Hamilton’s Debt Program

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Debunking the Musical

- Hamilton is one of the most influential founders and helped shape the course of history.

  - Let’s do a bit of debunking.
  
  - ”The duel with Burr was in 1804, not right after the election.”
  
  - ”Jefferson resigned fairly early in Washington’s first term, Hamilton followed soon after”

- Hamilton admitted his affair with Maria Reynolds to James Monroe, Fredrick Muhlengerg, and Abraham Venenabe not to Madison, Jefferson, and Burr.

- Hamilton does not ask Burr to help with the Federalist.
A general investigation of government debt

- Primary source material.
  - The Cash Nexus by Niall Ferguson
  - Fiscal Discrimination in three wars (Hall and Sargent JME 2014 148-166)
  - "Alexander Hamilton, Conversion, and Debt Reduction" (Swanson and Trout in Explorations in Economic History 1992 417-429)
A general investigation of government debt

- First let’s discuss public debt more generally with an emphasis on its history.
  - The need for public debt is intimately linked to the necessities of war.
  - “The sinews of war are unlimited money.” (Cicero)
  - “…success in war depends on having enough money to provide whatever the enterprise needs.” (de Balsac)

- Cost of war and its frequency has varied over the centuries.
  - Between 1816-1992 the Correlates of War project estimates 210 interstate wars and 151 civil wars.
  - At least one war is going on in 78 years of the 18th century.
Government debt is a relatively new invention.

- Private debts date back to 2000 BC.
- First public debts appear to be in Venice in the 12th century, where the debt was secured by the revenues from their salt monopoly.
- Later Genoa and Florence.
  - Initially just bills of exchange – paid off in specie at a pre-specified date.
  - Later negotiable bills that can be exchanged with a third party.
  - Northern Europe evolves annuities (consols).
A general investigation of government debt

- Medieval monarchs rely on wealthy banking families.
  - But these are more like personal loans.
- Not until 15th century in Catalonia do we see something that looks modern.
- Big innovation is the Bank of England.
  - A group of wealthy individuals fully subscribe to an 8% annuity in 1694.
  - In return they are given a monopoly on note issuance and establish extensive commercial interests.
    - These interests give the Bank an incentive to keep the exchange rate between notes and specie fairly stable.
  - It also manages the debt issuance of the government.
A general investigation of government debt

• Hamilton is greatly influenced by this institutional arrangement. Will convert colonial debt to annuities and establish a First Bank of the United States much along the lines of the Bank of England.
• Hamilton desires the United States to become an integral part of the world economy and to command the respect of other countries.
• Given the relatively undeveloped domestic financial markets that requires access to world financial markets.
• Requires credibility.
• Madison and especially Jefferson do not share his world view.
A general investigation of government debt

- How do we think about the size of the debt and its economic consequences?
- A look at the history of debt across countries indicates that the answer to that question is likely to be rather complex.
A general investigation of government debt

Figure 8: Debt/GNP Ratios since the Late Seventeenth Century
The U.S. debt series is lower and smoother on average than that of GB or Ger.

- Rises to 60% of GDP after Revolution and down to 2% by 1860. During the Great Depression it rises to 45% (a lot of that is to do with a fall in the denominator), and to 114% in 1945.

- Britain in contrast has an enormous debt of 250% of GDP after the Napoleonic War. Raising that amount of resources is a fundamental reason why GB was able to prevail.
  - Yet the debt did not cripple the British economy. They avoided political crises often linked with large fiscal imbalances and were able to find the funds to initiate the industrial revolution.
  - Institutions matter.
A general investigation of government debt

- Hamilton views a modest amount of debt as beneficial to the economy.
  - “A national debt, if it is not excessive, will be for us a national blessing.”
  - Encourages growth of financial institutions.
  - Can help complete markets by allowing households a form of safe asset for saving against future contingencies.

- The burden of fiscal policy is represented by the PDV of tax payments.
- One period government budget constraint.

\[ b_{t+1} = g_t - \tau_t - (1 + r)b_t \]
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• Rearrange

  \[ b_t = \frac{1}{1 + r} [b_{t+1} - g_t + \tau_t] \]

• Update

  \[ b_{t+1} = \frac{1}{1 + r} [b_{t+2} - g_{t+1} + \tau_{t+1}] \]

• Plug in to the first equation

  \[ b_t = \frac{1}{1 + r} [\tau_t - g_t] + \frac{1}{(1 + r)^2} [b_{t+2} + \tau_{t+1} - g_{t+1}] \]
A general investigation of government debt

- Continue the process indefinitely

- \( (4) \)

\[
b_t = \sum_{j=0}^{\infty} \frac{1}{(1 + r)^{j+1}}[\tau_{t+j} - g_{t+j}]
\]

- And we see that the tax burden is basically the burden placed on financing all future government spending.

- If taxes are lump sum (a head tax), then lowering taxes today and raising them by enough to cover the additional debt in the future should have no economic effect (Ricardian Equivalence)

- Think of your own optimal spending plan given a fixed sequence for government spending and personal income. The government cuts today's taxes, but will raise future taxes to pay for the tax cut and the interest on the debt.
A general investigation of government debt

- If you buy the debt you can use it to pay off the future taxes and maintain your spending plan. It is optimal since your income stream has not changed and PDV of taxes have not changed.

- If taxes are distortionary, the government should smooth the dead weight losses of taxes by keeping tax rates relatively smooth. You can do that by keeping debt/gdp ratios fairly constant issuing debt in bad times, such as war, time, and paying down the interest on the additional debt plus future spending in the good times.

- England appears to follow that policy much to its benefit.

- Hamilton is a good student.
A general investigation of British debt

- The first English War that uses debt finance is the Nine Years War
  - It is too expensive to be financed by taxes.
  - King William III in 1694 creates a syndicate to help finance. This syndicate becomes the Bank of England.
  - Start of a new framework for managing debt, one that supports the economy and ultimately the empire.

- The primary form of debt is the perpetual bond, which in 1752 are consolidated (consols) into a number of distinct issues with fixed coupon payments.
A general investigation of British debt

Figure 2.1. Debt and Expenditure in the UK, 1692-1860

of the government's debts. In addition, government bonds were combined with a national lottery (Million Adventure). Life annuities were issued, as well as tontines. Short-term borrowing in case of war by the armed forces produced so-called army and navy bills, effectively short-dated promises to pay. The biggest experiment of all involved the South Sea Company, which offered to exchange all public debt in 1720 for shares. A similar exercise in 1719 had been attractive to both the government and the public, by improving the liquidity of outstanding debt. While the South Sea scheme ultimately failed, it demonstrated the attractions of liquid paper assets. The UK finally introduced consolidated annuities ("consols"), perpetual bonds with a relatively low interest rate (Dickson 1967). These were first issued in 1751. Originally carrying a yield of 3.5%, they were eventually converted to 3% in 1757 (and to 2.75% in 1888). Consols were liquidly traded, and became a prime savings vehicle for the moneyed classes in the UK.

2.2. Britain's growth and industrial transformation

Growth during the classic period of the British Industrial Revolution (1760-1850) was slow by modern standards. Initially, output growth per capita was barely faster than during the pre-industrial period. After the middle of the 18th century, growth accelerated from around 1% p.a. to 2.5%. At the same time, population increased rapidly, from 5.2 million to 19 million. Growth rates across sectors were highly unequal. Figure 2.2 shows annual GDP by sector. Agriculture expanded relatively slowly over the period 1700-1860, increasing total output by a factor of 2.8 – a slower rate of increase than that of population. Over the same period, real GDP in services increased 9-fold, and in industry, 14-fold (Broadberry et al. 2010).

Galor (2005) gives a figure of 0.1% p.a. for the pre-industrial era, while the work of Crafts and Harley suggests rates of 0.2% p.a. in the years 1760-1800.

A general investigation of British debt

- One also sees significant jumps and gradual repayment.
- Credibility allows the government to borrow at rates lower than those of private borrowers.
- However, the frequency and expense of conflict has the debt on an upward trajectory until Britain becomes the undisputed world power.
- For much of its history debt is an annuity or consol. The first finite maturing bond is not issued until 1914.
A general investigation of British debt

- Starting with the 7 years war and continuing through the American Revolution and Napoleonic Wars Britain amasses a lot of debt
- Bond holders require a higher rate of return, which raises the debt further.
- In between wars some of the debt is retired allowing the gov’t to retain investor confidence.
- Allows Britain to sell much more debt than France and allows it to martial resources equal to its larger rival.
- The correlation between debt sales and military expenditure is .83 between 1727 and 1839.
A general investigation of British debt

- War is estimated to account for 54% of govt spending in GB during the 18th century.
  - As high as 18% of GNP in each year from 1778-82. (~ 75% of GDP)
- For the U.S. in 1812 accounted for 50% of Govt spending.
  - Creates a situation where large amounts of funds need to be raised rapidly.
- Can fund by raising taxes, but revenue from import duties prove insufficient. GB uses land sales, but again insufficient. Must rely on more general taxes, such as sales taxes, poll taxes, and taxes on land. Occasionally, an income tax (Napoleonic wars).
  - But theory tells us it is helpful to smooth taxes – requires debt.
Hamilton and the debt

• The Revolutionary War is a risky undertaking, but potentially has a high return.
  
  • Significant probability of losing.
    
    • Goes on for so long because there are not enough resources to fight on multiple fronts. Becomes a war of attrition.
  
  • Continental Congress has no taxing authority, but must rely on the states contributing funds.
    
    • Free rider problem and very little revenue is raised.
• Free rider problem

  • All states benefit from winning the war, but if the other 12 states pony up resources and my state withholds I still benefit a lot.

  • Incentive to underpay my share.

  • The problem is, however, symmetrical and hence everyone underpays.

  • Same mechanism as under provision of effort at times when production is a team effort. Incentive to shirk.

  • The result is the federal government has little resources.
During the Revolution, the Continental Congress issued bills of credit, the American Continental, to finance much of the war.

- The separate states also issued their own bills of credit.
- A bill of credit is an unbacked IOU issued by a government that in principle can be redeemed by the holder. Often circulates much like currency.
- First issued June 22, 1775 and by December, 1776 nearly $25,000,000 in circulation. The rate of issue was faster than states could redeem them through taxes so that by December they had lost 1/3 of their value.
- By November of 1779 their face value was $199,900,000, but they now exchanged at a rate of 50 Continentals for 1 Spanish dollar.
Hamilton and the debt

- Continental continued to be traded during the 1780s with buyers hoping that revenue raised from the eventual sale of western lands would allow them to be redeemed near par.

- Never declared legal tender, but the seigniorage from their issue yielded $40,000,000 in specie and accounted for 84% of all Colonial revenue.

- Over the course of the War the Continental government raised about $47m in Spanish dollars and spent $87m dollars accumulating $41m in specie-denominated debt and interest in arrears.

  - Most of the expenditure was to finance the war, but $10m spent on establishing a post office, payments to Native Indian population, and financing diplomatic ventures.
By 1782, with its ability to print money exhausted —“not worth a Continental” — and limited by the Articles from taxing — revenues plummeted and the Congress was unable to pay off its debts or meet the interest payments on the debt.

- In 1784 promised interest payments were $2m but revenue was a scant $723,000.
- Govt is hand-to-mouth, just spend whatever it raises and defers all payments on debt.
- Debt traded at 20% of face value.
  - Explicit loans from the govt known as loan office certificates and final settlement certificates issued to civilians and soldiers. They were promises to redeem unpaid bills and wages.
Hamilton and the debt

• This situation confronts Hamilton as the first Secretary of the Treasury.

• Who is Hamilton?
  
  • He was born out of wedlock in the West Indies in 1757.
  
  • During the Revolution he was a valued member of Washington’s staff and a bit reckless on the battlefield.
  
  • He along with James Madison are the two founding fathers most responsible for our Constitution.
• His worldview differs from that of Madison and especially Jefferson.

• It is for the United States to become an integral part of the world economy.
  • In the world he lived in that would require access to debt markets.
  • Given the lack of domestic financial sophistication, that would require access to international markets.
  • In turn, that requires a solid financial reputation implying that much of the Revolutionary War debts must be paid.
  • Doing so will establish the necessary credibility.
Hamilton and the debt

- He faces a daunting task.
  - Total Revolutionary War debts stand at around $80m of which $25m has been incurred by the states.
  - Continental Currency is worthless.
  - Debt is circulating as low as 15 cents on the dollar.
Hamilton and the debt

- Treasury Dept. created by Congress in September of 1789 to administer to manage fiscal affairs. As the first Secretary of the Treasury, Hamilton inherits this mess. But he is well prepared.

- 10 days after becoming Sec of Treasury in 1789 he is directed by the House to prepare a plan “for the support of public credit, as a matter of importance to national honor and prosperity.”

  - He fairly accurately estimates that the national debt is around $54.1m of which $11.7m is owed abroad.

  - State debts are more crudely estimated at $25m for a total of $79.1m or 40% of GDP.

  - If pays interest on the 6% original terms, need revenue of $4.6m plus the $.6m to run the gov’t.

    - Politically infeasible to raise taxes that much.
Hamilton and the debt

- Overall plan:
  - Envisions a world of competing empires.
  - America must develop economic and financial foundations.
  - Must avoid confrontation with Britain who is the predominant power.
  - Lays groundwork of a modern nation state patterned after the institutions in GB.
- Congress debates for 10 days and the final plan is very much along one of his initial proposals.
Hamilton and the debt

- Hamilton submits an overly complex series of plans.
  - The plans involve a partial repudiation of the debt as there is no way to pay it all.
  - Madison calls for a plain system and it draws from Hamilton’s third option.
  - It is actually a bit more generous to debt holders paying on average 85 cents on the dollar against Hamilton’s 81.7 cents on the dollar.
  - Because of confusion it allows for possible repayment in 22 years rather than Hamilton’s proposal which would have taken at least 34 years.
Funding Act of 1790 allows for the issue of three new loans.

- A consol – a perpetual bond – paying 6%, a consol paying 3%, and a consol paying 6% with interest deferred until 1801.

- For every $100 of Continental loan office certificates or final settlement certificates, the holder received $66.67 in 6% stock and $33.33 in deferred 6% stock. Interest in arrears was paid with the 3% stock (a compromise with the Congress).

- Further, the Federal government assumed States debt as well as unpaid interest with 4/9 paid in 6% stock, 2/9 in deferred 6% stock, and 3/9 in 3% stock.
  - This will help align economic interests of the elite with those of the Federal Govt.
• “If all the public creditors receive their dues from one source, their interests will be the same. And having the same interests, they will unite in support of the fiscal arrangements of government.” AH

• Plan is part of overall strategy that includes a National Bank partly funded by govt debt. Monetizes the debt and creates liquidity.
  • Benefits northern and eastern speculators who purchased the debt at deep discounts.
• Restructuring goes smoothly.
  • By 1791 $31.8m has been converted.
  • In 1792 another $26.7m and by 1794 all but 2% converted.
• Money is raised from an increase in import duties and some excise taxes.
  • Tariffs kept fairly low – they are for revenue not protection.
  • AH is also relying on improved prospect for growth and the ability to raise additional debt to smooth future taxes as needed.
• Madison argues for a total repayment, “No logic, no magic can diminish the force of the obligation.”
But “to make the revolutionary soldiers the victims of the governments default and to pay taxes to fund the claims was to Madison an injustice.

Madison wants to compensate the initial holders at the highest price that had previously prevailed on secondary markets with any remaining capital gains going to the current owners.

This discrimination scheme is uncharacteristic of his earlier writings – he had been a critic of discrimination. It is a government interference in private contracts.

Madison also wants states to be credited for the debt they have repaid. Hamiltons plan in a sense penalizes responsible states and Virginia in particular.
Hamilton and the debt

- Relative to par values, Hamilton administered substantial haircuts to domestic creditors, paying foreign creditors somewhat more generously. Dutch in full and the French with a 20% haircut.

- In Philadelphia financial markets the 6% stock traded at around 90% of par, while the 6% deferred and 3% traded at 45% of par. So, much of the debt is basically, written off.

- Owners of Continental dollars fared much worse – $1 in specie for every $100 Continental dollars (Hamilton’s initial proposal was for 40 to 1). Simply infeasible to pay off Continentals as well.

- With the assumption of state debts, the Federal govt owed $74.3m in specie, which was about 35% of GDP.
Federal debt by type of loan

[Graph showing the federal debt by type of loan from 1775 to 1805, with categories such as State Debts, Domestic Principal, Domestic Interest, Foreign Loans + Interest, deferred 6 per cent, 6 per cent, 3 per cent, and Other Loans.]
Principle and market value
Hamilton and the debt

- 3 ways to view the repayment.
  - Market value of the new securities relative to the par value of the old securities. This measure indicates how close the debtor is to fulfilling the original promise (49%).
  - Or one could compare the PDV both before and after the settlement, which measures how much of the promised payments were honored (71%).
  - Or one could measure market value to claims after settlement to the market value of the original claims, which measures how much creditors benefited from the new arrangement (138%).
• Regarding Continental Dollars around $74m were never redeemed.

• In order to limit the chances that U.S. currency and debt would ever be repudiated in the future, the Constitution prohibits the States from issuing currency or bills of credit, nor make any Thing but gold or silver Coin a Tender in Payment of Debts.”

• It also gives Congress the power “To coin Money, regulate the Value thereof ...”
  - At the time, generally viewed that the Congress prohibited from issuing paper currency.
Hamilton and the debt

- What role does credible debt play for a government.
  - It allows it to smooth taxes in the face of surges in expenditure perhaps due to war or large land purchases.
  - Also in many models, it is optimal at time 0 to repudiate existing debt and promise never to default on any newly issued debt. The problem is how does one credibly make that commitment.
  - To some extent, Hamilton, in part, followed that prescription by repudiating some of the debt. As well, the prohibition on paper money meant that the government would not be able to debase the debt through inflation.
Hamilton and the debt

Why did Hamilton want to pay the debt?

- The most compelling reason is that he believed it would give the U.S. access to debt markets in the case of another war.
- Dutch debt was paid immediately, while French debt payments were delayed and also received a small haircut.
  - At the time, the French were viewed as an unlikely source of future funding.
  - The Dutch on the other hand were viewed as an entity by which large amounts of debt could be sold fairly quickly.
The success of the program was remarkable. Prices on U.S. government debt recovered almost immediately even though there was a partial repudiation of the debt.

- Apparently, the new Constitution was a factor in changing expectations.
- That need not have been the case. When PA defaulted for 2 and 1/2 years in the 1840s it took over 5 years for state bonds to return to par even though all debts were repaid in full.

What was Hamilton’s reasoning behind assuming state debts.

- Those debts were largely accumulated to fund the Revolutionary War and should be financed nationally.
- The Federal government now had the advantage in raising revenue as states could no longer levy tariffs.
Initially the assumption of state debts did not pass the House.

- It was necessary to compromise with the VA delegation over the eventual location of the nation’s capital.
- It was also not clear if the Federal gov’t could pay both its own borrowings and those of the states.
- For this to happen would require a vibrant U.S. economy, and this is what happened. Economic growth picked up to 1.03%-1.51% over the period 1793-1800 (Goldin and Lewis).
- Increased int’l trade caused revenues to rise by 26% per year over 1790-95.
## Federal tax revenues by year, 1789-1800

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**Table 1:** Sources: 1789-1793: Van Eeghen Papers, Archives of the University of Amsterdam; 1794-1800: Historical Statistics of the United States (2006, 5-80).
Other competing viewpoints

- Much of the debt was not held by the original lender, but repurchased by financial speculators (contrary to Hamilton's claim that only 1/3 was not in original hands).

- Madison proposes allocating payoffs to current and former bond holders so that current holders would not reap capital gains and former holders would be compensated for capital losses.

- Hamilton opposes this idea because of reputational affects on prospective bond holders and the impairment of the market for govt bonds becoming liquid.

  - What price will someone buy an existing bond if there is uncertainty that they will not be fully paid in the future, but may have to split some of the proceeds with original holders.

  - What if the bond goes through many hands.
Hamilton and the debt

- Look more generally at the political and economic interests that define fiscal policy.
  - Repayment of debt depends on future revenues from taxes and sales of publicly owned property on the one hand and the other from government spending.
  - Prices of debt reflect whether fiscal policy is viewed as sustainable.
  - Need a Constitutional framework so that political processes are likely to produce reasonably good outcomes.

- Should a gov’t pay its debts.
  - Not all citizens hold the debt and taxes are distortionary.
  - But, the government may want to borrow again. Contingencies could arise and it is better to smooth taxes.
• Should the central gov’t pay debts of subordinate govts like the states.
  • If part of a deal that awards tax authority previously held by the states is transferred to the national gov’t then it is part of the deal.
  • But, does it then raise expectations that future state debt will be paid nationally. You can see the problem here.

• Prior to 1789 creditors answered yes to the Continental Congress paying debts why many tax payers answered no.

• The Articles of Confederation gave the central govt no power to independently raise revenue resulting in Continental debt valued between 10% and 20% of par.
  • That it sold for that much was an indication that purchasers were betting on a political reorganization.
Some states like PA and RI actually serviced some of the U.S. debt held by their own residents by swapping state bonds for Continental ones.

- Interested in binding monied interests to continue the support of the Articles of Confederation.
- State repayments of their own debts varied widely.

Hamilton and Robert Morris were in favor of the federal government assuming state debts because they wanted to cement revenue raising authority with the federal govt.
• When debt is denominated in domestic currency a way of defaulting on a part of the debt is through unanticipated inflation.

• The inflation during the revolution made the framers wary of inflation and the Constitution places restraints on the issuance of fiat money, the issuance of which currently pays my salary.

• Helped make future payoffs more credible.
Why is this credibility so key?

- Britain versus France
  - From 1688 - 1788 Britain defeated France in 4 out of 5 wars (Nine Years War (1688-97), War of Spanish Succession (1701-14), War of Austrian Succession (1741-48) and Seven Years War (1756-63) but not the American Revolution (1776-83).
  - Britain reformed institutions to allow it to raise enough revenue in peace time to finance debt sustained during wars.
  - French institutions were designed to limit the revenue raising ability of the king.
  - The British could issue more debt in case of war.
Hamilton and the debt
Hamilton and the debt

- Britain raises revenues more effectively than France.
  - Increases taxes during war to pay increased debt services.
  - Consolidates debt into annuities and raises taxes to service the debt.
  - Smooths taxes and generates small but sufficient surpluses in peacetime.
  - Debt services rise during war then slowly decline in peace.
  - No defaults. Parliament passes specific taxes directed at funding new debt.
• Bank of England (1694) eventually acquires a monopoly on servicing the debt and issuing notes. Prevents government from playing one debtor off against another.
  
  • Banks owners were prominent members of society.

• Alternatively, France partially defaults 3 times–1713, 1759, and 1770. Uses suspension of interest payments and reconversions.
Hamilton and the debt

*Fig. 4.*—Military spending in Britain and France, 1688–1789. Sources: for Britain: Mitchell (1988); for France: Mallet (1789), Forbonnais (1758), and the references listed in n. 8.
Hamilton and the debt

- Wars cost Britain on average 1-1.5 years of revenues. For France only 0.5-0.8 years of revenues.
  - England outspent France by 40% in the 7 Years War even though only 1/3 the population.

- The British experience certainly influences Hamilton.
  - Converts debt into annuities.
  - Pays off foreign creditors with only a few instances of small haircuts.
  - Differs in that domestic holders face haircuts.
  - Wants to establish a National Bank to be the government’s agent.

- Too English for Jefferson.
The value of commitment and reputation.

- Often government policies are plagued by what is called a “time consistency” problem – the government has an incentive to renege on its promises.
  - Having borrowed a good deal of money to finance various activities it may have the incentive to default on the debt.
  - Or having passed some law that induces people to behave in a certain way it may wish to extract resources based on that behavior or it may wish to reward certain political classes by abridging the rights of others.
What mechanisms can be put in place to achieve outcomes that are consistent with competitive equilibria in the private sector and either don’t allow or induce the government not to renege.

- Commitment devices such as Constitutions are often helpful, but not perfect.
- Value assigned to a reputation is another.
  - Not mutually exclusive.
- Constitutions are difficult to amend and if institutions are sufficiently strong to guarantee constitutional safeguards, then the government will be somewhat constrained to act in a certain way – such as not tyrannizing a minority.
Hamilton and the debt

- Providing value to a reputation can also go a long way toward the government acting as a so-called “Ramsey planner” (Frank P. Ramsey).
  
  - If a government adheres to its promises, private agents may be able to reward it. No default and you get to borrow at low rates next period.
  
  - If the government reneges, it can perhaps be cut off from credit markets for long periods of time. This is often not sufficient to prevent all defaults, and one sees things like debt limits.

    - These may be difficult to enforce with many lenders and different priorities of securities.

    - Default is a fact of life.
• But in certain circumstances the benefits of fulfilling promises outweighs the cost of reneging and governments behave honestly.

• Needing funding for continued wars was such a motivation for Britain, but one France, for institutional reasons, was insufficient in preventing defaults.

  • Institutions matter

• Hamilton to the extent possible, and subsequently Madison and Grant to a greater extent, realized the benefit of reputation in international credit markets.

• The success of British financial institutions certainly motivated the Hamiltonian plan for the U.S. economy.
Appendix: example of how reputation works

- We can formally illustrate how reputational concerns may limit a government’s desire to inflate away the debt.
  - Any equilibrium must be rational in that the public’s expectation of what the gov’t will do turns out to be correct. If not, then expectations are not rational.
  - The benefit of unexpected inflation is that it proportionately lowers the real value of the debt that must be paid off: \( b(\pi_t - \pi_t^e) \) Note, you can only get a benefit if the inflation is unexpected because if it were expected a higher interest rate on the bonds would serve as compensation to holders of the debt.
  - Inflation is also economically costly: \( (a/2)\pi_t^2 \)
Appendix: example of how reputation works

• Together the benefit derived from any inflation rate is

\[ z_t = b(\pi_t - \pi^e_t) - (a/2)\pi_t^2 \]

• The gov’t maximizes the discounted stream of benefits, by either setting inflation once and for all, or setting inflation period by period taking expectations as given.

\[ \max E[z_t + qz_{t+1} + q^2z_{t+1} + ... ] \]

• where \( q \) is the discount rate at which future benefits are discounted.

• Under commitment to a rule the gov’t is effectively choosing both inflation and inflation expectations because those expectations are governed by the rule. Because inflation expectations will equal actual inflation

• the first term in \( z \) drops out and it is optimal to set
• Under discretion, expected inflation is taken as given at some value and the policy maker then chooses inflation. Maximizing net benefits now involves the benefit as well as the cost term and the first order condition implies that

\[ \pi_t = \frac{b}{a} \]

• Bond holders anticipate this and their expectation of inflation will also be \( \frac{b}{a} \) and the net benefit is \(-\frac{1}{2}(b^2/a)\), an inferior outcome.

• What about reputational issues. First we see that if inflation expectations equaled zero a discretionary policy maker has an incentive to cheat and the benefit to setting inflation at the discretionary rate is \((1/2)(b^2/a)\)
Appendix

• Now bond markets meet repeatedly.

• What if bond holders expectations evolve according to

\[
\pi_t^e = \begin{cases} 
\pi, & \pi_{t-1} = \pi_{t-1}^e \\
\frac{b}{a}, & \pi_{t-1} \neq \pi_{t-1}^e
\end{cases}
\]

• What value of inflation expectations will make it undesirable for the discretionary government to not cheat.

• If cheat, set inflation to \( \frac{b}{a} \) each period and benefit in odd periods:

\[
z^c = \left( \frac{b^2}{2a} \right) - b\pi - q\left( \frac{b^2}{2a} \right)
\]

• If don’t cheat and set inflation at \( \pi \):

\[
z^{dc} = -\left( \frac{a}{2} \right)\pi^2 - q\left( \frac{a}{2} \right)\pi^2
\]

• And \( \pi \geq \frac{b(1-q)}{a(1+q)} \) can support the reputational equilibrium.
• Note: the more patient the government the lower the inflation rate that can be supported. Also, the more periods you punish, the lower the inflation rate that can be supported.

• One could extend to punishments for actual defaults, but that is a lot harder.

• Or one can Constitutionally restrict the govt to use gold and silver coins, but the Congress could change the amount of gold or silver in a dollar. But that maybe more of an undertaking as previous coins would have to be weighed and converted.