THE MOTIVES OF U.S. DEBT-MANAGEMENT POLICY, 1790-1880:

EFFICIENT DISCRIMINATION AND TIME CONSISTENCY

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I. INTRODUCTION

Government financial policy is typically identified with the choice among money, debt, or taxes to finance a given level of government expenditure. This definition of the financial side of public finance follows from the paradigms of modern macroeconomics, in which the intergenerational consequences of government financial policy and the cost of debt service are derived from the sequence of net government deficits, after having properly controlled for the allocative microeconomic effects of government expenditures, transfers and taxation.[1]

While the levels of deficits, their monetization, and the degree of taxation, have all been central concerns of public policy since colonial times, the history of government financial policies, and the controversies they have wrought, cannot be reduced to a sequence of choices among money, debt, and taxes.

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Some of the most important debates on the management of the public debt, and some of the most important instruments of debt issued by the government, involved policy decisions about which kind of debt to issue, and which kind to grant seniority. Government financial policy from the Revolution through the post-Civil War era is replete with examples of this, including: discrimination across different classes of creditors in default or suspension policy, sometimes accomplished by varying the numeraires of debt or by granting special tax receivability to certain debt instruments; transformations of debt maturity structure; the use of callable debt; and the creation of rules designed to constrain the future money supply and debt supply processes (for example, the establishment of sinking funds, specie standards, debt ceilings, and debt covenants or special privileges).

One response to these debt-management instruments and other policies is to dismiss them as irrelevant, or neutral, with respect to the cost of debt service. Although policy makers clearly initiated these policies in the belief that they would reduce debt service, one could argue that such views were misguided. For example, Francis Bowen [1870: 405] dismissed sinking funds as ineffectual instruments for establishing confidence in debt redemption:

> ...such a fund is a delusion and a loss whenever the government is contracting new debt more rapidly than the Fund is paying off old debt. Borrowing more money than you pay is not a promising mode of reducing one's debt.

According to Bowen, the level of the overall deficit rather than gross debt retirement is what matters for government credibility.

Similarly, the suspension of greenback convertibility and the issuance of debt denominated both in gold and greenbacks during and after the Civil War is viewed by Rolnick and Wallace [1984] as unnecessary and neutral. According to their view, a change in the overall amount of debt issued, and a change in the numeraire of some components of debt, should have identical consequences. Similar arguments could be made for the irrelevance of maturity structure and callability provisions in government debt due to term structure arbitrage in the bond market. Finally, the enactment of laws limiting the money- or debt-supply processes conceivably could be undone by a government whenever it so chose, and thus cannot solve "time inconsistency" problems in public finance.

Indeed, many debt-management policies seem worse than neutral. Issuing callable debt entails the cost of purchasing the call option. Rolling over short-term debt instead of selling a single long-term bond issue increases the transaction costs of placing debt. The creation of two numeraires during the Civil War (one for coin-denominated bonds and one for greenback-denominated debts, including money) may have been costly politically, as the slogan "let's have the same dollar for the plowholder as for the bondholder" indicates.

This paper explores each of these categories of government debt-management policy as employed from the Revolution through the 1870s, and offers interpretations of their purposes. Many of these policies had important consequences for the cost of debt service. Various factors ignored by standard models of public finance, including strategic political considerations, the segmentation of debt markets among different classes of creditors, and the potential for a government credit collapse, all played a part in motivating these policies.[2] Debt-management policies were undertaken to reduce the perceived default risk on some or all government debt, and there are good reasons to believe that the policies had this intended effect.

Debt-management policies reduced debt-service cost for two reasons. First, they allowed the government to take advantage of the segmentation of debt markets by discriminating across creditors in the allocation of default risk. Some creditors (those who charged the least to bear the risk) were allocated a disproportionately large share of default risk. The government effectively "Ramsey-taxed" to reduce the cost of debt service by making the most inelastic credit suppliers bear much of the potential taxation (default) burden.

Second, the government used debt-management policies to help tie its own hands, either by creating incentives for the government to tax in a timely way in the future (and thus reduce current default risk and bond yields), or by establishing rules for future behavior that mattered because of the costs of changing those rules. Such policies were instituted with the conscious intent of reducing the problem of time inconsistency.

II. GOVERNMENT DISCRIMINATION IN THE TREATMENT OF CREDITORS AND TAXPAYERS

Often government financial management involved preferential treatment of certain classes of creditors. This discrimination took various forms, including forced loans, differential default policy, the earlier satisfaction of certain classes of obligations, and the use of interim protection through tax payment parity guarantees for some classes of assets.[3]

A. The Revolution and Its Aftermath

A hierarchy of debt was established as an important feature of U.S. financial policy during and after the Revolutionary War. During the Revolution, wages to soldiers and large denomination interest-bearing debt were indexed to inflation, and foreign creditors were paid interest in specie, while Continental currency holders suffered a severe decline in the market value of their assets. In devising his plan for redeeming wartime debts, Alexander Hamilton insisted on the necessity of the federal government's providing for the debts incurred

by the states during the War, and argued that interest-bearing debt should be repaid to secure a favorable reputation for the nascent government. To this end, a sinking fund was established to give prior claim on revenues to the "funded" debts. Hamilton's only concession with regard to the Revolutionary debt was to reduce the effective yield on the debts from the earlier rate of 6 percent to the new rate of 4 percent.[4] While conversion into funded debt was optional, most creditors chose to do so, presumably because of a lower perceived default risk on funded debt. At the same time, Hamilton proposed (and Congress disposed) that currency and winning lottery tickets be redeemed at only 1 percent of their promised value [Hamilton, 1790: 62-64].

After the Revolution, discrimination in government debt continued. Debt took the form of domestic or foreign bond placements and domestic bank loans, and the terms of debt varied depending on its source. The government used a variety of inducements to secure placement of its debt abroad at effective rates of interest in excess of the legally mandated maximum interest rate of 6 percent. These inducements included commissions (or "points") paid to purchasers of bonds, "gratuities" in the form of bonuses paid in the form of additional bond principal, and lottery chances for bondholders with prizes in the form of further bond principal. Hamilton, among others, argued on grounds of necessity to allow these violations of the effective interest rate ceiling in foreign markets. At the same time, the 6 percent ceiling was enforced with few exceptions for loans placed in the United States during the post-Revolutionary period.

Furthermore, the government used its special power over the affairs of the Bank of the United States, as well as its special relationships with the Bank of New York and the Bank of North America, to secure loans at rates of 5 and 6 percent, when the market rates of return on government bonds were much higher. In 1798 bank loans were placed at 6 percent, while the yield on government bonds was 8 percent.[5] Between 1792 and 1798, loans from the Bank of the United States to the government (essentially payable at the government's pleasure) exceeded $10 million, a third of which was not repaid until after 1801 [Dewey, 1903: 112]. From the beginning, Hamilton had viewed the Bank as a fiscal device of the government. By creating rents from the Bank's unique charter, and by securing special privileges for the government in its dealings with the bank, Hamilton planned to create an elastic source of low-cost credit for the government. In addition to the direct benefits of loans at below market rates, the Bank further subsidized the government by being forced to accept government bonds at par in payment of capital subscriptions. Finally, the government was granted substantial stock ownership in the Bank without having to actually contribute to paid-in capital, and the government liquidated its capital in the Bank in 1796 at a substantial profit.[6] Gallatin's failed proposal for rechartering the Bank contained a provision allowing the government to require the Bank to lend as much as 60 percent of its capital to the government.

Clearly, Hamilton and Gallatin both saw in the Charter of the Bank of the United States a source of captive rents to be shared by the government.

B. The War of 1812

During the War of 1812 discrimination among classes of debt changed course from initial policies that sought (as before) to protect long-term debtholders to later policies that attempted to withdraw from the promised support of long-term debt in favor of the newly created short-term notes. In early 1813, in response to a lack of enthusiasm for the newly authorized issue of government bonds, Secretary Gallatin hit upon the idea of offering a conversion guarantee to subscribers. The government guaranteed that if, due to subsequent bond issues in 1813, the price of bonds fell, the government would award bond-principal bonuses to the original subscribers to compensate them fully for the depreciation in bond prices.[7] The government was able thus to place $18 million in 6 percent bonds at a price of 88 percent of face value.

The subsequent need for financing during 1813 did not require the government to issue the promised bonuses to early subscribers at that time, as the additional $8.5 million in bond issues in 1813 were purchased at 88.25 percent of face value. The government began to rely on short-term treasury notes from 1813 on, partly as a means to avoid having to pay bond principal bonuses, which it continued to offer on its bond issues.[8]

To make these novel instruments more attractive, beginning with the earliest issue in 1812, treasury notes were made receivable for all payments due the government at par with specie. The early issues had a one-year maturity. Subsequent issues were of successively smaller denominations, and issued without any promised redemption date, though they were made exchangeable for treasury bonds (which traded at a discount relative to notes until the end of 1815). All except the last issue bore 5.4 percent interest, while the last issue, the small denomination notes of February 1815, paid no interest. All notes were issued at par. Because of their usefulness in extinguishing tax liabilities, because the notes were convenient to use as a transacting medium, and because they were issued in limited amount, they traded at or near par throughout the period and circulated alongside specie and banknotes as cash. By 1815, some $17 million in treasury notes were outstanding.

Surprisingly, as the War wore on, rather than use treasury notes to finance the government's expenditure needs and maintain the protected (senior) status of bonds, the government chose to retreat from its protection of bonds. It limited the supply of treasury notes, and used bonds to provide for the bulk of government debt issues in 1814 and 1815. Total government debt increased from $45.2 million on January 1812 to $118.6 million in September 1815. New bond debts accounted for $63.1 million of the increase. The increases in net debt issues for each year from 1812 to 1816 were primarily the result of bond

issues. Even in 1815, the year of the largest increase in outstanding treasury notes, net long-term debt issues of some $19 million comprised more than 60 percent of the overall increase in debt [Dewey, 1903: 138].

Bonds were effectively subordinated to shorter-term treasury notes. Even when treasury notes were issued in early 1815 with no specific redemption date, tax payment receivability ensured that notes could be "redeemed" (for tax liabilities) before those revenues could be accumulated to pay off bond debt. The subordination of bond debt to treasury bills coincided with severe depreciation in bonds. At their lowest price, government 6 percent bonds traded at 65 percent of face value at the end of 1814. Banks were the largest holders of government loans, and the depreciation in bonds forced banks throughout the country to suspend specie convertibility in the summer of 1814.

The drop in government bonds cost the government millions of dollars in unintended bonuses to early bond subscribers, due to policy errors by the Secretaries of the Treasury.[9] In two successive bond issues in 1814, Secretaries Campbell and Dallas attempted to circumvent the payment of bonuses to early subscribers (of the first loan of 1814) by the purely formal maneuver of getting new bond authorizations for the later bond issues. This amounted to a default on the government's commitment to keep bonds trading near par. Bondholders were able to demonstrate that this was an attempt to renege on their promised bonuses, and the Treasury was forced to reverse its policy and pay the difference between the latest sale price of bonds and the price paid for the first issue in May (88 percent of face value). These bonuses were extremely costly. August issues sold for 80 percent of face value, and the December issues sold for 65 percent of face value.[10] Ultimately, after paying out bonuses, the government received only $4.3 million for the August issues of $6.25 million, and less than $1 million for the December issues of $5 million.

Although these compensatory issues caused increases in government debt, they did not precipitate the fall in the value of bonds. Dallas negotiated the subscription of the last bond issue at 65 percent of face value on the premise that debtholders would not be granted bonuses, and by March 1815, the end of the War had revived government credit to the point where new 5 percent bond issues were selling at par. What is most startling about the government's financing policy, and most telling from the standpoint of discriminatory treatment of debt issues, is the decision to restrict the supply of treasury notes and subordinate bond debt through the special tax receivability and early redemption of treasury notes. The government chose to keep 5.4 percent treasury notes trading at par, while allowing 6 percent bonds to fall to 65 percent of face value.

The costs of the reliance on bond financing were not limited to the relatively high cost of debt service that bond financing entailed. By continuing to rely on bond issues at double the current yield of treasury notes, the government legitimized the market's expectations of greater default risk on bonds.[11]

Moreover by trying to renege on its promised bonus to early subscribers, the government further imperiled its reputation in bond markets.[12] Finally, by driving down the value of loans negotiated in 1812 and 1813, which were held mainly by banks and which did not benefit from the bonuses enjoyed by the subscribers of 1814, the government forced banks to suspend specie convertibility until the credit of the government could be restored.[13] Given the high rates of discounting, the reputational costs of subordinating bond financing, and the consequences of bond depreciation for the banking system, it seems puzzling that the government did not issue more treasury notes.

C. The Civil War

As Table 1 shows, the Civil War was by far the largest source of government debt increase during our period. While the Revolution and the War of 1812 both produced high levels of debt per capita relative to peace-time periods, neither came near the 40-fold increase in per capita debt from 1860 to 1865.

Table 1. Government Debt

	*Total Debt**		*Interest-Bearing Debt*	
	Level ($ Millions)	*Per Capita ($)*	*Level ($ Millions)*	*Per Capita ($)*
1800	83.0	15.6	83.0	15.6
1810	53.2	7.3	53.2	7.3
1820	91.0	9.4	91.0	9.4
1830	48.6	3.8	48.6	3.8
1840	3.6	0.2	3.6	0.2
1850	63.5	2.7	63.5	2.7
1855	35.6	1.3	35.6	1.3
1860	60.0	1.9	64.6	2.1
1861	87.7	2.7	90.4	2.8
1863	1,111.4	33.3	707.5	21.2
1865	2,674.8	77.0	2,221.3	63.9
1867	2,508.2	69.3	2,248.1	62.1
1869	2,432.8	64.4	2,162.1	57.3
1871	2,247.0	56.8	1,934.7	48.9
1875	2,090.0	47.5	1,722.7	39.2
1880	1,919.3	38.3	1,724.0	34.4
1885	1,375.4	24.5	1,496.2	26.7
1890	890.8	14.2	723.3	11.6

Note: *Public Debt less cash in the Treasury.
Source: U.S. National Monetary Commission [1910: 255].

The effective subordination of certain classes of debt to others was an integral part of government financial management during and after the Civil War. The government entered the Civil War in unusually poor financial condition. After eight consecutive years of federal surpluses, from 1850 to 1857, Congress acted to reduce the level of tariffs, which accounted for almost all federal receipts during this period. The reduction in tariff rates, the recession beginning in 1857, and the long-term decline in agricultural prices after the Crimean War led to a drastic decline in customs receipts, and caused a rise in the level of debt from $28.7 million at the end of 1857 to $64.8 million at the end of 1860 [Studenski and Krooss, 1963: 125]. Bond authorizations placed severe ceilings on the yields allowable on government bonds, and few were subscribed at the legally mandated prices. Thus most of the financing needs of the government were met by short-term note issues.

Although the secession of the South allowed the passage of the Morrill Tariff bill in March 1861, which restored duties to their pre-1857 rates, extraordinary military expenditures and the portent of war more than offset the beneficial effects of the tariff on the market valuation of public debt in early 1861. Under the stewardship of the newly appointed Secretary of the Treasury, Salmon Chase, the government kept new debt issues low. Bond price floors limited the extent of new bond issues, and for the first months of 1861 the government augmented bond finance with short-term issues and postponement of bills payable.

During 1861 the Treasury issued a wide variety of debt instruments and did not discriminate initially in their backing. It guarded against depreciation of its newly created currency issues (the "demand notes") by promising coin redemption on demand, and by making currency issues receivable in payment of tariffs at par with specie as it had done for treasury notes during the War of 1812.[14] It limited price differences between bonds and notes by giving noteholders the right to convert their holdings into bonds at will.

The single most important early source of funds for the government was the massive loan that Secretary Chase negotiated personally with a syndicate of bankers from New York, Boston, and Philadelphia. At a time when government bonds and notes had a current yield in the marketplace of between 7.5 and 8 percent, and were therefore not issuable because of the Congressional lower bound of par on the sales of government debt, Chase managed to convince the bankers to purchase at par $150 million of "seven-thirtees," maturing in 3 years and paying 7.3 percent interest.[15] The banks agreed to purchase the debt in three installments, each $50 million, from August through the end of 1861. They planned to resell these bonds to the public, though the banks bore the full risk of interim depreciation.

In the latter months of 1861, it became clear that, contrary to prior consensus, the War would not be over quickly and government finances were in need of substantial augmentation through taxes. The surprisingly large expenditure

needs of the government were revealed in detail on December 10 in Chase's Annual Report. Furthermore, the Secretary's Report disappointed market expectations of a call for substantial taxation, and created concerns due to his proposals to create a uniform currency by regulating the banking system. This demise of public credit was exacerbated by the worsening of the Trent Affair, which raised the possibility of British entry into the War in support of the South. On December 16, news reached New York of an effective British threat of war.

As in 1814, the banks' exposure to public credit risk through their holdings of government debt led to fears of bank insolvency as the value of the debt fell. Banks suffered a sharp contraction of reserves and were forced to suspend on December 30.[16] As matters worsened, the government chose to subordinate some debt instruments to others. From 1862 on, new issues of currency (greenbacks) and the remaining old demand notes would not be convertible into specie on demand. Although the value of the old demand notes was maintained by virtue of their continued receivability for tariff payments at par with specie, greenbacks were not receivable at par with specie and the promise of resumption of convertibility on demand was not given a specific date.

By making greenbacks a legal tender, and hence a legal numeraire for the satisfaction of all dollar-denominated debt, the government tied the value of all dollar-dominated debt to the falling value of the greenback. The government itself issued two kinds of debt, short-term dollar-denominated debt (interest-bearing and non-interest-bearing), and longer-term coin-denominated bonds. These two forms of debt issued prior to 1863 were linked through conversion privileges, which allowed greenbacks to be converted at par into 6 percent bonds, and short-term treasury notes to be converted into three-year "seven-thirtees." At Chase's behest, Congress abrogated the conversion privilege for greenbacks in March 1863, effective July 1863 [Love, 1931: 100-06; Mitchell, 1903: 104, 107, 115, 195-97]. Together, the creation of depreciated legal tender currency and the revocation of conversion allowed the government to discriminate between two classes of obligations, bonds and other debt. Discrimination was clearly Chase's intent in requesting abrogation of conversion. He had withheld bonds in anticipation of repeal, refusing on his own authority to issue amounts authorized by Congress because their market price was, in his opinion, too low [Love, 1931: 102-04].

Coupons on coin-denominated bonds were paid in specie, and when the first principal repayments occurred in 1869, the coin payment provisions were honored. Paper-denominated debt, on the other hand, could fluctuate in value with the value of greenbacks. Given the commitment to specie payment of bonds, greenbacks and other paper-denominated debts were effectively subordinated to bonds. Not until 1879, however, were greenbacks and greenback-denominated debts redeemed at the promised specie parity. Thus,

the government honored the promised specie convertibility of its debts sequentially, giving preferential treatment to bondholders.[17]

The main beneficiaries of this policy were bondholders and banks. Indeed, Bray Hammond has argued that the creation of legal tender currency—rather than Chase's preferred strategy of establishing the National Banking System to bolster the demand for government bonds (to be required as backing for bank notes) in 1862—was prompted by a concern for the interests of the banks [Hammond, 1970]. Banks held bonds and notes, all of which had depreciated since their purchase from the government. Banks were obligated to redeem their deposits in dollars. The creation of depreciated legal tender allowed bank liabilities to fall in value along with bank assets, and thus permitted the banks to maintain solvency. The legal tender laws, therefore, were a tax on all dollar-denominated debt, including the holdings of bank depositors, and the depreciation of greenbacks created inflation gains for all debtors, not just the government.

The government reinforced the protection to bondholders by relying mainly on short-term paper-denominated debt to finance the war (see Table 2). Given the subordination of paper-denominated debt to bonds, restrictions on the supply of bonds insulated bondholders from default risk. As Table 3 shows, as of August 31, 1865, bond indebtedness accounted for only 40 percent of total net debt.

Another discriminatory aspect of Civil War finance that favored bondholders was the creation of the National Banking System from 1863 to 1865.[18] The hallmark of this institution, and its most important effect on the public credit, was the 10 percent annual taxation of state-chartered bank notes (which rendered them unprofitable), and their replacement by the notes of national banks. National banks' notes were guaranteed by the government and backed by bank holdings of government bonds to the extent of 111 percent of note issues, and by required greenback or specie reserves of between 5 and 25 percent (depending on the date and location of the bank), as discussed in Calomiris [1988b].

While it was argued that the Act was justified by the desirability of a uniform currency (greenbacks and national bank notes traded at par, as both were guaranteed obligations of the government) to replace the multiple currencies of the antebellum period, it was no coincidence that the Act came at the height of the Civil War. National bank notes provided a further means of seignorage rent for the government. Rather than increase the supply of government legal tender currency (perceived by many, including the Secretary of the Treasury, as a temporary device of questionable constitutionality), the National Banking System created an additional permanent real demand for bonds and, to a much lesser extent, greenbacks, as reserves.[19] Thus it added to the protection of bondholders, while doing relatively little to bolster the value of dollar-denominated debts. There was a drastic fall in bond yields beginning in March

Table 2. Federal Debt Composition, 1865-1889
(millions of dollars)

	August 31, 1986	*July 1, 1870*	*July 1, 1875*	*July 1, 1880*
Funded Debt:				
3 percent bonds	14.0	14.0	14.0	14.0
4 percent bonds	0.6	—	0.7	739.3
4.5 percent bonds	—	—	—	250.0
5 percent bonds	235.2	221.7	607.1	484.9
6 percent bonds	859.8	1,765.3	1,100.9	235.8
Total	**1,109.6**	**2,001.0**	**1,722.7**	**1,724.0**
7.3% notes	830.0			
Other short-term debt*	443.2	45.5		
Matured debt	1.5	3.7	11.4	7.6
Non-interest bearing debt:				
United States notes	433.2	356.1	375.8	346.7
Fractional currency	26.3	39.9	42.1	7.2
Other	2.1	34.5	80.3	34.9
Total	**461.6**	**430.5**	**498.2**	**388.8**
Gross debt	2,845.9	2,480.7	2,232.3	2,120.4
Cash balance	88.2	149.5	142.2	201.1
Net debt	2,757.7	2,331.2	2,090.0	1,919.3

Note: *Includes 6% certificates of indebtedness, $85.1 million; temporary (4, 5, and 6%) $107.1 million; $5% notes, $34.0 million; and 6% compound interest notes, $217.0 million.

Source: Studenski and Krooss, *Finacial History of the United States* [1963: p. 174], based on "Reports of the Secretary of the Treasury," 1867, 1870, 1875, and 1880.

1865, around the time the demand for bank notes and derived demand for bonds were ensured by the newly legislated tax on state bank notes; but this decline may have resulted from tax increases and Northern battle successes more than from the change in banking law.[20]

Lucas and Stokey [1983] have argued that it may make sense for a government to suspend convertibility of debt and inflate the debt numeraire during wartime, to provide a state-contingent tax smoothing rule. Bordo and Kydland [1988] have developed that argument further, and applied it to a

Table 3. Composition of Marginal Federal Debt Issues By Fiscal Year, 1861-1865

	1861-1862				*1862-1863*				*1863-1864*				*1864-1865*				*Total*			
Loan	*I*	*R*	*NI*	*ND*	*I*	*R*	*NI*	*ND*	*I*	*R*	*NI*	*ND*	*I*	*R*	*NI*	*ND*	*I*	*R*	*NI*	*ND**
Oregon war debt	1.0		1.0														1.0		1.0	
Loan of 1842						2.6		2.6										2.6		2.6
Texan indemnity										1.0		1.0		1.6		1.6		2.6		2.6
Loan of July and August 1861	50.0		50.0						30.6		30.6		108.6		108.6		189.2		189.2	
Five-twenties of 1862	13.8		13.8		175.0		175.0		321.6		321.6		4.3		4.3		514.7		514.7	
Loan of 1863									42.1		42.1		32.2		32.2		74.3		74.3	
Ten-forties of 1864									73.3		73.3		99.6		99.6		172.9		172.9	
Five twenties of June, 1864													90.7		90.7		90.7		90.7	
Navy pension fund													7.0		7.0		7.0		7.0	
Total	**64.8**		**64.8**		**175.0**	**2.6**	**172.4**		**467.6**	**1.0**	**466.6**		**342.4**	**1.6**	**340.8**		**1049.8**	**5.2**	**1044.6**	
Treasury notes of 1857		2.5		2.5														2.5		2.5
Treasury notes of 1860		10.0		10.0														10.0		10.0
Treasury notes of 1861	26.9	30.7		3.8		2.1		2.1		1.9		1.9					26.9	34.7		7.8
Seven-thirties of 1861	122.7		122.7		17.3	.1	17.2			.7		.7		138.4		138.4	140.0	139.2	.8	
One-year notes of 1863									44.5		44.5			38.5		38.5	44.5	38.5	6.0	

Two-year notes of 1863								166.5	13.6	152.9			114.0		114.0	166.5	127.6	38.9
Compound interest notes								17.3	2.3	15.0		180.2	1.5	178.7		197.5	3.8	193.7
Seven-thirties, 1864-65												671.2		671.2		671.2		671.2
Total	**149.6**	**43.2**	**106.4**	**17.3**	**2.2**	**15.1**		**228.3**	**18.5**	**209.8**		**851.4**	**292.4**	**559.0**		**1246.6**	**356.3**	**890.3**
Old-demand notes	60.0		60.0		56.2		56.2		2.9		2.9		.4		.4	60.0	59.5	.5
Legal-tender notes	98.6		98.6	291.3	2.1	289.2		86.4	42.6	43.8		4.2	4.3		.1	480.5	49.0	431.5
Fractional currency				20.2		20.2		8.2	5.5	2.7		14.6	11.4	3.2		43.0	16.9	26.1
Total	**158.6**		**158.6**	**311.5**	**58.3**	**253.2**		**94.6**	**51.0**	**43.6**		**18.8**	**16.1**	**2.7**		**583.5**	**125.4**	**458.1**
Temporary loans	66.4	8.5	57.9	115.2	67.5	47.7		169.2	197.3		28.1	131.4	118.5	12.9		482.2	391.8	90.4
Certificates of Indebtedness	49.9		49.9	157.5	50.4	107.1		169.2	165.1	4.1		131.0	174.8		43.8	507.6	390.3	117.3
Total	**116.3**	**8.5**	**107.8**	**272.7**	**117.9**	**154.8**		**338.4**	**362.4**		**24.0**	**262.4**	**293.3**		**30.9**	**989.8**	**782.1**	**207.7**
Grand Total	**489.3**	**51.7**	**437.6**	**776.5**	**181.0**	**595.5**		**1128.9**	**432.9**	**696.0**		**1475.0**	**603.4**	**871.6**		**3869.7**	**1269.0**	**2600.7**

Note: *I = Issued
R = Redeemed
NI = Net increase
ND = Net decrease

Source: Dewey [1903: 308].

variety of historical episodes. What is interesting about the financing of these three wars, however (and particularly apparent in the Civil War), is the *selective* nature of suspension and depreciation. During the Civil War and its aftermath, all interest and principal payments on bonds were made in specie, as promised, and the quantity of bonds issued was held to a low level to support bond prices. The government discriminated against other, paper-denominated debtholders by giving them only a vague promise of future convertibility, by relying on them for marginal funding needs (and hence, allowing the real value of outstanding paper-denominated debt to fall), and by postponing actual convertibility until 14 years after the end of the Civil War.

Although the process of returning to specie convertibility of government debts was discriminatory, it occurred sooner and more gradually than the ten-year lapse between the honoring of coin payment of bond principal and the resumption of greenback convertibility indicates. From 1869 through 1878, the restructuring of debt from paper- to coin-denominated securities gradually put more and more of the public debt on a specie basis. As Table 3 shows, coin-denominated debt rose steadily as a proportion of total net debt, from 40 percent in August 1865 to 90 percent by July 1880.

Some advocated a more rapid resumption of convertibility, which would have put bonds and paper-denominated debt on an equal footing much sooner. Furthermore, once the War had passed there were attempts to return to the status quo by revoking the legal tender status of greenbacks and challenging the dual standard system of debt. Salmon Chase, in his capacity of Chief Justice of the Supreme Court, argued in *Hepburn* v. *Griswold* (1869) that the government had the right to emit bills, but not to make them a legal tender, as that provision constituted an unconstitutional impairment of contracts. Chase had been a reluctant advocate of greenback issues during his tenure as Secretary of the Treasury, for which he implicitly apologized in his opinion [Hammond, 1970: 184-185; Dunne, 1960: 69-76]. The full ramifications of this decision were not clear, as the case had focused on the issue of whether debts contracted before the War could be satisfied in greenbacks. Nevertheless, the status of dollar-denominated debt made after 1862 was clouded by the opinion of the majority, which favored the unconstitutionality of greenbacks as a legal tender. Changes in the composition of the Court led to a reversal of *Hepburn* v. *Griswold* in *Knox v. Lee* (1871) and *Parker* v. *Davis* (1871), and a reassertion of the constitutional right of the government to declare its bills a legal tender.

A defence of Chase's position can be found in the intentions of at least some of the founding fathers and the precedent established by the use of currency during the War of 1812. The framers of the Constitution deliberately left the legality of federal money creation vague, in part because they wanted to ensure flexibility in case of war. Some delegates pointed specifically to the efficacy of currency finance during the Revolution as evidence that it might be needed,

at least as a last resort [Hurst, 1973: 12-16; Dunne, 1960: 13-16]. The issues of currency at the end of the War of 1812 had been used as a last resort, had not been granted legal tender status, and had been withdrawn immediately after the War. The notion that the federal government had the power to circulate paper currency on a permanent basis during peacetime and declare it legal tender was a novelty of Civil War finance without constitutional authority or precedent.

In practical terms, however, a repeal of legal tender status for greenbacks would have meant a large lump-sum transfer of wealth to creditors, who could demand payment of all dollar-denominated debt in specie. The injustice and costs of such a transfer, to the government and other debtors, led the Justices to find in the penumbra of the Constitution a right that was not (but needed to be) there.

In summary, during the Civil War, currency and short-term paper-denominated debt were used as a buffer to insulate coin-denominated bond debt and the banking system from the exigencies of War expenditure needs. The revocation of the conversion privilege, the establishment of a depreciated numeraire for short-term dollar-denominated debt, the enactment of the National Bank Act, and the reliance on short-term debt issues as the principal means of finance, were all part of a consistent effort to discriminate in favor of bondholders. The legal tender law also served the interests of banks and other debtors, and prevented bank insolvency by reducing bank liabilities to a level commensurate with bank assets.

D. Interpreting Discrimination

Throughout the early history of U.S. debt management, discrimination among creditors was pervasive but conditional. Discrimination was especially pronounced during periods of high expenditure (wars), in which the government's reluctance to tax implied that the commitment to some or all of the debt would be relaxed. In these episodes, the government chose to concentrate the relaxation of support for its debt in certain types of instruments and maintain favored treatment of others, rather than allow all debt to depreciate pari passu.

There are common patterns, as well as important differences, across these various episodes in the discriminatory treatment of bondholders. In the Revolutionary and the Civil War periods, expenditure shocks led to an increase in the use of short-term debt, the eventual resort to currency, the continued primary reliance on short-term debt for later financing needs, and the depreciation of short-term debt and money to maintain the relative value of bonds. In the War of 1812, the first stage was similar to these: short-term notes were issued, and bonds were favored by special insurance arrangements. But as matters deteriorated, the government relied mainly on bond finance, tried

to renege on its commitment to insure bondholders, and maintained the value of short-term debt and currency through tax receivability, while it allowed bonds to depreciate greatly in value.

The use of short-term credit was extremely rare and reserved almost exclusively to wartime. Given the high brokerage costs of rolling over debt (usually either 1/4 or 1/8 percent of total debt subscribed), it made sense for the government to have preferred long-term to short-term debt under normal circumstances.[21] During wartime, however, short-term debt was issued to provide a buffer for long-term bonds. That is, if the government were forced to default, inflate, or suspend some of its debt by the future exigencies of war, the segregation of debt into notes and bonds allowed discrimination to preserve the value of bonds.

Of course, discrimination between short- and long-term debt would not have been possible unless the two groups of debtholders could be segregated. Without an effective means of segregation, short-term debtholders would have had an incentive to bid for bonds in foreign and domestic markets, and their actions would have eliminated any advantage from selective default rules. Segregation could be enforced by direct placement of favored debt (rather than open auction), by differences in the denomination of debt that prevented bidding for large-denomination favored debt by the less wealthy domestic lenders, or simply by marketing securities in different places and relying on prohibitive arbitrage costs to preserve a yield differential. As we have seen, such practices were quite common.

In effect, this meant that bondholders were asked to bear less than their proportional share of government default risk when that risk became large. This is a puzzling policy rule in a world where debtholders are risk averse. Spreading a given amount of default risk over as large a group as possible should reduce the cost of selling risky debt to creditors, since risk aversion implies that the per-dollar risk premium on debt rises with the degree of risk borne by the creditor.

What did the government have to gain by so discriminating in favor of bonds? The answer may lie in varying costs of default in the different debt markets. From the standpoint of domestic residents, long-term bonds, short-term debt, and money were not perfect substitutes because of differences in denomination and transactability. One can posit downward sloping domestic demands for each of these instruments. Foreign demands were important mainly in the market for bonds. The bond market was a more competitive market for credit internationally, involving investors and governments all over the world. The market for treasury notes, and money in particular, was more nationally isolated. Short-term debt was less practical for foreigners to hold because of the short duration of holdings and the need for turnover. Domestic residents faced lower costs of turnover and were attracted by the smaller denominations of the securities (given the lack of privately supplied substitutes).

Local bank monopolies, due to unit banking laws and information costs that limited the development of private securities, gave the government a captive market for small denomination T-bills. The demand for money was national in character as well, partly because the usefulness of money to pay national taxes created economies of scope for using it in other transactions. Furthermore, the redeemability proviso of fiduciary money entailed a "put option" to the holder; the value of this declined with the distance one would have to travel to exercise it.

Given that the bond market was more competitive or, in other words, had a higher elasticity of demand, it could punish government default more effectively, and charge more for bearing default risk. Thus, maintaining a reputation in the bond market was more valuable than maintaining one in the money or note markets. A "Ramsey-pricing" government finance policy, therefore, would favor bondholders by making other creditors bear more default risk. To accomplish this, the government would have to restrict the supply of senior bond debt and, if default became necessary, make the other instruments bear most of the burden of default. A simple formalization of these points is presented in Motomura [1991].

The creation of the Bank of the United States and the government's reliance on it for funding is consistent with the market segmentation approach to discrimination. The Bank was, by design, a source of inelastic supply of credit to be used when credit was tight. The rents created by its charter thus were shared by the government during its time of need in the 1790s. Furthermore, this rent sharing, as well as direct stock ownership by the government, increased the potential costs to the government of defaulting on loans to the Bank, and thereby lowered the default risk of government borrowing from the Bank, as opposed to other creditors. Thus, the Bank could profitably charge the government a lower interest rate than other lenders. The difficulties experienced in financing the War of 1812 in the absence of the Bank were the prime motivation for its second charter in 1816.

Market segmentation and Ramsey-pricing can account for the selective default on the Revolutionary debt, the use of special guarantees on bonds in 1813 and 1814, the discrimination in favor of bond debt during and after the Civil War, and the use of the Bank of the United States as a financing tool. Legal tender laws were an important component of discriminatory policy during the Civil War, as a means to alter the numeraire of debt. They were not needed to create a demand for government currency. Tax receivability was a sufficient condition for the currency issues of the War of 1812, the old demand notes of 1861, and many of the colonial issues to be highly valued and circulated as media of exchange. Legal tender provisions enacted during the Civil War were a means of stabilizing the banking system (by depreciating its liabilities), and of creating two numeraires for government debt, which permitted discrimination by the government in favor of bondholders. Enacting a legal

tender law in 1814 would have been inconsistent with the role of short-term debt and money in the government's financing plan, since by then the government had decided to discriminate in favor of short-term debt and maintain its value.[22]

According to the debt-discrimination approach to Civil War legal tender legislation and suspension, neither the Rolnick-Wallace argument that the change in numeraires during the Civil War was neutral with respect to the cost of finance, nor the traditional view they criticize that saw suspension as excessively costly, is correct. Suspension, like other discriminatory devices used throughout this period, reduced the overall cost of finance by acting as an effective means of segmenting various types of creditors.

Two important questions about the selective timing of the use of different government debt instruments, however, remain unanswered: the limited federal role in money supply during peacetime, and the reversal of direction in the treatment of bondholders during the War of 1812.

First, why was money not issued by the federal government during peacetime, too? Unlike large denomination interest-bearing debt, zero-interest currency can circulate indefinitely and be distributed at virtually zero brokerage cost. Furthermore, as advocates of paper money have noted for centuries, it is welfare improving in that it saves resources from mining, minting and wastage of specie coins [Calomiris, 1988a]. State governments, through their holdings of state-chartered bank stock, benefitted from the "seignorage" rents earned on zero-interest bank currency, while the federal government (after selling its stock in the Bank of the United States) did not share in these benefits during peacetime.

Even if federal government currency were defaulted on occasionally (when expenditure shocks were especially severe), some people would still desire to hold it and bear that risk. While it is reasonable to oppose forcing people to accept money (i.e., to oppose legal tender laws that make paper money a medium for satisfying private debts), it is inefficient not to allow individuals to hold government-created paper if they so choose. This can be accomplished by allowing conversion of government debt into paper money at the creditors' discretion, without making money a legal tender.

One might expect that the demand for properly backed paper money would be large during normal times, and not much reduced by the occasional government default or suspension during wartime, as long as people understand the government's contingent default rule for money and other debt. Although some experiments with government paper currency issues, including the Continentals, ended in default, many other colonial currencies were issued with great success, and enjoyed the confidence of the market [Calomiris, 1988a; Smith, 1985; Wicker, 1985].

Given its potential benefits, the lack of government-created paper money prior to the Civil War seems best attributed to constitutional concerns about the role of the federal government, the opposition of states and state-chartered

banks to an incursion on their "seignorage," and perhaps some extrapolation from the depreciation of the Continental note issues. During wartime people were willing to put aside these concerns because the need to win the war outweighed long-term considerations about the proper role of government, and because support for the temporary use of currency during wartime could be found in the intentions of the founders.[23]

A second factor not explained by the market-segmentation theory of debt discrimination is the government's reversal of direction late in the War of 1812, in which it switched from policies favoring bondholders to those that discriminated against bondholders. One explanation for this unusual switch is that the circumstances were particularly desperate for government finance—so desperate that the government could no longer afford to maintain its reputation in the bond market.

In general, as war expenditures rise and debt accumulates, there comes a point where the potential for government default can lead bondholders to withdraw from the market regardless of the yield offered. In other words, the yield could rise so high that default would be a practical necessity in the future (because of economic or political limitations on taxation) and bondholders would not find any bond yield attractive.

As worsening fortunes take a government nearer to this point, a switch to favoring short-term notes may be useful to provide a "hedge" against future financing needs. By favoring short-term notes (keeping their supply low and their price high, and singling them out for special receivability in payment of taxes), the wartime government ensured that in the event of a major unanticipated need for funds, it would have access to those funds through note issues, even if the subordinated bond market were closed. Increasingly, bonds became claims on more distant and uncertain taxes, as current taxes were used to back notes. An additional benefit of money and note finance is the rapidity with which such financing needs can be met.

In other words, once the rate of time preference of the government rises sufficiently (due to a threat to its survival), the goal of preserving future access to the bond market becomes secondary.[24] In anticipation of this, the government will need an alternative means of credible finance for such emergencies. The policies of 1814 and 1815 can be viewed as providing for this potential (unrealized) collapse of government credit.

The government's credit was on the verge of collapse toward the end of 1814. James Monroe had to pledge his personal fortune to secure funds to transport General Jackson's troops to New Orleans. In November 1814, one member of Congress wrote:

> So completely empty was the Treasury and destitute of credit that funds could not be obtained to defray the current ordinary expenses of the different Departments...the Department of State was so bare of money as to be unable to pay even its stationery bill...the

> Treasury was obliged to borrow pitiful sums, which it would disgrace a merchant in tolerable credit to ask for....The Paymaster was unable to meet demands for paltry amounts—not even for $30....In short it was difficult to conceive a situation more critical and perilous than that of the government at this moment, without money, without credit, and destitute of the means of defending the country [Myers 1970: 78].

Peace followed soon after the battles at the end of 1814, and government credit was restored. The loan of March 1816, which offered only a 5 percent coupon, was fully subscribed at par. Given the contingent default rule for bonds (only default as a last resort), one would expect that the penalty imposed on future bond issues from following this rule would be small. If the market understands the default policy of the government, it will not penalize future government bonds for the bad luck, and subordination, of the past. This may explain why, once the war had ended, government bond yields fell so precipitously.

III. DEBT MANAGEMENT POLICIES AS INCENTIVE DEVICES

In section II, I argued that the government found it useful to vary its reliance on short- as opposed to long-term debt, and use a variety of accompanying policies, to discriminate across creditors. But discrimination, varying the term structure of debt, and other policies, affected more than the *relative* default risks of debt instruments. Here I argue that often debt management policies affected the government's incentives to tax, and therefore, the default risk for government debt as a whole.

A. Discrimination and Incentive Compatibility

Given the advantages of discriminating in favor of certain creditors, government policies that shifted some of the government's debt into the favored debt categories implied a reduction in overall government default risk. By borrowing more from its most valued customers the government increased the likelihood of repayment. That is, it became more likely that the government would pursue responsible fiscal policy because the penalties associated with not doing so became greater.[25]

The massive bank-syndicate loan of 1861 provides a striking example of this phenomenon. Recall that bankers agreed to purchase $150 of "seven-thirtees" at par at a time when the market price on other government debt was nearly 100 basis points higher. Why did the bankers agree? Hammond [1970:74] points to the low level of loan demand in the summer of 1861 as one contributing factor. But this seems insufficient to explain why the bankers were willing to take the loans at such low terms. Conceivably, Chase could have exercised

some leverage, for example by threatening to exclude uncooperative banks from the Independent Treasury System. On the other hand, a syndicate of all the banks of New York, Boston, and Philadelphia acting jointly through appointed representatives would not be bullied easily.

It is imaginable that the bankers found a loan to the government at this low rate to be in their own self interest. After all, the financial collapse of the government, or the failure to provide an adequate timely defense, were not in the interest of commerce. Additionally, there was safety in numbers. By banding together as a syndicate, they increased the probability of responsible fiscal management by the government and reduced the costs to any one bank of government mismanagement or default. The war was not expected to be protracted or expensive and the government was not likely to endanger the entire banking system of the country. Even if by some improbable turn of events (and these did occur), the banks suffered a drastic depreciation, they would suffer it together as they had in panics before, and as before would weather the storm through suspension as they had for previous aggregate shocks.

In this sense, government credit from banks was not a perfect substitute for credit from individuals, since the incentives of the government and the risk suffered by government creditors depended on the source of funds. In other words, by borrowing through the banks the government was able to commit to more responsible management than it could have by issuing loans directly to individuals. Also banks were willing to pay more than individuals for government debt because they faced less bankruptcy risk from a given shock to government finances.

The most convincing evidence that the bank loan effectively reduced the cost of government borrowing is the ability of the banks in August and September to sell the first installment of the "seven-thirtees" to the public profitably. Public sales of the second subscription were slow in October and November, and the banks opted to take 6 percent bonds rather than "seven-thirtees" for the third installment, planning to sell these in European markets [Mitchell, 1903: 36]. The payments on the third installment proceeded smoothly until December 10, 1861. Furthermore, the "safety in numbers" argument for the lesser risk of bank-originated credit to the government is borne out by the favorable treatment banks received during the debt crisis and the enactment of the legal tender bills.[26]

In the case of the transformation of the Civil War debt from paper- to gold-denominated securities, discrimination had an additional incentive effect. Not only did the debt transformation lower the proportion of paper-denominated debt, but it reduced the probability of default through inflation on the remaining paper debt. In other words, restructuring the debt increased the market's confidence in the resumption of future greenback convertibility into gold. By removing the potential debt-reduction benefits of reneging on promised resumption, the government increased public confidence in the return to gold.

Table 4. Var Results

Lagged Endogenous Variables	*DLG*	*DLNET*	*DRINC*	*DLEX*	*DCPR*	*DLWP*	*DLDEP*	*DLN*	*DLPROD*	*DLUK*
					F-Tests					
DLG	.002	.691	.761	.357	.027	.531	.087	.712	.384	.935
DLNET	.279	.055	.005	.883	.297	.976	.141	.973	.659	.436
DRINC	.287	.979	.687	.937	.153	.952	.217	.980	.643	.467
DLEX	.297	.126	.472	.970	.288	.129	.140	.031	.795	.930
DCR	.000	.923	.802	.440	.096	.912	.042	.693	.310	.902
DLWP	.981	.043	.118	.813	.243	.529	.678	.726	.924	.648
DLDEP	.358	.915	.644	.653	.003	.690	.004	.391	.775	.758
DLN	.208	.743	.670	.985	.756	.196	.346	.000	.731	.833
DLPROD	.247	.398	.214	.390	.126	.272	.315	.036	.047	.988
DLUK	.265	.092	.180	.558	.824	.467	.118	.109	.395	.665
					Correlation Matrix					
DLG	1.00									
DLNET	−.04	1.00								
DRINC	.09	−.92	1.00							
DLEX	.00	−.14	.02	1.00						
DCPR	.09	.19	−.15	−.12	1.00					
DLWP	.02	.07	−.10	.10	.19	1.00				
DLDEP	−.21	−.16	.18	.19	−.49	−.06	1.00			
DLN	−.04	.02	.04	−.10	.13	.02	−.07	1.00		
DLPROD	−.13	−.09	.02	−.11	−.03	−.09	.13	−.03	1.00	
DLUK	.25	−.18	.16	−.11	.05	.39	.02	−.09	.05	1.00

Decomposition of Forecast Variance (40 month)
(*Columns sum to 100 percent*)

DLG	45.85	1.84	3.05	3.32	10.20	1.62	6.40	2.41	5.05	6.40
DLNET	3.59	62.96	53.55	3.01	5.60	3.50	8.33	1.25	6.92	4.31
DRINC	8.94	3.23	9.73	8.56	10.99	8.03	7.34	3.06	7.74	7.56
DLEX	6.94	5.82	6.13	62.99	5.42	9.67	7.27	8.77	3.87	2.56
DCPR	11.97	1.35	2.44	4.49	44.54	4.16	16.62	3.78	6.46	2.64
DLWP	1.60	5.33	4.00	1.24	2.73	54.46	2.32	1.47	4.60	15.66
DLDEP	2.72	2.48	3.25	2.94	7.34	3.16	37.74	2.54	4.33	4.23
DLN	9.38	4.07	4.17	1.64	4.19	8.56	3.23	66.13	3.62	4.35
DLPROD	3.87	5.90	6.30	8.93	4.37	3.25	5.00	5.18	51.74	2.01
DLUK	5.52	7.01	7.39	2.88	4.62	3.57	5.74	5.41	5.68	50.29

Notes: Data are monthly from March 1867 to December 1878.
Equations are estimated with 69 degrees of freedom. All variables except DRINC are first-differences of logs. Six lags are used in estimation.
Definitions follow:

DLG = greenbacks
DLNET = government debt net of Treasury gold
DRINC = ratio of gold-to-greenback-denominated debt (differenced)
DLEX = exchange rate
DCPR = commercial paper rate
DLWP = U.S. wholesale price index
DLDEP = bank deposits at New York, Philadelphia and Boston
DLN = national bank notes
DLPROD = U.S. production index
DLUK = constructed British wholesale price index

Source: Calomiris [1988b: 745].

The evidence to support this proposition comes from an analysis of the effects of unanticipated conversions of debt from paper- to coin-denominated securities for the period 1867 to 1878 on the gold value of paper securities. A vector-autoregressive (VAR) model was constructed, using monthly data for this period on: the supply of greenbacks, national bank note issues, bank deposits, the commercial paper rate, an index of economic activity, total net federal government debt, the ratio of coin-denominated to greenback-denominated debts, the gold value of a greenback, and a wholesale price index. Variables other than the two government debt series were included to control for other potential "news" affecting exchange rates. As shown in Table 4, unanticipated conversions of paper-denominated debt into coin-denominated debt caused increases in the gold value of greenbacks, and accounted for 8.6 percent of the forecast variance of the exchange rate.

Table 5 plots the yields on government bonds from 1861, when bonds became gold-denominated with certainty, to 1877, by which time U.S. and British government bonds were earning practically the same return. These data indicate that the conversion of paper- to gold-denominated debt was accompanied by a decline in bond risk.

Discrimination in favor of bondholders changed from a policy that was used to reduce the relative value of paper-denominated claims to one that increased their value along with that of specie-denominated debts. During the most difficult fiscal years of the War, paper debt absorbed the shocks to overall default risk and served as the principal source of funding. After the War, the transformation of debt from paper to gold numeraires reduced the default risk on remaining paper securities. In the earlier period, paper debt served as a buffer to protect bonds from adverse expenditure shocks. Once the war had passed, the conversion to specie debt was part of the necessary policy to convince markets that future taxation would be forthcoming, and that the specie standard would be restored.

Table 5. Percentage Yields to Maturity on US and British Government Securities

	1865	*1867*	*1869*	*1871*	*1873*	*1875*	*1877*
U.S. 6's of 1881*	11.6	8.7	7.7	5.6	5.9	5.4	4.0
British Consols	3.4	3.2	3.2	3.2	3.2	3.2	3.1

Note: *Yields are in gold with certainty for 1869 and later years. For 1865 and 1867 there was a possibility that principal payments would be made in greenbacks.

Source: All US bond data are averages of January and July numbers, which provide comparable ex-dividend yields. Data for 1865 are from Roll, [1972:488]. All other years are from Calomiris [1985: chap. 3, Appendix]. Consol yields are from Mitchell and Deane [1962:455].

Term Structure and Incentive Compatibility

A government that issues short-term debt is forced to renegotiate the terms of finance each period. The renegotiation constraint provides immediate incentives for responsible fiscal management and taxation. By financing short-term, the government creates the opportunity to take advantage of the potential benefits of renegotiation by, for example, raising taxes, and thereby reducing default risk and debt-service cost. If the debt were long-term, the time horizon for government action on taxes would be extended.[27] Short-term debt provides greater incentives for rapid enactment of taxes, and thus generates good news immediately (that taxes are more likely), that in turn drives up the price of current issues.

The transactions costs associated with short-term debt are greater, due to the need to reissue debt that matures. This may add to the "news" content of choosing to finance with short-term debt. By choosing to incur a cost up-front in the form of higher transaction costs, the policy maker signals an intention to take advantage of the benefits inherent in short-term debt.

Thus the tax-news argument provides a motivation for the government to use short-term debt, in addition to the discriminatory motivation for debt term-structure decisions. Unfortunately, in practice it is hard to isolate these two alternative motivations. The protection of holders of long-term bonds, and the advantages of providing incentives to tax, both would have motivated roughly coincident use of short-term, paper-denominated debt, and are difficult to disentangle. Both theories predict that the reduction of fiscal uncertainty and increasing confidence in debt redemption should reduce the reliance on short-term, paper-denominated debt.

Conversion of short-term debt to long-term "funded" debt was a common feature of the periods after the Revolution, the War of 1812, and the Civil War, as both theories predict. Even during the Civil War, there seems to have been a strong link between fiscal news and the timing of the change in debt structure. The reliance on short-term debt and the incidence of fiscal difficulty follow the same ups and downs from 1861 to 1865. Tax increases due to legislation in 1862, 1863, and 1864—which caused tax revenues to rise from $52 million in 1862 to $264.6 million in 1864—at first led to an increase in bond issues and a reduced reliance on short-term notes, as Table 3 shows.[28] Ever rising expenditures, persistent deficits, and war setbacks in 1864, led to increased fiscal uncertainty, which is visible in higher bond yields and greater currency depreciation. This was associated with the renewed use of short-term debt to finance the War in 1864 and early 1865.[29] Once the War was over, short-term debt was steadily retired, as shown in Table 2.

C. Callable Debt as an Incentive Device

A callable bond is a bond that can be redeemed at par at the discretion of the issuer. Virtually every bond issue of the United States from 1790 to 1880 had some call feature, though interestingly, the terms of callability varied across different bond issues. Some bonds were redeemable without limit at the pleasure of the government; others were redeemable in limited amounts, or only after several years had elapsed.[30]

In essence a callable bond issue is identical to the combined sale of a fixed-term bond and the simultaneous purchase of a call option to repurchase the bond at par. A call option provides a capital gain to the issuer when bond yields decline (and bond prices rise) sufficiently. The purchase of a call option reduces the price of the bond issue, therefore, by the value of the option, and thus increases the cost of finance. What can justify the purchase by the government of call options?

If the government were a private bond issuer, callable debt might be explained by a higher degree of risk aversion on the part of the issuer, who wants to avoid interest rate risk and purchase "insurance" from bondholders. But it is difficult to explain why the government should be buying interest rate insurance from taxpayers. The government, with potentially the most diversified income base in the economy, should be able to insure itself better than anyone else against interest rate risk with taxation policy, while relatively risk-averse taxpayers should be purchasing insurance from the government.

Another potential explanation of callable debt relies on asymmetric information. If the government knows more about the future than the public—say, for example, that the government knows that bond yields will soon fall because taxes will rise and cause a reduction in government default risk—then the government can profit from this inside information by purchasing a call option. Asymmetric information, however, is an implausible justification for callable debt. In the United States, taxation policy is debated openly and the Secretary of the Treasury, the President, or members of Congress are unlikely to have inside information about the likelihood of taxes to rise. Bond investors were sophisticated, and were perceived as such by the most famous early advocate of callable debt in the United States, Alexander Hamilton.

Hamilton did argue that issuing callable debt would be profitable in the future because yields would fall over time, due to falling world interest rates and an improvement in the government's credit, but he did not argue that he or other government officials had inside information. Instead, he believed that the "public creditors will be most sensible of the justness of this view" [Hamilton, 1790: 17]. But if bondholders also expected a fall in yields, how could the government profit from issuing callable debt? The reduced price of current government debt (the high perceived value of the call option) would

offset the capital gain enjoyed by the government in the future if the bond market operated efficiently, as Hamilton believed it did.

One way to make sense of Hamilton's argument for callable debt is to consider the causal connection between the use of callable debt and improvement in the government's credit. Hamilton's argument for the advantage of callable debt was conditioned on the improvement in public credit that would come with the adoption of his taxation and debt-management programs. Hamilton explicitly argued that the federal assumption of the War debts of the states and the use of a sinking fund would reduce government default risk. Debt assumption, he argued, would provide powerful government creditors with a strong incentive to support the new government and help to push through federal tax legislation; the sinking fund would make it difficult for responsible fiscal policy measures to be reversed. Perhaps Hamilton saw the use of callable debt itself as a source of improvement in the public credit. That is, if government default risk were lower for callable than for noncallable bonds, then the cost of the call option might be more than offset by the increased price of the bond.

But how does callability reduce default risk? Callable bonds can mimic the positive incentives of short-term debt, and can do so at a lower cost, depending on the brokerage fees for rolling over debt and the time horizon appropriate for incentive manipulation. Like short-term debt, callable debt involves a cost—the purchase of the option—but provides a *contingent* benefit in the form of the capital gain the government can enjoy by reducing its default premium in the future through responsible fiscal management. Thus, the greater is the potential for improvement in fiscal affairs, the more beneficial it will be to rely on callable debt. The up-front fee paid can be more than offset by the reduced default risk premium.

One might object that this search for a rationale for callable debt neglects the possibility that Hamilton and other Secretaries of the Treasury simply failed to understand that they were paying a fee for the call option in the form of a lower price for debt issues. There is clear evidence, however, that Hamilton and Gallatin understood the cost paid by using the option. In his 1795 Report, Hamilton reasoned that bond investors had profited from the government's offer to convert the Revolutionary War debt, redeemable at the pleasure of the U.S. government, into debt with a more limited call provision by which debt could only be called gradually over time:

> ...the complying creditors actually received valuable considerations for the modification of their claims.... Instead of the stipulated annuity being redeemable at pleasure, whenever a fall in the market rate of interest should render it advantageous to pay off principal, it has acquired a more fixed character by the relinquishment of the right of the Government to redeem, except in certain proportions, and a capacity to increase in capital value, by a declension of the market rate of interest [Hamilton, 1795: 178].

> ...it is a material point gained to be able to arrest the hand of Government from paying him, when it is his interest not to receive [Hamilton, 1795: 180].

Gallatin implicitly referred to the cost paid for call options in a letter of February 26, 1810, in which he commented that bondholders preferred an initial period of irredeemability to none.[31]

Callability took a variety of forms which varied over time. In the extreme, a bond of indefinite maturity could be callable at any time in full. Some of the early loans of the United States were made on these terms, but after 1820 virtually no loans were issued in this extreme form [Love, 1931]. From the 1820s until the Civil War, callable bonds typically had indefinite maturity, but an initial period in which the call option could not be exercised. The trend over this period was toward successively longer periods of initial irredeemability.[32] The loans of February, July, and August 1861—which coincided with the Morrill tariff's reestablishment of the higher pre-1857 tariff rates—extended this trend. These bonds matured in twenty years, paid 6 percent coupons, and contained no call option.

The increasing financial difficulties of the early Civil War years were associated with a reversal of the trend against the use of callability. The "five-twenties" of 1862 were redeemable after five years, and matured in twenty. The temporary loan of 1862 had an indefinite maturity and was redeemable after ten days' notice. The certificates of indebtedness of 1862 had a one-year maturity and were redeemable before then at the pleasure of the government. With the exception of the noncallable loan authorized in March 1863, issued at a time of (in retrospect, temporarily) improving conditions for the North, all other Civil War bonds were redeemable after five or ten years from the date of issue.[33] After the War, call options on new bonds were again reduced. Bond issues in the 1870s had a fifteen- or thirty-year period of initial irredeemability.

Thus the history of the use of callable bonds confirms the predictions of the incentive-compatibility argument. During times of relative fiscal difficulty, when the cost of the call option was justified by the benefits of reduced default risk, callable debt was used to a greater extent.

Hamilton's policy of funding the Revolutionary debt (which was callable at the pleasure of the government) into debt that was callable to the maximum extent of 8 percent per year, anticipated the later pattern of varying reliance on callability. Once the period of greatest financial uncertainty had passed, the optimal amount of callability was reduced.

Gallatin argued for reestablishing full callability on Hamilton's exchange debt. His purpose was to speed the redemption of bonds from a redemption period of 18 years to 9. He proposed to reconvert the debt to bonds paying effectively the same yield, but callable at the pleasure of the government. Callability was restricted, however, by the proviso that the bonds could not

be called until other outstanding bonds had been redeemed. The main advantage (according to Gallatin) of this to the creditors was the reduction of transactions costs that were incurred due to the partial (8 percent) redemption of principal.[34] Public creditors were not as impressed with this deal as Gallatin had hoped they would be. Only $8.1 million of the $50 million in debt was exchanged.

This should come as no surprise. On the margin, even if creditors as a class might have benefitted from changing debt to a fully callable form (during a period of fiscal troubles the reduction in default risk may offset the cost of the option, as argued above), it would never have been worthwhile for an individual to convert voluntarily to callable debt. An individual's conversion has no effect on government incentives and offers the government an option at no cost, at the expense of the creditor. Apparently, Gallatin expected the creditors to agree that the ease of transacting larger sums all at once, rather than piecemeal in 8 percent lots, would outweigh their losses in granting the government its option at zero cost. He miscalculated.

It is important to note that the validity of the arguments that short-term debt and callability were useful devices for reducing default risk during periods of fiscal stringency does not depend on their having been understood fully by the Secretaries of the Treasury who employed them. It would be enough for policy makers to employ a rule of thumb, based on past experience with the costs of debt service under various financing schemes, that short-term debt and callability should be employed during difficult times. Callable debt had been in use in Britain at least as early as the seventeenth century [Bowen, 1870: 404].

IV. MONETARY STANDARDS, DEBT-SUPPLY CONSTRAINTS, AND SINKING FUNDS

The political constraints faced by public policy makers in history did not allow independent, sequential choices of policy. Policy often was "path-dependent" by design. Policies other than current taxation, debt issuance, and monetization, were constructed by policy makers with the intent of constraining future levels of debt, money, and taxes. These constraints on the future also reduced the current cost of debt service through their effect on default (or depreciation) probabilities. Constitutional limitations on the monetary powers of state and federal authorities, the legislated commitment to return to greenback convertibility in 1879, the Gold Standard Act of 1900, and many other acts of central importance to the history of deficits and their monetization were constructed to constrain the latitude for future policy, rather than to set current levels of deficits or money. Bordo and Kydland [1988] argue that the adoption of a gold standard was itself a form of government commitment. In the presence of such constraints, even a history of deficits alone must be

written largely as a history of discrete institutional changes that limited subsequent marginal decisions by policy makers, and hence set the long-run pattern of financial policy over some intervals.

There are (at least) two important reasons such discrete policies were at all effective in generating future path dependence: inertia (that is, the costs of removing the policy once in place) and incentive alteration (the changes in the contingent benefits of taxation that occur in the presence of the policy). Current policy makers can induce path dependence in policy by altering the incentives faced by their successors. For example, a policy maker can increase the probability of timely taxation by issuing short- rather than long-term debt or, as from 1862 to 1878, by retiring paper-denominated debt in favor of specie-denominated debt. Another example is the bank loan of 1861, which enjoyed lower default risk by virtue of its link to the banking system.

The importance of reversal costs is evidenced by the persistence of discrete institutional changes and the fact that they were relaxed only in response to extreme events. Specie standards were suspended only during wars or financial crises. Other legislated guarantees or resolutions were maintained, even under severe political pressure to undo them. For example, the Resumption Act of 1875, which set January 1, 1879 as the date to begin resumption of greenback convertibility, should have no impact in the absence of reversal costs since it could be overturned prior to its implementation. But reversal was a real concern only for a brief period in 1876 when the control of the Democratic party was uncertain. Before that, and thereafter, the timetable set by the act was credible, and without it resumption would likely have been postponed beyond 1879.[35] There was nothing to prevent, in principal, a second suspension of convertibility immediately after resumption. But those on both sides of the question of resumption clearly regarded the return to gold as a discrete jump away from the possibility of inflation.

Alexander Hamilton was a firm believer in the costs of policy reversal, which he described with characteristic eloquence:

> ...why, it might be asked, if a disposition unfaithful to the public engagements, or unfriendly to public credit, should exist, would it not operate to produce a violation of a provision made, as well as to prevent the making of one?
> ....To undo...requires more enterprise and vigor...than not to do....This is particularly true where a number of wills is to concur.... In collective bodies, *votes* are necessary to ACTION; absences may produce INACTION. It often happens that a majority of voices could not be had to a resolution to undo or reverse a thing once done, which there would not be a majority of voices *to do*...
> ....This reasoning acquires tenfold force when applied to a complex Government like ours...acting through different organs...the House of Representatives, the Senate, and the President. [Hamilton, 1795: 179].

This sort of reasoning underlay much of Hamilton's policy agenda. He was most concerned to establish precedents for responsible fiscal policy, and he

believed that these policies, once enacted, would be perpetuated partly by political inertia. Hamilton lobbied Congress to establish sinking funds, make long-term commitments to tax, and establish new taxes in order to set precedents that would be difficult to reverse.

It is interesting to note how often specific promises were kept by the government. The government ruled in favor of compensating bond investors who had received price guarantees in 1814 and 1815; it maintained promised lower bounds on bond price issues—and thus upper bounds on bond supply—for most of US history; promises of receivability in payment of tariffs were honored for the old demand notes in 1862 and 1863; even the revocation of the bond conversion privilege for greenbacks provided a grace period for moneyholders to convert to bonds [Mitchell, 1903: 115-18, 197].

The role of sinking funds in contributing to the credibility of government debt repayments likewise depends on the cost of revoking their provisions. Whether sinking funds acted effectively to constrain future fiscal policy has been a topic of centuries of debate. Detractors of sinking funds argued that they had little effect when debt repayments were financed by new debt issues. Hamilton's faith in sinking funds came from his view that reversal costs would make them succeed in the long run. By making debt repayment automatic (by subordinating new debt to old debt through old debt's prior claim on taxation revenues) and by requiring new debt issues to be authorized by act of Congress, an institutional bias was created toward the retirement of debt. Although the sinking fund in no way guaranteed that deficits would disappear, it required a positive act of Congress to maintain them. The burden of action was placed on the spenders. The sinking fund acted as a device to set the pace of debt retirement, absent shocks of sufficient degree to mobilize contrary policy.

The very fact that government creditors voluntarily chose to convert 6 percent nonfunded debt into 4 percent funded debt indicates a perceived advantage from the sinking fund. At the least, the sinking fund gave preference to funded debt at the expense of nonfunded debt. Moreover, the sinking fund policy established a queue in which the financing of new expenditures was subordinated to existing funded debt. This "disciplined" Congress by ensuring that the marginal cost of financing new expenditures would be sensitive to government taxation policies and prevented Congress from subordinating old funded debt (effectively increasing its risk) to lower the cost of new bond flotations.[36]

Secretary Chase re-established a sinking fund as part of his debt-management policy, although continuing borrowing requirements led Secretary McCulloch to ignore the sinking fund law on practical, transactions-costs grounds. After the Civil War, however, Secretary Boutwell revived the sinking fund, which once again set the pace for the retirement of government debt on an orderly and smooth basis. Although subsequent Secretaries varied in the strictness of their adherence to the sinking fund's requirements, none ignored its existence, and all claimed to act in accordance with its provisions.[37]

V. CONCLUSION

To capture many of the important aspects of U.S. government financial history one must define policy to include aspects of strategic debt management that typically have been ignored by macroeconomists. Economic historians should broaden not only their definition of policy, but the tools they bring to bear in explaining specific policies. It is hard to explain many government financial policies that were of central concern to contemporaries without invoking a combination of market segmentation, strategic incentive manipulation, the government's potential for credit rationing, and political costs of legislation reversal.

This approach to debt-management policy sheds new light on the question of how governments deal with problems of "time inconsistency." The standard time inconsistency problem, as in, for example, Kydland and Prescott [1977], is that governments often find that the commitments they make today are not optimal to meet in the future. This leads to distrust of the government by the citizenry which in turn increases the cost of debt-service and reduces the latitude for policy. Time inconsistency can be eliminated, however, if governments can find ways to tie their own hands from acting on the basis of period-by-period optimization. The debt-management policies examined in this article provided constraints that limited the discretion and influenced the incentives of subsequent administrations in a manner that facilitated commitment to responsible fiscal policy, and helped to ensure credibility.

Quantifying the importance of debt-management policy for debt service costs is difficult, since it would require the calculation of counterfactual default risk, based on a hypothesized history of what might have been. How much higher would the cost of financing the Civil War have been if only long-term noncallable debt had been used from the start? Would debt retirement have proceeded as smoothly without sinking funds?

In some cases we can gauge the importance of debt management. Clearly, the discrimination across classes of debt mattered for their prices as, for example, in the price differences between bonds and notes in 1814. In some instances one can place a lower bound on the likely benefits derived from the use of short-term debt, equal to the transactions costs incurred by the policy (say, 25 basis points per year). In the case of the loan of 1861, a comparison of debt-service cost before and after the negotiation with the banks indicates a savings of up to 100 basis points on the $150 million dollar debt placed with the banks. In the case of the War of 1812, the preservation of the value of short-term notes gave the government a stop-gap measure to ensure its very survival because it faced credit rationing in other markets.

A. An Incentive-Compatible Distribution of Power

As Hamilton recognized in the earliest days of US finance:

> Government, being administered by men, is naturally, like individuals, subject to particular impulses, passions, prejudices, vices; of course to inconstancy of view and mutability of conduct.[38]

He saw his role as Secretary of the Treasury as that of administrator and triage officer of the present, and manipulator of the future, and he designed policies to help keep the government on the path of fiscal responsibleness. Hamilton, and his successors, knew that they would be judged by history, and that their performance would be gauged in part by the cost of debt service and the government's reputation in debt markets. By continuing to vest in the Secretaries of the Treasury much of the power to determine the form of debt, Congress maintained the political precedent of allowing far-sighted financial managers to guide and constrain future policy.

Political pressures, sometimes of a partisan nature, did infringe on the debt-management powers of the Secretary, but here the exception exemplifies the rule. When Congress, under the pressure of the inflationist movement of the 1890s refused to authorize debt issues to support the gold standard, the Secretary of the Treasury enlisted the help of the Belmont-Morgan syndicate to circumvent the Congressional restriction and maintain the gold standard. Although the Secretary was not able to avoid the fiscal uncertainty, high debt-service costs, and macroeconomic costs of the period of silver crisis, he was able to sustain the gold standard until the political resolution of the crisis in the election of 1896.[39]

The founding of the Federal Reserve System, and subsequent creation of the FDIC, FSLIC, FHLBB, Farm Credit System, and other authorities whose jurisdiction overlaps with, or supersedes, the Secretary of the Treasury, drastically altered the Secretary's role as the initiator of comprehensive financial policy, and undermined his ability to set the Congressional agenda. Perhaps the best testimony to Hamilton's wisdom regarding the need to centralize financial planning, and place it outside of Congressional control, is the current Congressional paralysis in reforming deposit insurance or in reducing the federal deficit. In both cases, without doubt, Hamilton would have had a plan and the unique authority to place it at the top of the nation's list of proposals.

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NOTES

1. This definition of fiscal policy is common to Keynesians, New Keynesians, Monetarists, and New Classicists alike, though there is disagreement regarding the importance of some effects of government policy. For example, New Classicists, like Robert Barro, argue for the neutral impact of government savings decisions, while Keynesians and New Keynesians argue for the importance of these effects. Instead, New Classicists focus on the distinction between monetization and nonmonetization of expenditures as being the key financing decision [Sargent and Wallace, 1981]. Barro [1981] has stressed the importance of distinguishing between the effects of distortionary expenditure policies and the effects (if any) of net government savings (deficits).

2. Throughout the discussion "the government" is treated as a single party with the objective of minimizing debt service costs for any given level of taxes and expenditures. It is reasonable to presume that such an objective would be pursued by the Secretary of the Treasury, since debt service cost would be an important measure of his performance. During this period debt management policy usually was initiated by the Secretary of the Treasury, or by Congress with the Secretary's approval. Although not every plan of every Secretary of the Treasury was adopted by Congress, and Congress did play an important role in originating some policies, virtually no debt-management policies were adopted without the approval of the Secretary of the Treasury. The convention of granting this much power to an individual with a strong interest in maintaining low debt service costs contributed to government credibility, as described below.

3. For a discussion of the role of taxation parity in maintaining the value of government debt, see Calomiris [1988a, 1988b].

4. Hamilton's original plan [Hamilton, 1790] specified several voluntary options for government creditors to convert War debt into new, funded debt. Each of these proposed options had identical present discounted value under Hamilton's assumed declining time path for the government's marginal cost of funds in the bond market. Only one of these options was provided by Congress. It allowed creditors to receive new securities, with an effective yield of 4 percent, in exchange for old, and offered 3 percent interest on payments in arrears. Creditors could choose to retain their old 6 percent debts, but those would not be funded, and thus would be subordinated effectively to funded debt. No interest rate on arrears of nonconverted debt was specified.

5. See Love [1931] for examples. The so-called "temporary loans" from the banks were often not repaid for several years, as the tables in Love's Appendix show.

6. See Love [1931:31]. The United States Treasury Department estimated the net profits to the government from bank dividends and sale of stock at $573,580, for a net return on capital of 28 percent. See United States Treasury Department [1897].

7. It was, of course, common practice to grant subscribers of the same bond issue equivalent terms at any point in time. This feature compelled Gallatin to limit subscriptions to the $11 million 6 percent loan of 1812, after the declaration of War on June 12 led to a decline in demand for government debt. The conversion privilege adopted in 1813 was unique in that it granted the same terms to subscribers at different times.

8. The first treasury notes had been issued in 1812 after the declaration of War, in order to allow the government to close subscriptions for the 6 percent Loan of 1812, and thereby avoid having to reduce the price of bond subscriptions received prior to that date. See Love [1931: 37].

9. In 1814, the Department of the Treasury was in a state of flux. Gallatin was in the process of resigning, and he had two successors within a year of his resignation, Campbell and Dallas. The tumult in financial leadership may have played a part in causing the policy blunder.

10. The last issue sold for 80 percent of face value in nominal terms, but it was paid for with suspended banks' notes valued below par; thus, the real price was 65 percent of face value. Not until 1855 did Congress accede to pay the full difference in the real value of bond issues to bondholders. See Bolles [1883:232-34].

11. Term-structure arbitrage considerations would suggest the opposite pattern of yields, based on interest rate expectations. If the default risk on short- and long-term securities were the same, long-term debt issued during a war should enjoy a lower yield than short-term debt. For a discussion of term-structure changes during war, see Barro [1987:221-248]. Thus the difference in the market's pricing of the two securities can be attributed to different perceived risk of default. Under these circumstances, the government could have improved its reputation in debt markets by issuing more short-term debt, which would have signalled its intention to repay future bonds in full. In fact, this paper argues that the government did employ essentially this policy during the Revolution and Civil War. By continuing to rely on bond debt during the War of 1812, however, the government worsened the market perception of bond default risk.

12. Concern for the long-term reputation of the government in bond markets no doubt explains the government's decision to pay bonuses ultimately.

13. At the end of 1812, banks held $9.2 of the $13.1 million in new issues. In addition, many individual subscribers paid for their bonds in installments, pledging the bonds as security. Thus banks were particularly vulnerable to the reduction in the value of long-term debt [Studenski and Krooss, 1963:71]. An unwitting benefit of bank suspension was that it increased the demand for treasury notes as a medium of exchange, and thus prompted the issue of small denomination notes not bearing interest.

14. Initially, the tariff backing of demand notes was redundant, since they were convertible into specie on demand. After suspension of convertibility on demand in December 1861, however, the receivability became important and kept demand notes trading virtually at par with specie until all were paid in as tariffs [Love, 1931:89-93; Mitchell, 1903:194-96; and Calomiris, 1988b:719-50].

15. These current yields are calculated using the prices reported in *The New York Herald* and *The Independent* newspapers, cited in Hammond [1970: 75]. *The Herald* reported 7 percent bond prices of 88 percent of face value, while *The Independent* reported prices as low as 90 percent of face value. These bond prices are similar to those shown in Roll [1972: 479].

16. Mitchell [1903:19-43] shows that public credit exposure, rather than the earlier outflow of specie to the government, was the true cause of reserve contraction and suspension. Secretary Chase's policy of requiring specie as repayment for government debt has often been mistakenly blamed for bank suspension.

17. Roll [1972] finds, in examining yields on paper- and gold-denominated government securities, that bondholders still had non-zero expectations of full specie redemption even before 1869, when the commitment to full specie redemption for bonds was unclear. Calomiris [1988b], using bond yield differentials for the later period 1868-79, shows that by 1869 specie resumption of bonds was a virtual certainty. The market was reassured in 1869 by the redemption of maturing principal in gold, the ruling of the Supreme Court, and the congressional legislation of March, 1869, which supported redemption.

18. The original National Bank Act of February 1863 was amended in June 1864 and March 1865, progressively establishing higher taxation of state-charted bank notes to encourage entry in the national system.

19. Like many Jacksonian Democrats, Chase (a Republican with Jacksonian monetary policy views) was not opposed in principle to national banking. Many of the Jacksonians wanted to regulate banks at the national level and to have a national bank of issue, with strong specie backing, to displace the state banks of issue, which were perceived as less sound. Duncombe [1841] is a prime example. For more examples, see Schweikart [1988].

20. As Roll [1972: 488] reports, yields on 6 percent bonds maturing in 1881 fell from 12.71 on March 1, 1865 to 9.68 percent by April 5.

21. See Love [1931: Appendix, pages 2-3, column N2]. Note that the earliest loan commissions listed on page 1 were much higher, but these are really interest payments in disguise, used to avoid legal limits on interest.

22. The reason enacting a legal tender law would have been inconsistent, rather than simply neutral in the context of policy in 1814, is that it would have been perceived as a sign of weakness of the currency.

23. Another way to say this is that during war a nation's discount rate rises, due to the need to survive the war. All long-term considerations, including matters of principle, become subordinated to short-term survival.

24. Motomura (1991) argues that changes in time preference accompanying war expenditure shocks account for the irregular pattern of coin debasement policies in early modern Spain.

25. For a given aggregate default risk, optimal government policy will limit the supply of the liabilities to the high-default-cost borrowers. On the other hand, when aggregate default risk is a matter of policy, default risk and debt service can be reduced by the "precommitment" that comes from issuing debt to high-default-cost borrowers. In some circumstances, the benefits from market segmentation may outweigh the benefits from precommitment, and vice versa. For example, if the potential for increasing taxes is small, and if default policy is mainly governed by the fortunes of war, then little would be gained from precommitment, and it would make sense to protect senior debt and keep its supply limited.

26. Of course, according to my argument, the bank loan could not have provided continuing support for government debt once all bank-subscribed debts had been resold.

27. In addition, if long- and short-term debt have the same numeraire, then the temptation to inflate is greater for long-term debt, since the capital gains from inflation are larger for long-term contracts. In this case, short-term debt finance also reduces the risk of inflation. When long-term debt is specie-dominated, however, and short-term debt is denominated in paper, as was true in the Civil War period, inflation uncertainty is reduced by relying on long-term debt.

28. For a discussion of tax legislation, see Studenski and Krooss [1963: 149-53], and Dewey [1903: 298-309].

29. See Roll [1972] for a discussion of the connection between War news and real bond yields, and Calomiris [1988b] for an analysis of the greenback/gold exchange rate as an indicator of fiscal news.

30. For a detailed account of the terms of debt issues, including callability, see Love [1931], Bayley [1881], and U.S. Treasury Department [1897].

31. *American State Papers,* Finance, Vol. II, 412ff.

32. For example, the four-and-one-half percent loan of 1824 was redeemable at any time after January 1832, the loan of 1843 was redeemable at any time after June 30, 1853, and the loan of 1858 was redeemable after 15 years from the date of issue, again at the pleasure of the United States.

33. It is interesting to note that of the $975 million authorized under the loan of 1863, only $75 million was issued. This confirms that the loan was the product of premature optimism.

34. Gallatin offered other arguments as well, but these seem contrived and unconvincing and depend upon the proposition that people cannot distinguish interest from principal payments. See Gallatin [1806: 346-51].

35. For a discussion of the Resumption Act and its effects on anticipations of resumption, see Calomiris [1988b].

36. Congress was able, however, partially to circumvent the seniority of funded debt by assuming non-funded Treasury notes and making them receivable in payment of taxes, as during the War of 1812.

37. For a more thorough discussion of sinking fund compliance, see Patterson [1954: 134-42].

38. Alexander Hamilton, "Second Report on the Public Credit," cited in Patterson [1954: 134, n. 1].

39. For a discussion of the operation of the Belmont-Morgan syndicate's contract with the government, see Garber and Grilli [1985]. For a discussion of the macroeconomic costs of the silver crisis, see Calomiris and Hubbard [1989, 1987].

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