A History of U.S. Debt Limits

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Debt Design and Management

Constitution assigns Congress authority to issue and manage debt.

- Article 1

  > *The Congress shall have Power To lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defence and general Welfare of the United States; ...*

  > *To borrow money on the credit of the United States;*

- Today Congress has delegated this authority almost entirely to the Treasury.

- It has retained one tool – a debt ceiling.

Debt Limit a Sideshow?

In my brief time in Washington, I've found the worst myth to be the belief that the debt ceiling imposes any control on government spending. The plain truth is that the debt limit does not affect the deficits or surpluses;

Assistant Secretary for Financial Markets, U.S. Treasury, Brian C. Roseboro, 2003

Questions

1. Has the debt limit usually increased over time?

2. Has the debt limit been an upper bound on total debt to be anticipated over medium to long horizons during peace?

3. Has the debt limit actually constrained anyone?

4. Why did Congress delegate security design and management of the debt to the Treasury during the 1920s and 30s?

5. Has the debt limit been unambiguous in terms of units of account?

6. How is the debt limit measured? Is it "marked to market" or is it in terms of "face value"?

Limit or Limits?

- Congress has imposed an aggregate limit only since 1939

- Before WWI, Congress imposed limits on each bond

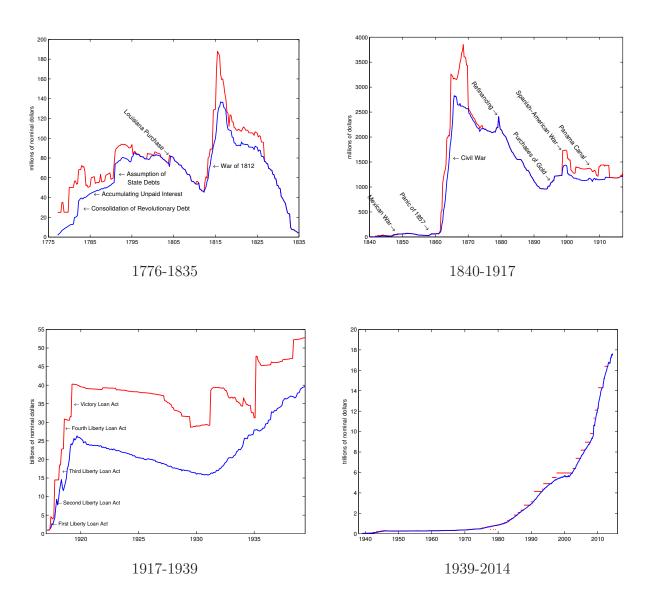- We construct an implied limit before 1939

Figure 1: Nominal Federal Debt and the Aggregate Statutory Limit

Nominal debt is the dotted line. The statutory limit is the solid line. Prior to 1939, the limit is constructed by summing individual limits on securities. After 1939, the limit is the official debt ceiling.
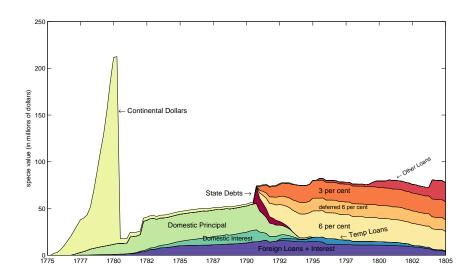
U.S. Treasury Debt Prior to World War I

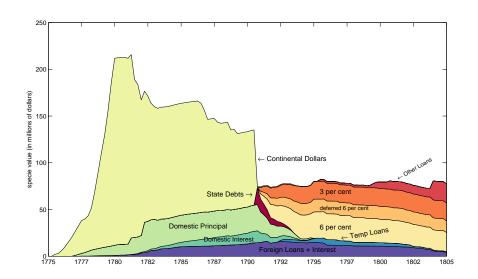Between 1776 and 1916 Congress authorized and designed 200 securities

- maturity
- coupon rate
- call and exchange features
- projects on which proceeds could be spent

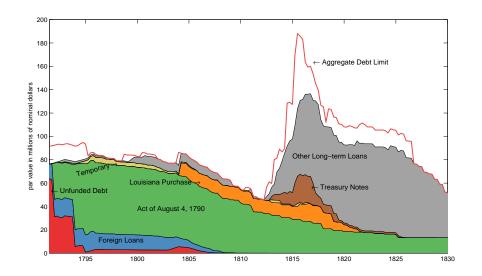No standardization limited liquidity and thinned markets

Federal Debt by Type Loan

Federal Debt by Type Loan
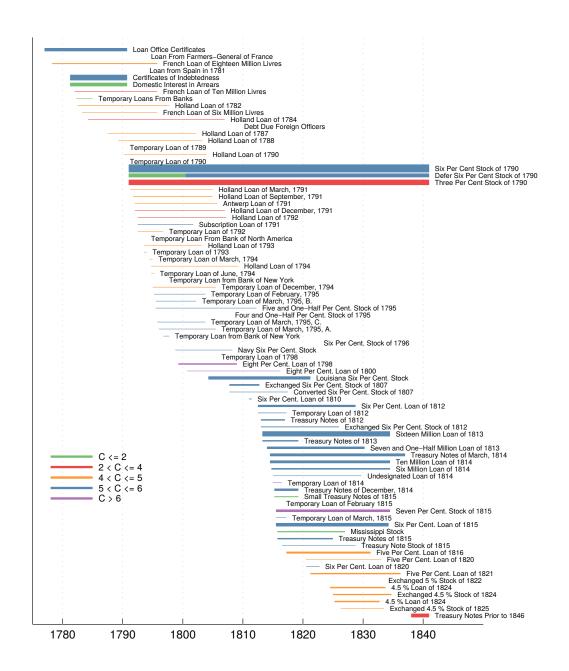
Federal Debt by Type of Loan from 1791 to 1830
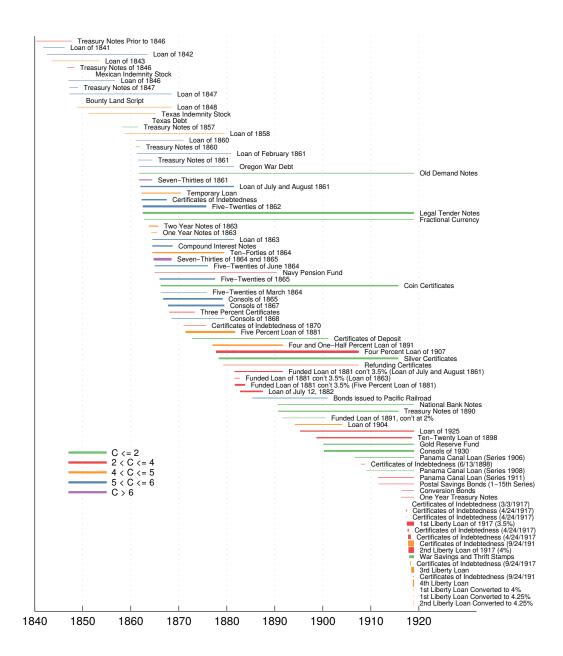
Figure 24: Debt Issues Outstanding: 1775 to 1840

Figure 25: Debt Issues Outstanding: 1840 to 1918

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Sources of Statutory Debt limits

- Before World War I, Congress imposed limits on individual securities

- For most securities, Congress limited quantities to be *issued*
    - Limits were not on quantities *outstanding*
    - After a security was redeemed, it could not be re-issued

- We construct implied limits on aggregate limit by keeping track of unexpired limits on each individual security
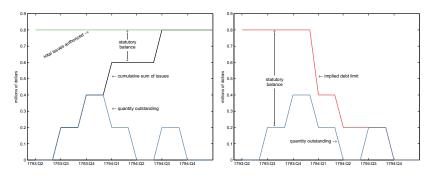
Details

For each security and date, keep track of

- amount originally authorized
- amount issued up to now
- amount redeemed

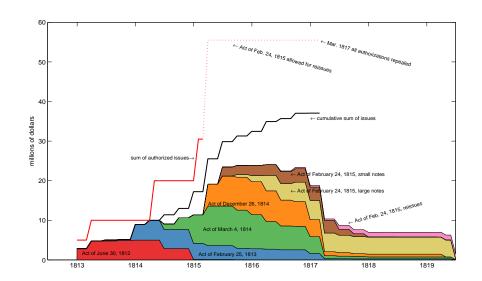Deduce implied limit on additional amounts that can still be issued

Example: The Temporary Loan of 1793

Authorization, Issuance and Quantity Outstanding
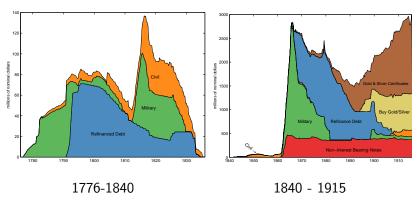
Quantity Outstanding and Implied Limit

Treasury Notes of 1812 to 1815: Quantities Outstanding, the Cumulative Sum of Issues, and Authorizations

- Project finance: before WWI
- Undifferentiated finance: after 1917

Before WWI: Project Finance

1776-1840   1840 - 1915

Debt Decomposed by Statutory Purpose

Second Liberty Bond Act

The Second Liberty Bond Act of 1917 granted the Secretary of the Treasury

> *to borrow from time to time, on the credit of the United States for the purposes of this Act, and to meet expenditures authorized for the national security and defense <u>and other public purposes authorized by law</u> not to exceed $7,538,945,460*

End of Project Finance

- Second Liberty Bond Act differed from all previous statues by including the phrase "and other public purposes authorized by law."

- That broad language broke the tight connection between borrowing and spending for specific purposes that had characterized Congress's policy since 1776.

- Limits cast in terms of par values

- Time limits?

- Units of account?

- Issues apply to recent discussions of threat to Fed's solvency

Prices

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

- $\left(\frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}}\right) = (1 + r_{t-1,t}^j)$ is the one-period gross nominal return on a j-period zero coupon bond

- $r_{t-1,t}^j$ is the net nominal rate of return

Quantities

- $G_{t+j}^t \sim$ federal government expenditures
- $T_{t+j}^t \sim$ federal tax revenues
- $\sigma_{t+j}^t \sim$ federal surplus

Fiscal Policy

$$\{\{G_{t+j}^t, T_{t+j}^t\}_{j=0}^\infty\}_{t=0}^\infty$$

Budget Constraints

P.V. of surplus = value of government debt

$$\sum_{j=0}^{\infty} q_{t+j}^t \sigma_{t+j}^t = \sum_{j=0}^{\infty} q_{t+j}^t s_{t+j}^t$$

Quantities

- $c_{t+j}^t \sim$ coupon

- $b_{t+j}^t \sim$ par or principal (occasionally a strike price)

- $s_{t+j}^t \equiv c_{t+j}^t + b_{t+j}^t$

Two measures of government debt

U.S. government accounts:

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

Macroeconomics:

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

Two measures of "interest payments"
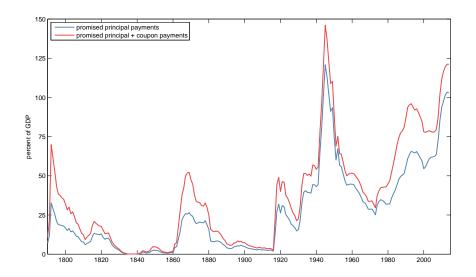
US government accounts:

before 1929:

$$c_t^{t-1}$$

after 1929:

$$c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}$$

Macroeconomics:

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

Promised Principal and Coupon Payments

Conceptual Differences

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

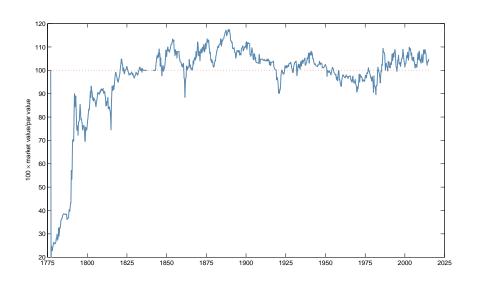- It neglects the government's outstanding promises to pay coupons
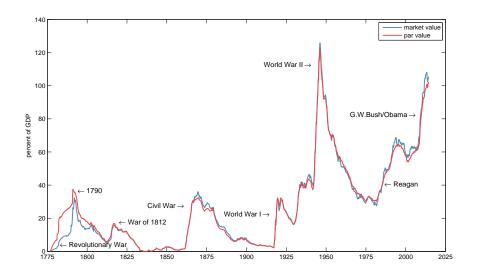
$$\sum_{j=1}^{n_t} c_{t+j}^t;$$

  and

- The book value doesn't discount future payments of principal b_{t+j}^t by multiplying them by the market prices q_{t+j}^t.

Discrepancies have been positive and negative

Ratio of Market Value to Par Value of Debt

Debt to GDP Ratio, Market and Par Value, 1776-2014

Debt Limit is on Face Values

The debt ceiling is an upper bound on $\sum_{j=1}^{n} b_{t+j}^t$ not on $\sum_{j=1}^{n_t} q_{t+j}^t (b_{t+j}^t + c_{t+j}^t)$

- Promises labeled "principal" are recorded as debt and count against the limit

- Promises labeled "coupons" or "interest" do not.

Government budget constraint

$$\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t = \sum_{j=1}^{n_{t-1}} q_{t+j-1}^t s_{t+j-1}^{t-1} - \sigma_t^t$$

$$\sigma_t^t = T_t^t - G_t^t$$

Government budget constraint

$$\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t = \sum_{j=1}^{n_{t-1}} \left(\frac{q_{t+j-1}^t}{q_{t+j-1}^{t-1}} \right) q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} - \sigma_t^t$$

$$= \sum_{j=1}^{n_{t-1}} q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} + \sum_{j=1}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} - \sigma_t^t$$

The second term on the right side of the second line measures time t nominal interest payments on the time $t-1$ nominal government debt:

$$\underbrace{\sum_{j=1}^{n_t}}_{\substack{\textbf{sum over} \\ \textbf{maturities}}} \quad \underbrace{r_{t-1,t}^{j}}_{\substack{\textbf{net} \\ \textbf{returns}}} \quad \underbrace{\left(q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} \right)}_{\textbf{values}}$$

Interest reported by government

1. Before 1929:

$$c_t^{t-1}$$

2. After 1929:

$$c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}$$

where $b_{1,t}^{t-1}$ is the par value of pure discount one-period treasury bills issued at $t-1$.

Government Budget Constraint Again

$$\sum_{j=1}^{n_t} q_{t+j}^t s_{t+j}^t = \sum_{j=2}^{n_{t-1}} q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} - \sigma_t^t + [c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}] +$$

$$\left[\sum_{j=2}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1} \right] + [(1 - r_{t-1,t}^1) b_{1,t}^{t-1} + b_{-1,t}^{t-1}]$$

$$\underbrace{c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}}_{\substack{\text{official} \\ \text{interest}}} \quad + \quad \underbrace{\sum_{j=2}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1}}_{\text{capital gains}} \quad + \quad \underbrace{(1 - r_{t-1,t}^1) b_{1,t}^{t-1} + b_{-1,t}^{t-1}}_{\substack{\text{pay or} \\ \text{roll over}}}$$

Two "interest payments" series

The nominal one-period holding period return paid by the government debt (in black)

$$\frac{\sum_{j=1}^{n_{t-1}} r_{t-1,t}^j q_{t+j-1}^{t-1} s_{t+j-1}^{t-1}}{\sum_{j=1}^{n_{t-1}} q_{t+j-1}^{t-1} s_{t+j-1}^{t-1}}$$

Official net interest payments as a percentage of the debt (in blue): before 1929

$$\frac{c_t^{t-1}}{\sum_{j=1}^{n_{t-1}} b_{t+j-1}^{t-1}}$$

and after 1929:

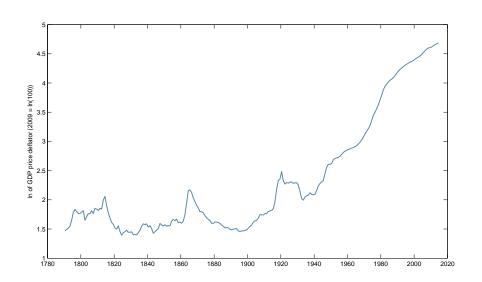$$\frac{c_t^{t-1} + r_{t-1,t}^1 b_{1,t}^{t-1}}{\sum_{j=1}^{n_{t-1}} b_{t+j-1}^{t-1}}.$$

Nominal Holding Period Return and Official Net Interest Payments as Percent of the Debt, Annual by Fiscal Year

- Except during the War of 1812 and the Civil War, Congress retained tight control on the debt.

- Limits increase and decrease

- On multiple occasions, Treasury Secretaries asked for more freedom to manage the debt. They were denied.

- Question: Has the debt limit constrained anyone?
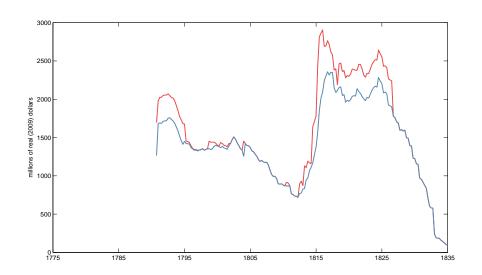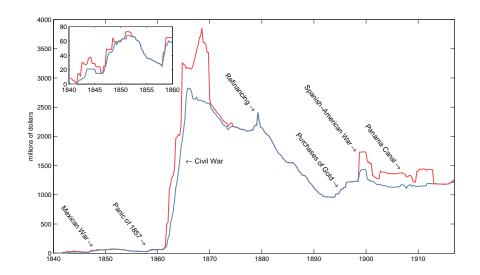 - Prior to WW-I, Yes.
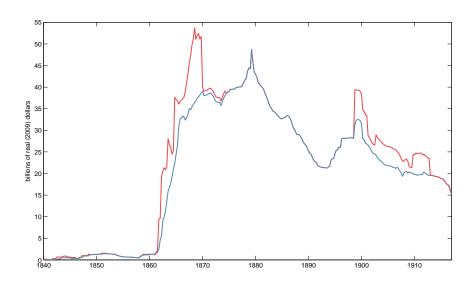
Natural Log of the GDP Deflator

Total Debt and the Limit: Nominal, 1776-1835

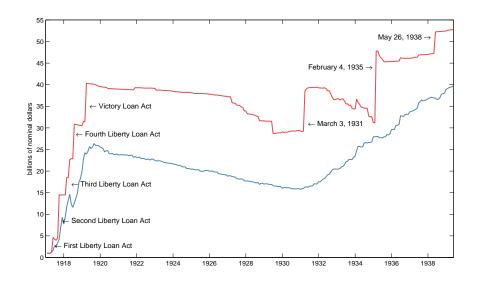# Debt and Debt Limit Divided by the Price Level: 1790-1835
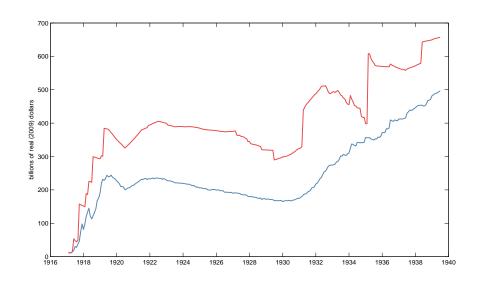
Total Debt and the Limit: Nominal, 1840-1916

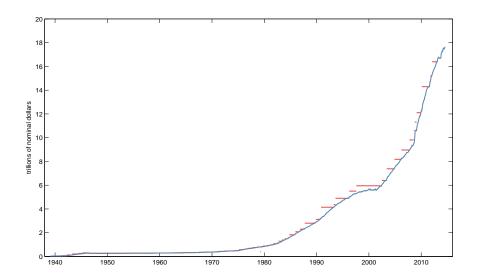# Debt and Debt Limit Divided by the Price Level: 1840-1916
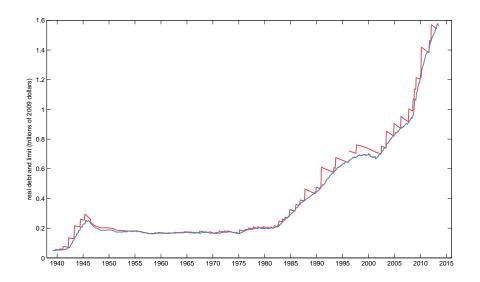
Total Debt and the Limit: Nominal, 1917-1939

Debt and Debt Limit Divided by the Price Level: 1917-1939

Total Debt and the Limit: Nominal, 1939-2014

Statutory Debt Limit and Debt Subject to it Divided by Price Level

US monetary units

- 1790-1834: gold/silver gold and silver mint ratio of 15 to 1. Free coinage (sale) of both gold and silver.

- 1834-1873: gold/silver mint ratio of 16 to 1.

- 1862-1868: green backs inconvertible legal tender.

- 1873-1900: free coinage of gold only. Limited silver coinage.

- 1792-1900: "coin" means gold or silver.

- 1900-1933: free coinage of gold. "Coin" now means gold.

- 1933- : Federal Reserve notes.

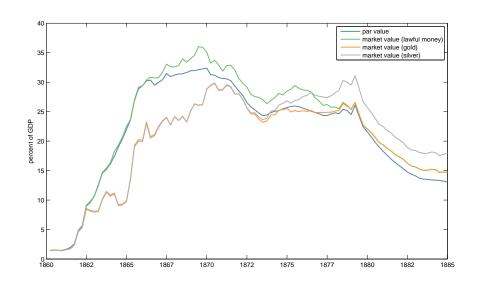# Has the debt limit been unambiguous in terms of units of account?

Usually

Important exceptions:

- War of 1812

- Civil War

- Silver agitation of the 1890s?

- Gold abandoned in 1933?

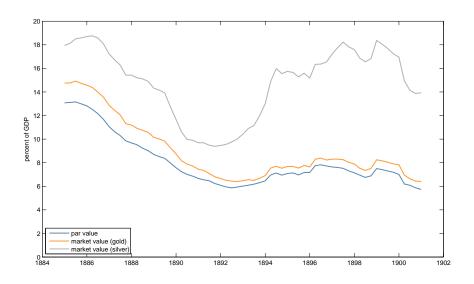How much of currency X , if purchased at market prices, would it have taken to purchase the entire stock of debt? (X being gold, silver, greenbacks)

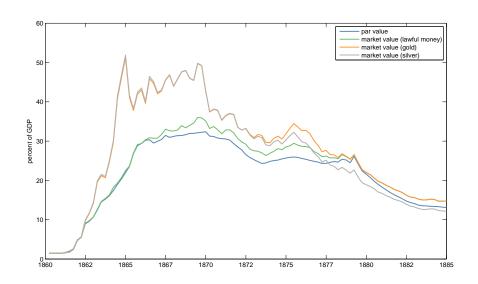# Par and Market Value of the Debt By Unit of Account: 1860 - 1885

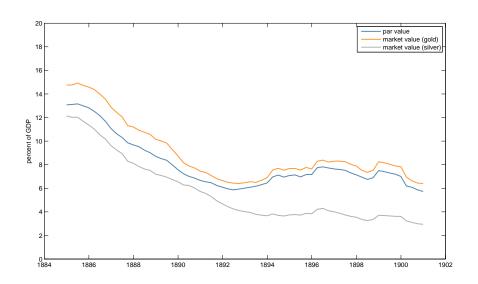# Par and Market Value of the Debt By Unit of Account: 1885 - 1900

How much in gold would the debt have been worth if it had been paid back in silver dollars?

Par and Market Value of the Debt By Unit of Account: 1860 - 1885

Par and Market Value of the Debt By Unit of Account: 1885 - 1900

Have debt limits constrained subsequent authorities?

Classic example

J.P. Morgan and Grover Cleveland

We start with some background ...

An Act to Authorize the Purchase of Coin, and for other Purposes

- March 17, 1862

  the Secretary of the Treasury may purchase coin with any of the bonds or notes of the United States, authorized by law, at such rates and upon such terms as he may deem most advantageous to the public interest;

1870 Refinancing of the Civil War Debt

Two quotes from the legislation

> *The Secretary of the Treasury is hereby authorized to issue ... in the aggregate two hundred million dollars, coupon or registered, in such form as he may prescribe ...*

- placed limits on each of three types of bonds
- In 1871, the limit on the 5% bond was increased

> *But nothing in this act, or in any law now in force, shall be construed to authorize any increase whatever of the bonded debt of the United States.*
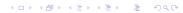
- Ultimately issued
  - 5%: $518 million
  - 4.5%: $250 million
  - 4%: $740 million
- So about $500 million in unused authority

Resumption Act of 1875

Section 3: And to enable the Secretary of the Treasury to prepare and provide for the redemption in this act authorized or required, he is authorized to use any surplus revenues, from time to time, in the Treasury not otherwise appropriated, and to issue, sell, and dispose of, at not less than par, in coin, either of the descriptions of bonds of the United States described in the [Refunding Act of 1870].

J.P. Morgan and the Gold Standard

- In 1894-1895, there was a run on U.S. gold reserves
  - U.S. gold reserves fell from $100 million to $60 million
- Treasury sought Congressional authority to borrow to buy gold
  - Congress refused
  - Battle between advocates and opponents of free coinage of silver
- J.P. Morgan proposed using the 1862 statue that gave the Treasury authority to purchase gold with bonds.
- The Cleveland Administration carried out this recommendation
  - sold 30 year, 4% bonds
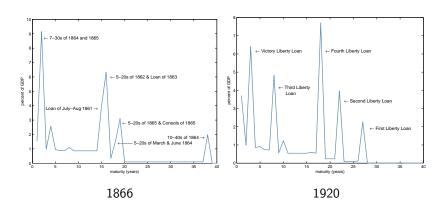 - current interest rates were 3%

The Legality of the 1895 Bond Sales

- Did the Adminstration have the authority to sell bonds to buy gold?
  - 1862 Act – can sell bonds for gold
  - 1870 Act – can not increase the bonded debt of the U.S.
  - 1875 Act – can borrow to prepare and provide for the redemption

- Cleveland Adminstration issued the debt
  - argued that bond sales were only for buying gold
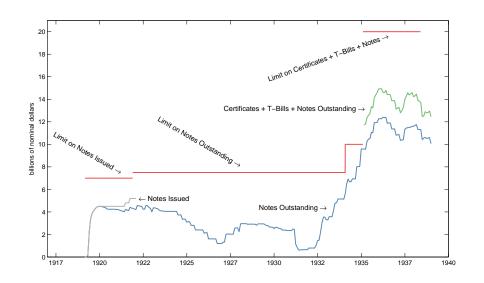 - not for ordinary expenditures

With a tight connection between spending and borrowing

- Treasury constrained to issue debt sequentially
- Echo effects
  - lumpy debt service events
  - confront future Treasury Secretaries with liquidity and roll-over risks
- Modest efforts to match security design with investor preferences
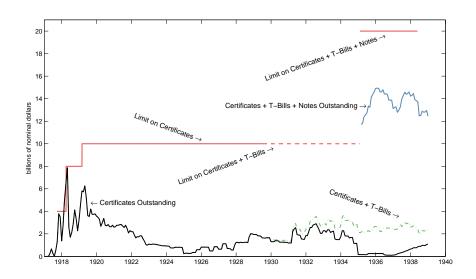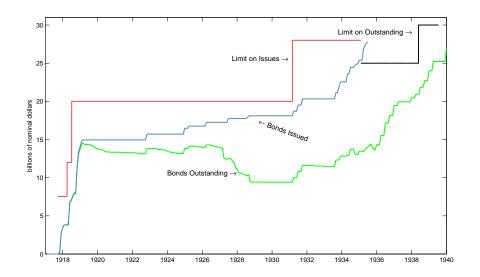
Debt Service Profiles, 1866 and 1920

1866

1920

Limits on Notes Outstanding: 1917 to 1939

Limits on Certificates of Indebtedness, Treasury Bills, and Treasury Notes Outstanding: 1917 to 1939
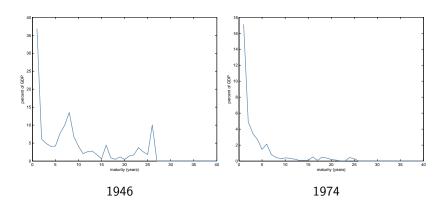
Limits on Bond Issuance and Outstanding: 1917 to 1939

Post WW-I Evolution of the Debt Ceiling

- In 1929, Secretary Mellon wanted to issue $8 billion in new bonds
  - to refinance existing debt
  - but threatened to put the Treasury over the limit on issues

- He wrote to Congress

    [I]t is obvious that the orderly and economical management of the public debt requires that the Treasury Department have complete freedom in determining the character of securities to be issued and should not be confronted with any arbitrary limitation which was not intended to apply to these circumstances.

- Congress raised the limit on bonds to $25 billion.
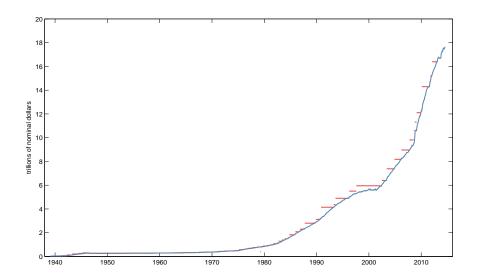
- By 1939, the Congress moves to an aggregate debt limit
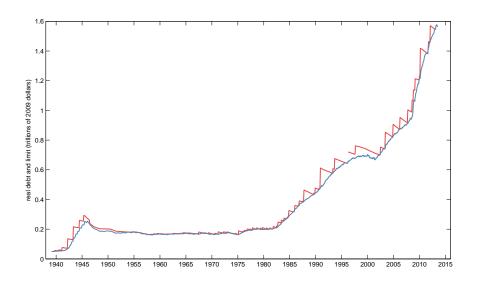
Debt Service Profiles, 1946 and 1974

1946

1974

Causes and Coincidents

- Keynesian economics?
- Reagonomics gone awry?

Total Debt and the Limit: Nominal, 1939-2014
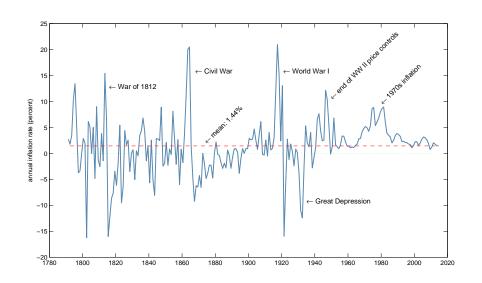
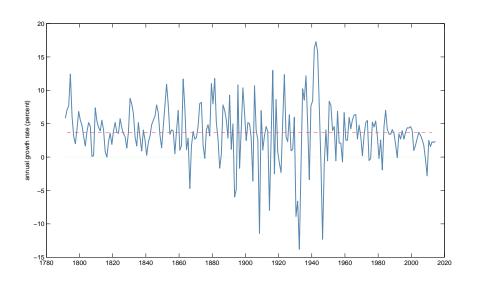# Statutory Debt Limit and Debt Subject to it Divided by Price Level

Slides In Reserve

1. Inflation and GDP Growth Rates
2. Details on Computing the Pre-1939 Aggregate Debt Limit
3. Real Debt and Debt Limits

Annual Inflation

Growth Rate of Real GDP

Constructing the Pre-1939 Aggregate Limit

- $b(\ell)^t$ denotes the **par value** of security ℓ outstanding at t.
- The law of motion

$$b(\ell)^t = b(\ell)^{t-1} + i(\ell)^t - r(\ell)^t$$

  where
  - $i(\ell)^t$ new issues
  - $r(\ell)^t$ redemptions
- Often Congress placed constraints on *total issues*

$$\sum_t i(\ell)^t \leq i(\ell)^*.$$

- $\bar{i}^t$ denote the *statutory balance* that could be issued.

$$\bar{i}^t = i(\ell)^* - \sum_{j=1}^{n} i(\ell)^{t-j},$$

- Implied limit on the *quantity outstanding*:

$$\bar{b}(\ell)^t = b(\ell)^{t-1} + \bar{i}(\ell)^t - \tilde{r}(\ell)^t.$$

- The aggregate debt limit $\bar{B}_t$:

$$\bar{B}_t = \sum_{\ell=1}^{N_t} \bar{b}(\ell)^t.$$