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Direct all comments and questions to

*Quarterly Review*  
Research Department  
Federal Reserve Bank of Minneapolis  
P.O. Box 291  
Minneapolis, Minnesota 55480-0291  
(612-340-2341 / FAX 612-340-2366).

## In Order to Form a More Perfect Monetary Union\*

Arthur J. Rolnick  
Senior Vice President  
and Director of Research  
Federal Reserve Bank of Minneapolis

Bruce D. Smith  
Adviser  
Research Department  
Federal Reserve Bank of Minneapolis  
and Professor of Economics  
Cornell University

Warren E. Weber†  
Senior Research Officer  
Research Department  
Federal Reserve Bank of Minneapolis

*We the people of the United States, in order to form a more perfect union, . . . do ordain and establish this Constitution for the United States of America.*

— Preamble, *U.S. Constitution*

Just like its political system, America's monetary system changed dramatically when the United States adopted a Constitution, in 1788. Before that, many different forms of paper money circulated widely in this country. These monies could not be redeemed for specie (gold or silver); they were generally known as *bills of credit*. During the colonial period, each colony could and did issue its own such bills. During the Revolutionary War, the federal government paid its expenses by issuing what are perhaps the best-known of these bills, the *continentals*. And after the war, many states continued the practice of issuing their own bills of credit. All these monies generally circulated against specie and against each other at varying exchange rates. The U.S. Constitution changed all that. Along with the political union, the Constitution created a monetary union: it eliminated exchange rate variability by giving only the federal government the power to issue any form of money.

Why the states agreed to give up that power is a question that scholars have not yet adequately answered. Conventional explanations, such as the fear of inflation or the

desire to control what money qualified as legal tender, are unsatisfactory because they do not quite fit the facts.

We think we have a better explanation. Specifically, we see evidence that the colonies and the states experienced exchange rate variability and found it undesirable, and we conclude that achieving a monetary union to eliminate that variability was a primary goal of the constitutional prohibition against bills of credit. This leaves us with a puzzle, though. Why was there such enthusiasm for the prohibition of state-issued money when the states could have achieved the same end by just fixing rates without giving up their power to issue money?

The answer is suggested by both theory and evidence. By applying a theory of the demand for money in which monies are perfect substitutes for each other, we argue that fixing exchange rates leaves issuers with too much control over the money supply and creates a seigniorage problem. This theory is supported by what happened to a group of colonies when they experimented with such a monetary union. A seigniorage problem arose when one colony in the group began to tax its neighbors by issuing excessive

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†Also Adjunct Professor of Economics, University of Minnesota.

amounts of money. In essence, this behavior caused the system to fail. Thus, a better explanation for the constitutional prohibition against state-issued bills of credit is that the states wanted a viable monetary union that would not only eliminate exchange rate variability but would also avoid the seigniorage problem inherent in fixed exchange rate systems.

### Inadequate Explanations

Throughout most of the colonial period (1690–1776), the Revolutionary War (1776–83), and the Confederation (1783–89), irredeemable currencies like bills of credit were widely used. That much is clear. What is less clear is why the framers of the Constitution wanted to prohibit their use. We examine two commonly offered explanations for that prohibition and point out where they are lacking.

The use of bills of credit began early in the history of the United States. During the colonial period, governments' expenditures quite often exceeded revenues. Since England largely prohibited the colonies from coining specie or chartering banks, colonial governments had to find other ways to obtain funds. Irredeemable monies, mainly bills of credit, became an extremely popular way to get around the British mandate. (See the Appendix for a detailed history of the use of bills of credit.)

Despite the widespread use of bills of credit, article I, section 10, of the U.S. Constitution explicitly prohibited the states, but not the federal government, from issuing them any more:

No State shall . . . coin Money; *emit Bills of Credit* [emphasis added]; make any thing but gold and silver Coin a Tender in Payment of Debts; pass any Bill of Attainder, ex post facto Law, or Law impairing the Obligation of Contracts.

Surprisingly, this issue caused very little debate. In fact, it received the largest favorable majority of any at the Constitutional Convention (McGuire and Ohsfeldt 1986, p. 99, vote 9).

Two explanations have often been offered for the prohibition against state-issued bills of credit. One explanation is based on the memory of the depreciation of the continental. This irredeemable money was issued in such large quantities that it often accounted for more than 80 percent of the federal government's income (Ferguson 1961, pp. 43–44), and its depreciation rate was severe during the Revolutionary War years. According to this explanation, people vehemently opposed state-issued irredeemable money because the memory of their losses from the continentals was so strong. This view appears explicitly in

Calomiris 1988, but it is certainly implicit or explicit in other literature.

We think there are several reasons to doubt this explanation. One reason is that it suggests the federal government should also have been prohibited from issuing bills of credit. But although this prohibition was considered, it was not enacted. A second cause for doubt is that during the Confederation period, states that had issued paper money (for instance, Pennsylvania) experienced deflations as large as the wartime inflation. Also unanswered are the questions of how and why seven states issued irredeemable paper monies during the Confederation period, if the fear of inflation was really so strong. Finally, this explanation fails to account for why the *Federalist* papers (Hamilton, Madison, and Jay 1788, no. 44, p. 298) refer only to "the loss which America has sustained *since the peace* [emphasis added], from the pestilent effects of paper money." That is, there is no reference to the problems that arose during the Revolution, when the continentals were depreciating wildly.

The second conventional explanation is that the constitutional prohibition was attractive because a combination of state issues of paper money and state legal tender laws disrupted commerce, particularly interstate commerce. This view, offered by Nevins (1924, chap. 12) and Schweitzer (1989), argues that some states or colonies issued currency, allowed it to depreciate, and then passed laws preventing creditors in other areas from extracting payment in any other form from the area's debtors. To the extent that this practice was followed, it acted as a one-time tax on interstate or intercolony transactions using credit.

Of course, what enforced the use of depreciated state currency issues were the legal tender laws passed by the states themselves. Schweitzer (1989, p. 322) concludes that "it was the damage of legal tender laws to interstate relations, rather than the possibility of bank notes or the memory of Continentals, that resulted in the Constitutional prohibition of state paper money."

Indeed, Rhode Island and North Carolina, which had made their paper money a legal tender for payment of private debts at par, created a stir when their monies depreciated. Some states retaliated by passing their own legal tender laws or by prohibiting the circulation of other states' money, and interstate commerce was disrupted. Thus Nevins (1924, p. 570) argues that "the worst State disputes connected with currency arose from the enactment of measures impairing the obligation of contracts" which included "the making of depreciated paper a legal tender for

debts.” And Schweitzer (1989, p. 318) asserts that “many believed that tender laws were increasingly causing friction between states.” She quotes James Madison (Schweitzer 1989, p. 319) to the effect that paper money “is producing the same warfare and retaliation among the states as were produced by the State regulations of commerce.”

This explanation is also rather weak. If interference with private debt contracts was the problem, the framers of the Constitution could have simply prohibited (as they did) the states from making anything but gold and silver a legal tender for payment of private debts—a point raised by Madison in the debates at the Constitutional Convention (U.S. 1787, p. 445). Yet the framers went beyond that.

### A Better Explanation

We think that a better explanation for the constitutional prohibition against state currencies is the states’ desire to create a monetary union, that is, to eliminate exchange rate variability. To support this point of view, we show not only that the bills of credit issued by the various colonies or states fluctuated in value against specie and against each other, but also that this exchange rate variability was regarded as a significant trade problem by the colonies and states.

#### *Variable Exchange Rates . . .*

##### □ *The Colonial Period*

Exchange rates during the colonial period have been the subject of extensive study by McCusker (1978), and his study shows that exchange rates were variable among the colonial monies. He states that Pennsylvania’s and Delaware’s money exchanged against each other at a variable rate, with Delaware’s money at a discount that “regularly ranged between 5 and 10 percent” (McCusker 1978, p. 182). Fluctuations in exchange rates between other colonial monies can be inferred from his data on the exchange rate between London’s pound sterling and the currencies of individual colonies. For example, his data imply that in 1761, Virginia’s money appreciated 14.5 percent against Massachusetts’ money and then depreciated 6.5 percent and 9.7 percent in 1762 and 1763, respectively. His data also imply that in 1761, New York’s money appreciated 5.2 percent against Massachusetts’ money and then depreciated 4.3 percent and 4.4 percent in 1762 and 1763, respectively (McCusker 1978, pp. 142, 211, 165).

##### □ *The Revolutionary War*

In contrast to data on exchange rates during the colonial period, data on exchange rates during the Revolutionary

War years are sparse. Nevertheless, the data that do exist clearly show that exchange rates continued to fluctuate among the various monies. Exchange rate fluctuations can also be inferred from the fact that the depreciation experience among the different monies was not uniform.

Depreciation was most severe for the federal money, the continental. In January 1777, \$1.25 worth of continentals was required to purchase \$1.00 in specie. By January 1781, \$100 worth of continentals was required to purchase \$1.00 in specie.

State monies also depreciated, but the rate of depreciation varied widely, as the following examples reveal:

- Pennsylvania’s paper money held its value much better than most states’. Between 1780 and 1783, the state issued its *island money*, a form of bills of credit (Nevins 1924, p. 489). This money exchanged with specie at a rate anywhere between 1.25 to 1 and 5 to 1 (Bezanson 1951, p. 345, Appendix, Table 4).
- Maryland, in 1780, redeemed its paper money for specie at the rate of 40 to 1 (Nevins 1924, p. 485, n. 18; Behrens 1923, p. 64).
- North Carolina, in 1781, rated \$200 of its paper money to \$1 specie; in 1782 this rate was revised to 800 to 1 (Morrill 1969, pp. 19–20).
- Virginia, in 1781, exchanged newly issued *loan certificates*, a form of bills of credit, with a face value of \$1 for \$1,000 of its previously issued currency (Nevins 1924, p. 486).
- South Carolina’s paper money was “almost worthless” by the final year of fighting, and “it became necessary for Governor Rutledge . . . to suspend the laws making it a legal tender” (Nevins 1924, p. 488).

##### □ *The Confederation*

Exchange rate variability was also persistent throughout the Confederation period. Even in states where the rates of depreciation were rather mild, exchange rate variability was still present. For example, the ratio of Pennsylvania state currency values to specie fluctuated, according to Bezanson (1951, p. 345, Appendix, Table 4), between 1.05 and 1.12 in 1786, between 1.10 and 1.75 in 1787, between 1.43 and 1.56 in 1788, and between 1.13 and 1.43 in 1789. Thus, while Pennsylvania currency held its value relatively well by the standards of the time, holders of its currency were still subject to exchange rate risk.

Other states experienced less well-documented fluctuations in the relative values of different currencies. Accord-

ing to Ferguson (1961, p. 244), "New Jersey's legal tender bills were fairly steady [in value], although they passed outside the state at a slowly increasing discount." In particular, New Jersey's paper currency had a stabler value internally than it did in either New York City or Philadelphia—a fact which led to political tension between New Jersey and its neighbors. Kaminski (1972, pp. 119–20) tells us that "New Jersey's tender provisions could not be enforced in the neighboring states, and consequently depreciation began in both Philadelphia and New York. . . . Before long, the depreciation in the neighboring states affected the Jersey currency's value at home." In "non-speculative ventures" within its own borders, New Jersey currency went at a discount against specie of between 7 and 15 percent (Kaminski 1972, p. 124). As early as May 1787, it was at a discount between 12 and 18 percent in New York. The analogous discount in Philadelphia at the same time was between 11 and 20 percent. In 1788, New Jersey currency was discounted by only 7 percent in New York, but by 33 percent in Philadelphia. By 1789, the discount was 33 percent in both New York and Philadelphia. (See Kaminski 1972, p. 125.)

In New York, bills of credit were at times at a discount of as much as 10 percent relative to specie. However, in the midsummer of 1787, newspapers "boasted that they were 'universally received upon a par with gold or silver'" (Nevins 1924, p. 528; Kaminski 1972, pp. 155, 158).

South Carolina may have had the stablest money during this period. According to Nevins (1924, pp. 526–27), "The paper held its value . . . . Such was its success that in 1789, when specie dollars were pouring into Charleston it was preferred as being more convenient to use."

The paper monies of Pennsylvania, New Jersey, New York, and South Carolina fluctuated in value relative to specie, and in the cases of New York and South Carolina in particular, these fluctuations appear to have been relatively small. This was not the case for the currencies of Rhode Island and North Carolina, which experienced more sustained and dramatic depreciation.

Rhode Island's currency depreciated rapidly. It circulated at 1/10 of its face value by 1788 (Ferguson 1961, p. 243) and at 1/12 of its face value by 1789 (Nevins 1924, p. 540). Finally, Nevins (1924, pp. 540–41) says, "in the autumn of 1789, the Legislature repealed the law making the bills a legal tender at par, and fixed the value at which it should be received by creditors, in satisfaction of awards in lawsuits, at one-fifteenth the value of specie." Thus, Rhode Island money depreciated markedly not only rela-

tive to specie; it also did so relative to the monies of the other states.

The money issued by North Carolina did no better. According to Morrill (1969, p. 70), it quickly "depreciated to an average of about 25 per cent off specie in the purchase of commodities and then stabilized at about 12.5 per cent to 15 per cent off nominal value when exchanged for hard money." This depreciation was largely complete by late in 1783, "after which time the paper's value remained practically steady for two years" (Morrill 1969, p. 71). However, by the end of 1785, the state's money "slipped from about 25 per cent off nominal value to perhaps 35 per cent off par, while in exchange for specie the currency declined from about 15 per cent off par to about 25 per cent off nominal value" (Morrill 1969, p. 75). The paper was about 33 percent below specie by 1786 and 40 percent below by 1787. In 1789, it reached 50 percent of nominal value, where it remained well into the next decade.<sup>1</sup>

#### . . . Impeded Trade

During the formative years of the United States, then, the currencies issued by the colonies and the states proliferated, and their rates of exchange varied considerably. The colonies and states found that this variability added to the cost of transactions across borders.

#### □ Virginia, 1755–64

Colonial monetary affairs were subject to British oversight, and as time passed, monetary relations between Britain and the colonies became an increasing source of friction. Such frictions came to a head between Britain and Virginia between 1755 and 1764. The result was the Currency Act of 1764 in which the colonies were forbidden from making their own paper currency legal tender for payment of public or private debts.<sup>2</sup>

Virginia was the last colony to issue paper money. When it first issued paper money in 1755, the colony was desperately short of specie (Ernst 1973, p. 15; Brock 1975, p. 468). Colonists who borrowed from English merchants, which was a widespread practice at the time, had incurred sterling-denominated debts. These debts were routinely (and necessarily) repaid in local currency, which was a legal tender. But the rate of exchange between Virginia

<sup>1</sup>North Carolina's currency continued to circulate for some time after the ratification of the Constitution. The Constitution prohibited the issue of new state currency, but did not require the retirement of old state currency issues (Morrill 1969, pp. 87–92).

<sup>2</sup>More specifically, the 1764 act applied to the colonies outside of New England. The New England colonies were covered by the Currency Act of 1751.

currency and sterling was subject to some fluctuation.<sup>3</sup>

Given the legal tender status of Virginia's currency, British creditors could not avoid repayment in this form. However, British creditors objected strenuously to being subjected to exchange rate risk. In 1758, British merchants petitioned the crown demanding "absolute protection against any fluctuations in the rate of exchange. Such risks were to be borne by the Virginians alone" (Ernst 1973, p. 52). Exchange rate risk, and who was to bear it, then became a subject of heated political discussion on both sides of the Atlantic.

In response to British pressure, Virginia law was amended in 1755 "to allow courts of record to settle all executions for sterling debts in local currency—paper as well as coin—at a 'just' rate of exchange. A just rate was taken to be the actual rate at the time of court judgment" (Ernst 1973, p. 54). This became the common legal practice.

British creditors, however, viewed even this as inadequate protection against exchange rate variation. Virginia law allowed an exchange rate to be set at the time of legal settlement, but British merchants wanted more. They wanted protection against exchange rate variation between the time of settlement and the time of payment. They also wanted the option of consenting "to accept paper money in amounts they deemed necessary for the purchase of sterling bills of exchange to the original and full value of sterling debts" (Ernst 1973, p. 52).

This was unacceptable to Virginia. In addition to forcing Virginians to bear all exchange rate risk in exchanges with Britain, such an agreement would have given British merchants bargaining power over Virginians who had only local currency as a means of payment.<sup>4</sup>

Thus, the question of who was to bear exchange rate risk between Britain and the colonies was hotly debated. Of course, the same issue existed among the colonies themselves, but here they had less freedom of independent action. One method for eliminating exchange rate variability would have been to create (or to attempt to create) a uniform North American currency. Such a proposal was in fact made by Benjamin Franklin in 1765, and a similar proposal had been made in Britain in 1763 (Ernst 1973, pp. 78–79, 97–105). Indeed, the Stamp Act (of 1765) was originally intended to raise funds to support a uniform North American currency. Thus, even at this early date, interest in creating a uniform currency manifested itself, but some time was to elapse before a uniform currency was actually created.

#### □ *The Confederation*

During the Revolution and continuing into the Confederation period, interstate commerce was of growing importance.<sup>5</sup> This trend suggests the desirability of a medium of exchange to be used in interstate transactions.

Several candidates for a common interstate money existed. One was specie. However, its usefulness for this purpose was reduced by the fact that it seems often to have passed by weight. Another candidate was *indents*, which were basically bills of credit issued by the federal government. This was the intent of Congress under the Articles of Confederation. (See the Appendix for details.) However, the value of indents was not uniform across states. A third candidate was one or more of the various state monies. That a state money was, in fact, used in interstate transactions is indicated by the observation that Pennsylvania money circulated in "Maryland, central Virginia, and the Ohio Valley; and North Carolina currency [circulated] in western Virginia and Kentucky" (Schweitzer 1989, p. 315). Nevertheless, the use of a state money in interstate transactions (as well as at home) was plagued by exchange rate uncertainty.

Consider the problems with Pennsylvania's money, a money which maintained its value far better than that of some other states. According to Bezanson (1951, p. 326), in the spring of 1789, Pennsylvania merchant James Cox wrote that "the very fluctuating state that our paper money has always been in, makes it difficult to ascertain the value of it at different periods." An illustration of the perceived costs of this exchange rate variability is the fact that the members of the Pennsylvania assembly refused to be paid in Pennsylvania money, which was a legal tender for the payment of public, but not private, debts (Kaminski 1972, p. 70).

An even more dramatic illustration is the attitude of the Bank of North America toward the money of its own state, Pennsylvania. The Bank of North America, chartered in

<sup>3</sup>However, in Virginia's case, the fluctuation was hardly dramatic. See McCusker 1978 or Smith 1985a.

<sup>4</sup>If Virginians had been forced to bear all exchange rate risk, one can ask what the incidence of this tax might have been. In particular, goods prices or interest rates or both might have adjusted to compensate them (partially) for bearing this risk. Whatever the incidence, however, any departure from optimal risk-sharing represents a source of inefficiency. Moreover, British creditors were apparently willing to bear whatever price adjustments resulted in order to shed their exposure to exchange rate risk. Thus, an impasse was reached, leading to the Currency Act of 1764. Again, this act prevented the colonies from making their own currencies a legal tender in payment of public or private debts.

<sup>5</sup>For some quantification of the importance of interstate trade, see Bjork 1963.

1781, had successfully circulated its bank notes for several years. In an effort to dissuade Pennsylvania from issuing its own paper money, the Bank announced that it would refuse to accept the state's money (at any discount) in transactions. This did not dissuade Pennsylvania; instead it led to a revocation of the Bank's charter. In an effort to regain its charter, "the Bank yielded and offered to receive state paper money on deposit, provided these paper transactions were kept 'entirely distinct and separate' from the specie accounts" (Kaminski 1972, p. 64). This the Bank did, keeping accounts in Pennsylvania money completely distinct from specie accounts, even though the state's money did not initially depreciate. The Bank actually did receive a substantial quantity of state paper money, and keeping separate accounts led to a "considerable extra expense to the Bank" (Kaminski 1972, p. 67). Apparently, this was a cost the Bank was willing to absorb in order to avoid exchange rate risk. (Recall that Pennsylvania currency fluctuated in value, rather than depreciating uniformly.)

New Jersey faced a similar problem with its money. Nevins (1924, pp. 569–70) points out that four systems of legal valuation of specie were in place among the different states and then argues that

these difficulties were accentuated by the total unreliability of the paper currencies. It was hard for even well-informed citizens to understand what value to attach to a handful of bills, and the tables of exchange between States would have filled a fat volume . . . . A man could not be sure that what was sound money in one county would pass when he had crossed an imaginary line, nor that if his bills did pass, he would not be charged a ruinous discount.

Some of the costs this exchange rate uncertainty imposed are illustrated by the problems that even New Jersey's Governor Livingston had in making out-of-state transactions. The Governor, who

naturally did much business in New York city, found it so impossible to use Jersey money "at the unconscionable discount which your brokers and merchants exact" that he collected what New York money was due him and saved it to employ across the Hudson.

## A Puzzle Solved

Simply arguing that the intent of the Constitution's article I, section 10, was to eliminate exchange rate variability among different currencies leaves us with a puzzle, though: the desired result could have been accomplished by just requiring the states to fix the exchange rates of their paper monies against a common currency. So why did the fram-

ers of the Constitution go to the extreme of prohibiting states from issuing bills of credit?<sup>6</sup> Understanding this is difficult if we take the conventional view that, for transaction purposes, different currencies are imperfect substitutes even when exchange rates are fixed. The puzzle can be solved, however, if we take the view that when exchange rates are fixed, monies become perfect substitutes; that is, they become interchangeable in transactions.

### Theory

Under the conventional view of the demand for money, there is no need to prohibit states from issuing bills of credit. A well-defined demand function exists for each money; monies are not perfect substitutes. Exchange rates are determined by the relative demand for real balances of different currencies. Under this view, the solution to the exchange rate problem would have been to require the states to peg the value of their bills of credit to a common currency, not to prohibit the states from issuing them altogether. Such a solution would have restricted the growth rate of each state's money. But it would have allowed the states to retain the ability to collect seigniorage revenue should the real demand for their currency increase—say, due to economic growth—an option that would clearly have been to their advantage.<sup>7</sup>

Under an alternative view of the demand for money, however, there is a need for the prohibition. Indeed, the prohibition becomes the states' logical response to a costly problem. According to this view, when exchange rates are fixed, currencies issued by different sovereignties are perfect substitutes for each other. From this perspective, prohibiting states from issuing bills of credit avoids the seigniorage problem inherent with fixed exchange rates.

The view that in a monetary union with fixed exchange rates, different currencies would be perfect substitutes is motivated by the observation that under such an arrangement all monies have, by definition, the same real rates of return. Consequently, if people choose a currency solely on the basis of its real rate of return, they will view all currencies as the same.

<sup>6</sup>The same issue of whether fixed exchange rates or a single currency is more desirable is currently being debated in regard to the proposed monetary union in Europe. Those favoring a single currency for Europe usually argue that, "a single currency establishes the credibility and longevity of a monetary union in a way that 'irrevocably' fixed exchange rates across multiple currencies do not" (Bean 1992, p. 39). Following this line of reasoning, one could argue that the prohibition on state issuance of bills of credit was included in the Constitution to make it more difficult for the states to opt out of the monetary union at a later time.

<sup>7</sup>See Bean 1992 for one example of the conventional view and its implications for a sovereign state's control over its money supply.

Models of money that incorporate such a perfect substitutes view have been studied by Kareken and Wallace (1981) and by King, Wallace, and Weber (1992). Kareken and Wallace use a model in which people choose among currencies solely on the basis of real returns. When the exchange rate between two currencies does not change, the currencies will have the same rates of return and people will be indifferent as to which they hold. The Kareken-Wallace model thus shows that exchange rates are indeterminate in the sense that any unchanging exchange rate between two currencies is consistent with an equilibrium.<sup>8</sup>

Exchange rate indeterminacy is resolved by fixing rates; however, another indeterminacy then arises. Specifically, Kareken and Wallace (1981) show that when exchange rates among monies are fixed, the individual money supplies are indeterminate in the sense that any time paths for two monies are consistent with an equilibrium.<sup>9</sup> Consequently, and contrary to the conventional view of the demand for money, a fixed exchange rate regime places no particular restrictions on the growth rate of any sovereign state's money supply.

This money supply indeterminacy directly gives rise to a seigniorage problem: governments can collect seigniorage revenue from citizens outside their jurisdiction and thereby redistribute income to their own citizens.<sup>10</sup> That is, states with money stocks growing faster than the average will be able to collect seigniorage from the citizens of states with money stocks growing slower than the average.

If governments exploit the opportunity to collect seigniorage revenue from citizens outside their jurisdiction, their actions can jeopardize the existence of such a monetary union. If one state collects seigniorage from the citizens of other states, then those states bearing the implied tax may choose to retaliate in any one of several ways. They could increase their own rate of money creation as a way of getting back their seigniorage income. The result might be high inflation, which would dilute the benefits of a monetary union. High inflation might also lead some states to impose controls to limit the use of currency other than their own and thereby limit the amount of seigniorage revenue other states could raise at their expense. In the extreme, this inflation could lead some states to opt out of the monetary union. Thus, under this view, a monetary union with fixed exchange rates among irredeemable paper currencies is likely to be difficult to maintain unless institutional arrangements are made to resolve this seigniorage problem.

### *Evidence*

So far in this section, we have discussed the seigniorage problem as a theoretical possibility that only arises in a special class of economic models. But there is historical evidence to suggest that it is of practical significance as well: this very problem arose in New England during the colonial period.

By 1710, all of the New England colonies had issued their own bills of credit, and these bills moved freely across colonial borders. Even though there was no official government enforcement of fixed exchange rates, Brock (1975, p. 35) says, "the bills of the several New England colonies customarily, although not always, passed current in all the rest at a uniform value." In other words, the exchange rates among the currencies of these colonies were constant at a rate of 1 to 1. This constancy of exchange rates implies, in turn, the potential for any one colony to levy the seigniorage tax on its neighbors.

This potential did not go unexploited, and Rhode Island was the culprit. As Brock (1975, p. 39) tells us, "the fact that Rhode Island bills circulated widely in other colonies permitted her to levy tribute on her neighbors." Between 1710 and 1744, the New England money supply grew at an average rate of 7.7 percent per year; over the same period, the supply of Rhode Island bills of credit grew at an average rate of almost 14 percent per year (Brock 1975, pp. 591–92). Most of this increase went into circulation in other colonies. Again according to Brock (1975, p. 41), "it was estimated that as many as five-sixths of the Rhode Island bills were absorbed by Massachusetts." By 1744, 43 percent of the New England money

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<sup>8</sup>There is an issue as to whether the exchange rate indeterminacy result of Kareken and Wallace 1981 applies when one or more of the currencies is to be retired. The result certainly applies if currency is only retired asymptotically, which is not an implausible description of the events we have described. It can also apply if the currency is retired in finite time.

King, Wallace, and Weber (1992) modify the Kareken-Wallace analysis to allow for uncertainty. In the modified economy, agents choose among currencies based on their rate of return distributions. King, Wallace, and Weber show that the exchange rate can be variable because the Kareken-Wallace indeterminacy extends to a large class of random processes for exchange rates, where the randomness is nonfundamental. See also Shell 1977, Azariadis 1981, and Cass and Shell 1983 for a discussion of the related notion of a sunspot equilibrium. Of course, in the economy of King, Wallace, and Weber, requiring individual sovereign states to fix their exchange rates against a common currency would eliminate the exchange rate variability.

<sup>9</sup>King, Wallace, and Weber (1992) also show that under a fixed exchange rate regime, the indeterminacy of money supplies extends to a wide class of random processes for the money supplies.

<sup>10</sup>For other discussions of the seigniorage incentive problem in monetary unions, see Casella and Feinstein 1989 and Zarazaga 1991.

supply had been issued by Rhode Island, which had only about 10 percent of New England's population (Brock 1975, p. 592).

Given the high rate of seigniorage taxation levied by Rhode Island on its neighbors, it is not surprising that constant exchange rates did not persist. According to Brock (1975, p. 314, n. 117), the citizens of Norwich and New Haven, Connecticut, petitioned the colonial assembly to do something about the circulation of Rhode Island bills. In 1747 (or 1748), the Norwich petitioners complained that

the Rhode Islanders have the Last Fall Sapped our Interest by buying up [with] Their pernicious bills our best provisions . . . and are now out buying up our Cows & best Stock [,] what They can with Those same pernicious bills.

In 1751, the merchants in New Haven complained that

the colony of Rhode Island by their present Large unequal proportion of outstanding bills are Enabled Annually to buy off A great part of the produce of this Colony the Labour of an Industrious people, to the no Small Detriment of the Inhabitants of this colony.

In May 1752, the Connecticut assembly agreed to prohibit the circulation of Rhode Island bills issued after 1750.

Massachusetts also grew disillusioned with this currency system. In 1749, Governor Hutchinson of Massachusetts proposed the retirement of the colony's own paper currency, after which "no person should receive or pay within the province bills of credit of any of the other governments of New England" (Brock 1975, pp. 249–50). In 1749, Massachusetts passed a law prohibiting the circulation of other New England currencies within its borders, with a fine of 50 pounds for a violation.

Thus, the informal monetary union achieved in New England broke down, and the failure was due to Rhode Island's attempts to collect seigniorage from its neighbors.

## Conclusion

We are not the first to try to explain the willingness of the individual states in the United States to give up their power to issue money. Nevertheless, we think other explanations are inadequate. We think that the motivation behind the constitutional prohibition against bills of credit was the states' desire to eliminate exchange rate variability and avoid the seigniorage problem that otherwise occurs in a fixed exchange rate system.

The formative years of the United States help illustrate

why a monetary union is desirable, yet difficult to maintain. During these years, exchange rate variability was viewed as significant and costly. Further, the New England experience of Rhode Island trying to impose a seigniorage tax on its neighbors supports our contention that a monetary union cannot be maintained simply by requiring the states to fix exchange rates. As we have seen, fixing exchange rates among paper currencies places no limits on the ability of individual states to raise seigniorage revenue. In order to form a more perfect monetary union, therefore, the framers of the Constitution avoided this seigniorage problem by prohibiting the states from issuing bills of credit.

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## Appendix

### A History of Bills of Credit in America

In the preceding paper, we refer only briefly to the widespread use of bills of credit during the formative years of the United States. Here we present a more detailed history of their use by the American colonies before the Revolutionary War, by the states and the Continental Congress during the war, and then by the newly formed country during the years from 1783 to 1789, the so-called Confederation period. (For an overview of some of the issues we discuss, see Sylla 1982.)

#### The Colonial Period

Since England largely prohibited the American colonies from coining specie and chartering banks, colonial governments had to find other methods of deficit finance. Bills of credit were widely used for this purpose by all the colonies, the states, and the federal government until their constitutional prohibition in 1788.

Massachusetts issued the first bills of credit in 1690. They were used to pay troops when tax revenue was insufficient. All the other colonies eventually followed Massachusetts' lead. In order to promote the use and value of bills of credit, they were usually made acceptable for tax payments at a fixed rate in terms of specie.<sup>1</sup>

The colonies issued bills of credit in two general ways. One was to create what was called a *loan office* in order to lend the bills at interest. While this money was not redeemable in specie, most enabling legislation for such issues required money issues to be retired as loans were repaid. These provisions were more adhered to in some colonies than in others, however. The interest on loans was used to fund general expenditures. In colonies with well-run loan offices, interest income often financed all peacetime expenditures, and taxes were only levied in wartime.

The other way of issuing paper money was simply to use bills of credit in government transactions. In all colonies, enabling legislation for this type of money issue also included provisions for future taxes to be used to retire the currency. Again, some colonies adhered to the provisions better than others.

#### The Revolutionary War

Bills of credit became an important source of government financing during the Revolutionary War. Since the ability of the federal and state governments to raise taxes was limited, as the war expenditures grew they relied heavily on paper money.

When the Revolutionary War began, the Continental Congress had no power to tax. To meet its revenue needs, it was

forced to rely on loans and debt, requisitions from state governments, and bills of credit. However, loans and debt provided little income, and the legality of the state governments was often poorly established. Even when their legality was well established, the states had little in the way of a tax collection apparatus. Thus, states' own revenue collections were not large, and they were reluctant to give what they did collect to the Continental Congress. As a result, the federal government had to rely heavily on its own bills of credit, known as *continentals*, to finance its expenditures. Indeed, during the 1775–79 period, bills of credit accounted for 82 percent of the federal government's income (Ferguson 1961, pp. 43–44).

The proliferation of continentals that permitted this seigniorage revenue to be raised is well known. The Continental Congress issued over \$226 million of continentals between June 1775 and the end of 1779, after which it ceased all issues.<sup>2</sup> Since the Continental Congress had no powers of taxation, it requested that the states make continentals acceptable for taxes at a fixed rate in terms of specie. The legislation that authorized the first issue of continentals provided for them to be retired with taxes collected from the states; such legislation did not accompany later issues, however. Consequently, state retirements of continentals through taxation were very limited.<sup>3</sup>

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<sup>1</sup>For a discussion of different colonial experiences, see Ferguson 1953; Ernst 1973; Brock 1975; McCusker 1978; Smith 1985a,b, and 1988; Wicker 1985; or Perkins 1992. Smith (1985a,b) explains how temporary monetization of deficits was consistent with stable currency values.

<sup>2</sup>The figure \$226 million is Ferguson's (1961, p. 30) estimate; slightly different figures are cited by other authors.

Also, while continentals ceased to be issued after 1779, a variety of other circulating liabilities were issued by the federal government after that year. See the discussion in the next footnote.

<sup>3</sup>Another type of federal government certificate, which had been in use since 1776, was a draft drawn on various departments of the government. According to Ferguson (1961, p. 57), these sorts of certificates "were issued by all the departments in lieu of money." At first merely handwritten notes, they later became printed forms. But "from the beginning they were connected with impressment," so they were exchanged (involuntarily) for supplies. Ferguson (1961, p. 63) estimates that "the certificates issued by federal officers must have approximated, in nominal amount, the entire sum of Continental currency." The certificates were irredeemable, bore no interest, and were issued in fixed nominal amounts. They apparently tended to be of even less value than continentals (Ferguson 1961, p. 65, n. 26), although Nevins (1924, p. 505) asserts that "it was often difficult, in practise, to distinguish between the certificates and paper money." And, in fact, the certificates did serve certain functions of money, since they were accepted by some states for taxes after February 1780. The Continental Congress began

The states also issued bills of credit during the Revolutionary War. All told, Nevins (1924, p. 481) says, “the specie value of the currency issued by the States during the Revolution was estimated by Jefferson in 1786 at \$36,000,000, or just as much as the specie value of the Continental currency.”<sup>4</sup>

### The Confederation

The end of the Revolutionary War did not bring an end to America’s use of bills of credit. They continued to be a common form of government financing both for the federal government and for the state governments.

Under the Articles of Confederation, the federal government was permitted to issue paper money, and it did so to help service the considerable debt it had accumulated fighting the war. Although the federal government stopped paying interest on federal loan certificates in 1782, it resumed interest payments on these certificates two years later. It made these payments by issuing *indents*, a paper currency which in all major respects was a bill of credit. Ferguson (1961, p. 224) provides a description of how these bills of credit were meant to function:

Indents were printed by the [federal] Treasury and deposited with the loan officers in each state, who turned them over to the local authority. The states were then supposed to issue indents for interest due on public securities. . . . Congress had the notion that indents would flow freely across state borders and be taken indiscriminately by all states for taxes. Since they were printed in small denominations, ranging from one to twenty dollars, they would provide a national circulating medium.

The indent system, which was in place throughout the Confederation period, was thus meant to be a simultaneous solution to two problems: it was to provide both a means for financing debt service through a kind of money creation and a uniform medium for interstate transactions. During the years 1786–89, between \$703,000 and \$1,364,000 of indents were outstanding. (For further evidence that indents circulated, see Bolles, 1884, pp. 324, 326.)

States were also allowed to issue their own money, and several states reestablished to a large extent the monetary arrangements that they had employed in the colonial period and during the war to service and retire debt.<sup>5</sup> Some of this debt was of their own issue, but many states also assumed responsibility for paying the interest on federal loans and debt held by their own residents when the Continental Congress stopped paying interest on them in 1782.<sup>6</sup>

Pennsylvania, for example, gave public creditors *certificates of interest*, and it made these certificates receivable for state tax payments. According to Ferguson (1961, p. 222), Pennsylvania “created in the process a kind of state paper money.” These certificates of interest were essentially bills of credit, and they added to those already in existence from the Revolution. Thus, by early 1785, it was estimated that Pennsylvania had more than \$160,000 in circulation.<sup>7</sup> In March 1785, Pennsylvania auth-

orized an issue of an additional £100,000 “to pay interest on all public securities held by citizens of the state” (Ferguson 1961, p. 229). Taxes and revenues from the sales of public lands were pledged to retire these issues.<sup>8</sup> Pennsylvania thus sought to finance debt service by the temporary creation of money, and the state issued £50,000 to create a loan office along colonial lines. All Pennsylvania currency issues were made receivable at face value for all payments to the state during this time.

New Jersey issued a *revenue money* to its public creditors. In 1786, it supplemented this revenue money by issuing £100,000 of bills of credit through a loan office. To promote the acceptance of the currency, New Jersey implemented a set of taxes to be used to retire the money, a law making it legal tender for payment of public and private debts, and penalties for discriminating between it and specie in transactions.

New York also issued bills of credit in 1786. In that year, New York issued £50,000 for the purpose of paying the interest on outstanding debt. (That is, the state was engaged in a form of currency finance.) In addition, New York issued another £150,000 through a loan office. Nevins (1924, p. 528) tells us that the money “was made a legal tender for private debt only in case of suits.” (For more on the New York experience, see Kaminski 1972, pp. 155, 158.)

Rhode Island, South Carolina, and North Carolina are examples of states that issued bills of credit during the Confederation period. In 1786, Rhode Island issued £100,000 through a

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accepting them from the states in payment of certain requisitions after March 1780.

The last wartime issues of the federal government occurred in 1782 when Congress decided to convert unliquidated public debts into a liquidated public debt. To this end, it appointed federal commissioners to inspect claims against the federal government. Ferguson (1961, p. 179) tells us that “the commissioners verified claims and revalued them in specie if they were stated in terms of depreciated currency. For balances due they issued ‘final settlement certificates’ amounting to over \$3,700,000.” Final settlement certificates, though, were also used in government payments. For instance, about \$11 million (in specie value) of final settlement certificates were issued in troop payments (Ferguson 1961, p.180).

<sup>4</sup>The states also issued certificates of various sorts in addition to their explicit issues of paper money. North Carolina, for instance, issued five different kinds of certificate debt over the 1778–82 period, with a nominal value in excess of \$40 million. Some of these certificates bore a fixed nominal interest rate, some bore interest and were indexed to the value of specie, and some bore no interest. Some also had a special status in certain kinds of payments to the state, while others did not. The result was that the relative values of different types of certificates varied. (See Morrill 1969 for a more complete discussion.) In addition, the states issued loan certificates which were analogous to federal loan certificates.

<sup>5</sup>See, for example, the work of Schweitzer (1989) or Ferguson (1961). The latter argues that during the Confederation period, “the various states were re-enacting their particular experience with paper money in colonial times” (Ferguson 1961, p. 244).

<sup>6</sup>Some states (Massachusetts being the most prominent example) sought to raise the required revenue entirely through direct taxation. The result was high tax rates and, eventually, a tax rebellion (Shays’ Rebellion of 1786–87).

<sup>7</sup>The term *pound* did not mean the same thing in different states. We use it here as it was used to refer to the currency of the state in question.

<sup>8</sup>And, in fact, £87,000 had been retired through these means by September 1788 (Nevins 1924, p. 522).

loan office. The state passed measures imposing penalties for discriminating in transactions between specie and the state money. The measures also made the state money a legal tender for payment of private debts. South Carolina had exchanged its own state debt for federal debt held by its own citizens, so that during the Confederation period virtually all debt held in South Carolina was state debt. The interest on this debt was paid by state issues of *special indents*. Ferguson (1961, p. 233, n. 31) estimates that "the actual emission of indents varied from \$273,000 to \$535,000 annually."<sup>9</sup> (For annual issues, see Higgins 1969, p. 245, n. 4.) These certificates were redeemed out of tax revenue. In addition, £100,000 were issued through a loan office in 1786. In North Carolina, the certificates issued during the Revolution were accepted for property tax payments through 1786. To supplement the certificates (and partly to replace them), North Carolina issued new bills of credit. In 1783, £100,000 were issued; and in 1785, another £100,000 were issued. The paper money was a legal tender for payment of all public and private debts.

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<sup>9</sup>Ferguson's (1961, p. 233) estimates for the South Carolina pound are "stated in terms of dollars at the rate of \$4.286 to £1, which the legislature adopted in 1783."

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