrict the covariance matrices V and U to be

$$V = \sigma_v^2 I$$

where σ_v is a scalar, and

$$U = \sigma_u^2 I$$

where σ_u is a scalar. We'll use σ_v and σ_u to indicate how tightly we want to impose the Hicks-Arrow theory. (A dogmatic prejudice in favor of the Hicks-Arrow theory would set $\sigma_u = 0$). Under the simplifications $V = \sigma_v^2 I$ and $U = \sigma_u^2 I$, formulas (26) and (27) simplify to

$$\hat{q} = (\sigma_v^{-2} S'S + \sigma_u^{-2} R'R)^{-1} (\sigma_v^{-2} S'p + \sigma_u^{-2} R'r) \tag{28}$$

and

$$(\sigma_v^{-2} S'S + \sigma_u^{-2} R'R)^{-1}. \tag{29}$$

These can be simplified further by using the ratio $f = \frac{\sigma_v}{\sigma_u}$ to make a heteroskedasticity correction that allows us to estimate the q^t vector via ordinary least squares, given f . The observation matrix Y and the regressor matrix X would become

$$Y = \begin{bmatrix} p \\ fr \end{bmatrix}, \quad X = \begin{bmatrix} S \\ fI \end{bmatrix}.$$

Eventually, we can regard f as a “regularization parameter” and investigate the consequences of tightening and loosening the restriction (23).

C Secretary Bryan's letter to President Wilson

I beg to communicate to you an important matter which has come before the Department. Morgan Company of New York have asked whether there would be any objection to their making a loan to the French Government and also the Rothschilds – I suppose that is intended for the French Government. I have conferred with Mr. Lansing and he knows of no legal objection to financing this loan, but I have suggested to him the advisability of presenting to you an aspect of the case which is not legal but I believe to be consistent with our attitude in international matters. It is whether it would be advisable for this Government to take the position that it will not approve of any loan to a belligerent nation. The reasons that I would give in support of this proposition are:

First: Money is the worst of all contrabands because it commands everything else. The question of making loans contraband by international agreement has been discussed, but no action has been taken. I know of nothing that would do more to prevent war than an international agreement that neutral nations would not loan to belligerents. While such an agreement would be of great advantage, could we not by our example hasten the reaching of such an agreement? We are the one great nation which is not involved, and our refusal to loan to any belligerent would naturally tend to hasten a conclusion of the war. We are responsible for the use of our influence through example, and as we cannot tell what we can do until we try, the only way of testing our influence is to set the example and observe its effect. This is the fundamental reason in support of the suggestion submitted.

Second: There is a special and local reason, it seems to me, why this course would be advisable. Mr. Lansing observed in the discussion of the subject that a loan would be taken by those in sympathy with the country in whose behalf the loan was negotiated. If we approved of a loan to France we could not, of course, object to a loan to Great Britain, Germany, Russia, or to any other country, and if loans were made to these countries, our citizens would be divided into groups, each group loaning money to the country which it favors and this money could not be furnished without expressions of sympathy. These expressions of sympathy are disturbing enough when they do not rest upon pecuniary interests – they would be still more disturbing if each group was

pecuniarily interested in the success of the nation to whom its members had loaned money.

Third: The powerful financial interests which would be connected with these loans would be tempted to use their influence through the newspapers to support the interests of the Government to which they had loaned because the value of the security would be directly affected by the result of the war. We would thus find our newspapers violently arrayed on one side or the other, each paper supporting a financial group and pecuniary interest. All of this influence would make it all the more difficult for us to maintain neutrality as our action on various questions that would arise would affect one side or the other and powerful financial interests would be thrown into the balance.... As we cannot prevent American citizens going abroad at their own risk, so we cannot prevent dollars going abroad at the risk of the owners, but the influence of the Government is used to prevent American citizens from doing this. Would the Government not be justified in using its influence against the enlistment of the nation's dollars in a foreign war?

Secretary of State William Jennings Bryan to President Woodrow Wilson, August 10, 1914

D US Treasury Credits: Original Principal and Present Value of Refinanced of Promised Payments

Country	Original Principal	Funded Interest	Funded Debt	Debt prior to funding including accrued interest	Present value of refinanced promised payments and present value as a percent of principal prior to refunding					
					3 per cent	4 $\frac{1}{4}$ per cent	5 per cent			
Belgium	\$377,029,570	\$40,750,430	\$417,780,000	\$483,426,000	\$302,239,000	62.5%	\$225,000,000	46.5%	\$191,726,000	39.7%
Czechoslovakia	91,879,671	23,120,329	115,000,000	123,854,000	124,995,000	100.9	91,964,000	74.3	77,985,000	63.0
Estonia	12,066,222	1,763,778	13,830,000	14,143,000	14,798,000	104.6	11,392,000	80.5	9,915,000	70.1
Finland	8,281,926	718,074	9,000,000	9,190,000	9,630,000	104.8	7,413,000	80.7	6,452,000	70.2
France	3,340,516,044	684,483,956	4,025,000,000	4,230,777,000	2,734,250,000	64.6	1,996,509,000	47.2	1,681,369,000	39.7
Great Britain	4,074,818,358	525,181,642	4,175,310,000	4,715,310,000	4,922,702,000	104.4	3,788,470,000	80.3	3,296,948,000	69.9
Hungary	1,685,836	253,164	1,984,000	1,984,000	2,076,000	104.6	1,596,000	80.4	1,388,000	70.0
Italy	1,647,869,198	394,130,802	2,150,150,000	2,150,150,000	782,321,000	36.4	528,192,600	24.6	426,287,000	19.8
Latvia	5,132,287	642,713	5,893,000	5,893,000	6,181,000	104.9	4,755,000	80.7	4,137,000	70.2
Lithuania	4,981,628	1,048,372	6,216,000	6,216,000	6,452,000	103.8	4,967,000	79.9	4,322,000	69.5
Poland	159,666,972	18,893,028	182,324,000	182,324,000	191,283,000	104.9	146,825,000	80.5	127,643,000	70.0
Rumania	36,128,495	8,461,505	46,945,000	46,945,000	48,442,000	103.2	35,172,000	74.9	29,507,000	62.9
Yugoslavia	51,037,886	11,812,114	66,164,000	66,164,000	30,286,000	45.8	20,030,000	30.3	15,919,000	24.1
Total	\$9,811,094,094	\$1,711,259,906	\$11,522,354,000	\$12,036,376,000	\$9,175,655,000	76.2%	\$6,862,285,000	57.0%	\$5,873,638,000	48.8%

Source: Page 443 of United States World War Foreign Debt Commission (1927).

E Franklin D. Roosevelt’s “bombshell message”

I would regard it as a catastrophe amounting to a world tragedy if the great Conference of Nations, called to bring about a more real and permanent financial stability and a greater prosperity to the masses of all Nations, should, in advance of any serious effort to consider these broader problems, allow itself to be diverted by the proposal of a purely artificial and temporary experiment affecting the monetary exchange of a few Nations only. Such action, such diversion, shows a singular lack of proportion and a failure to remember the larger purposes for which the Economic Conference originally was called together.

I do not relish the thought that insistence on such action should be made an excuse for the continuance of the basic economic errors that underlie so much of the present world-wide depression.

The world will not long be lulled by the specious fallacy of achieving a temporary and probably an artificial stability in foreign exchange on the part of a few large countries only.

The sound internal economic system of a Nation is a greater factor in its well-being than the price of its currency in changing terms of the currencies of other Nations.

It is for this reason that reduced cost of Government, adequate Government income, and ability to service Government debts are all so important to ultimate stability. So too, old fetishes of so-called international bankers are being replaced by efforts to plan national currencies with the objective of giving to those currencies a continuing purchasing power which does not greatly vary in terms of the commodities and need of modern civilization. Let me be frank in saying that the United States seeks the kind of dollar which a generation hence will have the same purchasing and debt-paying power as the dollar value we hope to attain in the near future. That objective means more to the good of other Nations than a fixed ratio for a month or two in terms of the pound or franc.

Our broad purpose is the permanent stabilization of every Nation’s currency. Gold or gold and silver can well continue to be a metallic reserve behind currencies, but this is not the time to dissipate gold reserves. When the world

works out concerted policies in the majority of Nations to produce balanced budgets and living within their means, then we can properly discuss a better distribution of the world's gold and silver supply to act as a reserve base of national currencies. Restoration of world trade is an important factor, both in the means and in the result. Here also temporary exchange fixing is not the true answer. We must rather mitigate existing embargoes to make easier the exchange of products which one Nation has and the other Nation has not.

The Conference was called to better and perhaps to cure fundamental economic ills. It must not be diverted from that effort.

Wireless to the London Conference, July 3, 1933

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