

A common currency: early US monetary policy and the transition to the dollar

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The US economy's transition to the dollar early in the federal period (1790–1811) marks the emergence of the monetary system that for the most part exists today. With it came a central bank, the start of modern banking and securities markets, and a newly found confidence among investors in the ability of the young nation to service its financial obligations. The importance of these events for the nation's early growth has only begun to receive the attention that it warrants.² At the very least, the historical record suggests that monetary conditions were deteriorating rapidly in the years leading up to the Federal Constitution of 1789. At that time unbacked issues of fiat money that helped to finance the American victory in the Revolutionary War gave way to an inflationary spiral, debt depreciation and a scarcity of real money balances. The need to unify the nation's currency and to restore the public's confidence in it weighed heavily in the minds of the forefathers as they drafted a constitution that forbade emissions of paper money by individual states in favour of committing to a securely backed transactions asset.

The forefathers based their decision to forbid state issues of paper money on their recent experience and on earlier accounts. The colonial money stock, essentially a combination of state-issued bills of credit and foreign coins, had functioned adequately at times in colonies such as Pennsylvania and New York, but was more often just a remedy for hardships imposed by wars and the extractive policies

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² See, for example, R. Sylla, 'US securities markets and the banking system, 1790–1840', *Federal Reserve Bank of St Louis Review*, 80 (1998); P. L. Rousseau and R. Sylla, 'Emerging financial markets and early US Growth', *Explorations in Economic History*, 42 (2005) and Working Paper No. 7448, National Bureau of Economic Research (1999); R. E. Wright, *The Wealth of Nations Rediscovered* (Cambridge, 2002).

of the mother country. When the system functioned badly, as it did at various times in New England and in the Carolinas, it caused serious difficulties for individuals involved in market transactions.

Scholars in the late nineteenth century such as Andrew MacFarland Davis tended to emphasise the more severe malfunctions of colonial monetary arrangements when engaged in debates with their contemporaries about expanding the money supply, but in doing so probably over-stressed the long-run importance of these events.³ Later, historians such as Leslie V. Brock, E. James Ferguson and Edwin J. Perkins have taken a more moderate stance, commenting instead on how surprisingly well the colonial monetary arrangements seemed to work much of the time.⁴ None of these scholars, however, have contended that the young US economy would have been better off had it retained a system of state-issued bills of credit into the nineteenth century.

While recognising that the colonial experience with paper money was not entirely unsatisfactory, and perhaps even necessary given the challenges of financing wars, promoting agriculture, and providing a medium of exchange in the face of restrictions imposed by England on coinage and specie imports, in this article I take a quantitative approach to exploring evidence of potential deficiencies in colonial monetary arrangements and documenting the degree to which conditions improved over the period from 1790 to 1850. I will contend that the transition to the dollar and all that came with it mattered because, over time, it succeeded in *monetising* the modern sector of the US economy, a feat that was not possible in an era when colonial legislatures were unable to commit credibly to controlling currency emissions.

A failure to monetise meant that a large portion of transactions occurred through barter, store credit and other informal means. Those with access to the market for larger-denomination internal bills of exchange certainly used them, but all of these methods involved transaction friction that might have been avoided with paper money that could hold its value. When states issued paper money in quantities small enough that the public retained confidence in the underlying resolve to impose the taxes required for its redemption, the real money stock expanded and monetisation proceeded. When issues became so large that the public began to question the commitment to redeem the bills, rightfully or not, depreciation quickly set in and monetisation halted. Charles W. Calomiris also makes this point, though focusing primarily on the depreciation of the federally issued 'continentals' of the 1776–89

³ See the discussion in E. J. Ferguson, 'Currency finance: an interpretation of colonial monetary practices', *William and Mary Quarterly* (1953), pp. 153–4.

⁴ L. V. Brock, *The Currency of the American Colonies, 1700–1764: a Study in Colonial Finance and Imperial Relations* (New York, 1975); Brock, 'The colonial currency, prices, and exchange rates', *Essays in History*, 34 (1992); Ferguson, 'Currency finance'; E. J. Perkins, *American Public Finance and Financial Services, 1700–1815* (Columbus, OH, 1994).

period.⁵ With monetisation inhibited, it is likely that the colonies did not achieve the level of economic development that would have otherwise been possible.

These ideas contrast with those advanced recently by Farley Grubb, who reinterprets the Constitution's ban on state issues as a successful attempt of powerful, moneyed interests to usurp state sovereignty.⁶ Ronald Michener and Robert E. Wright have challenged this view on factual and conceptual grounds.⁷ Rather than focus directly on this debate, however, which considers the political motivations of the key framers of the Federal Constitution, in this article I will simply present a few observations which suggest that the transition to the dollar was a defining moment in modern US development. In so doing I will try to make a case that: (1) the colonial economy was inadequately monetised; (2) as a result, the colonial economy did not experience financial deepening; (3) the money stock and financial sector expanded rapidly over the period from 1790 to 1850; and (4) this led to gains in financial depth. I will then present some econometric evidence suggesting that monetisation of the modern sector was a driving force behind aggregate investment in the antebellum United States.

I

Economic activity in the colonial period of American history is difficult to measure because many transactions did not involve an intermediate medium of exchange such as coins or paper money. Local, non-pecuniary credit transactions and barter were common means for individuals to obtain consumption goods, especially outside of the urban centres. And even though the colonies functioned reasonably well under such arrangements, it is likely that transaction costs were higher than necessary and led to real losses in economic efficiency. The metallic stock that did exist was a collection of foreign coins, primarily the Spanish silver dollar or 'piece of eight' and the Spanish gold pistole, with each coin valued at a local 'pound' equivalent that varied from colony to colony.

Economic historians will probably never know how much specie was actually in the colonies, but many scholars of the period believe that such coins accounted for only a small part of the money supply on the eve of the Revolutionary War. For example, Brock asserts that 'in ordinary times, the supply of specie was at best meagre and uncertain, and was not infrequently wanting altogether'.⁸ The

⁵ C. W. Calomiris, 'Institutional failure, monetary scarcity, and the depreciation of the continental', *Journal of Economic History*, 48 (1988). See also R. E. Wright, *Origins of Commercial Banking in America, 1750–1800* (London, 2001) for commentary on the under-monetisation of the colonial economy based on historical letters and other qualitative evidence.

⁶ Farley Grubb, 'Creating the US dollar currency union, 1748–1811: a quest for monetary stability or a usurpation of state sovereignty for personal gain?' *American Economic Review*, 93 (2003).

⁷ R. Michener and R. E. Wright, 'State "currencies" and the transition to the dollar: clarifying some confusions', *American Economic Review*, 95 (2005).

⁸ Brock, *Currency of the American Colonies*, p. 532.

second chapter of Anne Bezanson's study of prices in Pennsylvania opens with the claim that between 1770 and 1775 only 'a minor amount of coin furnished the medium of exchange in domestic trade'.⁹ Richard A. Lester states that 'gold and silver coins were a luxury in the colonies'.¹⁰ As far as quantitative estimates go, John J. McCusker and Russell R. Menard place the share of specie at about 25 per cent of the money supply.¹¹ And more recently, using advertisements in the *Pennsylvania Gazette* for runaway servants, convicts and apprentices between 1729 and 1775, Grubb estimates that specie was used in about 20 per cent of market transactions.¹² If these scholars are anywhere close to the mark, money would have been in insufficient supply to support all of the transactions for which it would have been convenient.

This is not to say that there is universal agreement about the amount of specie in the colonies. Using the results of Alice Hansen Jones's study of colonial probate records from 1774, Michener estimates that about two-thirds of the money supply in New York and Pennsylvania was comprised of specie.¹³ Potential problems with using probate records to estimate the money stock, and most importantly the fact that such measures represent the specie holdings of wealthy individuals and are thus unrepresentative of the population at large, are described by Bruce D. Smith and by McCusker and Menard.¹⁴ Specie, to the extent that it was available, also had a tendency to flow into colonies that valued it more in terms of the local currency and out of colonies that valued it less. All the while, specie was under pressure to go abroad to settle trade deficits with England. The crown prohibited the colonies from minting their own coins, and coins could not flow back from England in the course of trade because specie exports to the colonies were prohibited.¹⁵ This meant that

⁹ A. Bezanson, *Prices and Inflation During the American Revolution: Pennsylvania 1770–1790* (Philadelphia, 1951), p. 10.

¹⁰ R. A. Lester, 'Currency issues to overcome depressions in Pennsylvania, 1723 and 1729', *Journal of Political Economy*, 46 (1938), p. 326.

¹¹ J. J. McCusker and R. R. Menard, *The Economy of British America: 1607–1789* (Chapel Hill, NC, 1985).

¹² Farley Grubb, 'The circulating medium of exchange in colonial Pennsylvania, 1729–1775: new estimates of monetary composition, performance, and economic growth', *Explorations in Economic History*, 41 (2004).

¹³ A. H. Jones, *Wealth of a Nation to Be: the American Colonies on the Eve of the Revolution* (New York, 1980); R. Michener, 'Fixed exchange rates and the quantity theory in colonial America', *Carnegie-Rochester Conference Series on Public Policy*, 27 (1987), p. 258.

¹⁴ B. D. Smith, 'The relationship between money and prices: some historical evidence reconsidered', *Federal Reserve Bank of Minneapolis Quarterly Review*, 12 (1988), p. 29. Smith also includes a summary of other estimates of the colonial money supplies and the conceptual problems associated with each. McCusker and Menard, 'Colonial paper money', pp. 264–5. Michener, 'Fixed exchange rates', pp. 278–9, and 'Money in the American colonies', *EH Net Encyclopedia* (2003), discusses various inconsistencies that he finds in McCusker and Menard's calculation.

¹⁵ The British government did, however, as a matter of policy, ship specie to the colonies to pay troops stationed there.

the typical course of trade involved foreign coins flowing into the colonies from other points in the western hemisphere, such as the sugar islands, and a one-sided outflow of these coins to England.

It is against this backdrop that the colonies, starting with Massachusetts in 1690, experimented with issues of paper money. The money got into circulation as public payments for military operations and as direct loans to farmers by government land offices. According to the 'backing' theory as described by Smith, the paper would retain its value because it was backed by future tax collections, meaning that the colonial governments would promise to accept the paper at some point (usually years later) at face value in payment of tax obligations. When colonial governments could credibly commit to doing this, their bills of credit had real economic value because, given the level of economic activity and population growth, their convenience in transactions allowed them to be absorbed without depreciation.¹⁶ As the first signs of suspicion or doubt about the steadfastness of this commitment arose, however, as they did in South Carolina before 1730 and in North Carolina and Rhode Island in the 1740s, the paper money would depreciate against specie, often to the point of worthlessness.

The backing theory is usually associated with an apparent failure of the quantity theory of money. Michener disagrees with Smith, maintaining that the colonial experience did not involve violations of the quantity theory, but rather that most colonies operated under a *de facto* fixed exchange rate system, with specie and paper serving interchangeably as the medium of exchange and experiencing offsetting specie flows.¹⁷ Michener's argument is easier to make if, as he asserts, specie comprised a large portion of the money supply. If specie was less than plentiful, however, something akin to the backing theory must have been in operation.

It is important at this juncture to recognise that most of my analysis of the colonial period will proceed under the implicit assumption, held by a majority of scholars, that currency was indeed scarce in the colonies. If this is correct, the colonies could not have operated under Michener's *de facto* fixed exchange rates. More importantly, if Michener is right and about two-thirds of the colonial money supply was comprised of specie, the colonies would not have been as clearly under-monetised compared to the early federal period as my analysis suggests. Further, if the colonies operated under something like a fixed exchange rate system where specie emissions tended to offset specie outflows and vice versa, my conclusions about the inelasticity of the colonial money supply would need to be appropriately tempered.

¹⁶ B. D. Smith, 'Some colonial evidence on two theories of money: Maryland and the Carolinas', *Journal of Political Economy*, 93 (1985).

¹⁷ Michener, 'Fixed exchange rates', p. 237. A. J. Rolnick, B. D. Smith and W. E. Weber, 'In order to form a more perfect monetary union', *Federal Reserve Bank of Minneapolis Quarterly Review*, 17 (1993) argue instead that the colonies operated under flexible exchange rates and that the desire to eliminate them was the main reason why the US Constitution forbade state currency emissions.

II

The colonial experiences with currency depreciation led all colonists to place some positive weight on the possibility that their currency might one day become worthless. This limited the volume of bills that colonial governments could issue. The more stable experiments with paper money in Pennsylvania, New York and New Jersey avoided catastrophic depreciations because issues remained manageable. It does not follow from this, however, that these colonies had an optimal monetary arrangement. Rather, these colonies had great difficulty in monetising, at least if measured by the real value of paper money in circulation. Figure 1 shows the per capita stock of paper money from 1710 to 1775 in these mid-Atlantic ‘successes’ after converting to sterling equivalents. I made the conversions by dividing the amount of outstanding bills of credit by the total population of each colony, and multiplying the result by average annual sterling exchange rates.¹⁸

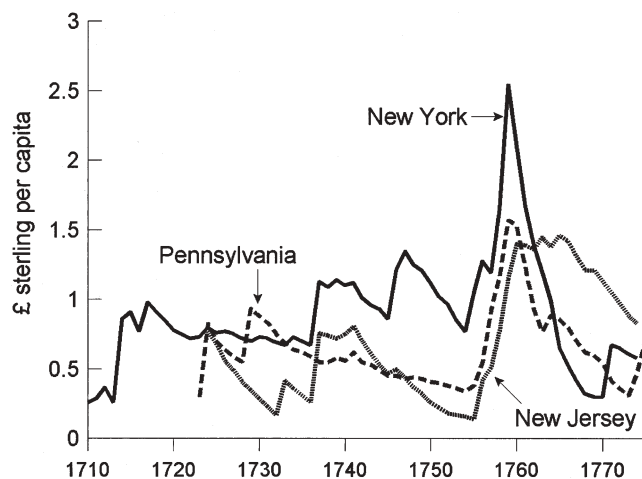


Figure 1. *Bills of credit outstanding per capita in the mid-Atlantic colonies, 1710-75*

¹⁸ Bills of credit in circulation for Pennsylvania are from Brock, ‘Colonial currency’, table 6, as corrected by Michener. For New Jersey they are from Brock, *Currency of the American Colonies*, table 6, p. 93, for 1724-52, and from Brock ‘Colonial currency’, table 5, for 1753-74. The amount of outstanding bills for New York is available on an annual basis after 1747 from Brock, ‘Colonial currency’, table 5. From 1709-47, Brock, *Currency of the American Colonies*, pp. 66-73, includes records of emissions, anticipated redemptions and many actual redemptions. There are also a few benchmark estimates of the overall stock of bills. Using this information and linear interpolation for missing years in the time paths of individual issues and their retirements, I approximated the stock of bills for New York during this period. Colonial populations are from US Bureau of the Census, *Historical Statistics of the United States: from Colonial Times to 1970* (Washington, DC, 1975), p. 1168, series Z-9, Z-10, and Z-11, and use constant growth rates to interpolate between decadal observations. Sterling exchange rates are annual averages of local currency per £100 sterling from J. J. McCusker, *Money and Exchange in Europe and America, 1600-1775: a Handbook* (Chapel Hill, NC, 1978), table 3.5, pp. 162-7 for New York; table 3.6, pp. 172-3 for New Jersey; and table 3.7, pp. 183-8 for Pennsylvania. I use linear interpolations to fill in between occasional missing observations.

It may be surprising that Pennsylvania (given by the dashed line in Figure 1), often touted as the great example of currency finance at its best, saw its per capita stock of paper money fall steadily from 1724 until 1755. It rose from 1755 to 1760 in the midst of the Seven Years' War, but then fell rapidly, reaching its lowest point in the pre-Independence period by 1773. In 1750, bills per capita were about £0.7 (14s.) in local Pennsylvania currency or £0.4 in sterling equivalent. This amount could purchase, for example, using December prices from Arthur H. Cole, one gallon of rum (3s.), one bushel of wheat (4.5s.), one bushel of corn (2.5s.), and 2lb of cotton (2s.).¹⁹ In other words, the stock of paper money could have supported purchases of staple goods if it had changed hands frequently enough. Yet any savings or other hoarding of coin would have lowered velocity, and the colonists were faced with other cash expenses such as building materials, capital goods and farm maintenance costs.

A comparison of bills of credit per capita in Pennsylvania with England's per capita money stock further suggests that the colonial economy was undermonetised. Rondo Cameron estimates England's M2 money stock in 1750 at about 52 million in 1790 sterling.²⁰ Since England's population was about 6 million in 1750 and the consumer price index (1790–1) was 0.779, real money per capita was about £6.80 – much more than the £0.4 sterling equivalent for Pennsylvania. Even allowing for the generous possibility that specie accounted for two-thirds of Pennsylvania's money stock, the per capita money stock (paper money plus specie) could therefore not have exceeded £1.20 in sterling equivalent. If specie accounted for about 22.5 per cent of the money supply (i.e. the average of the estimates from Grubb and from McCusker and Menard) per capita holdings would be closer to £0.52 sterling. It is true that many English citizens could use money as a form of savings more easily than the colonists due to the presence of a still small but rapidly expanding set of country banks, and that their consumption possibilities in the market economy were wider, but it is hard to imagine that these differences would have created anywhere from a six- to thirteen-fold increase in the demand for money.

To make another comparison, 14 Pennsylvania shillings in 1750 would be worth about \$38 US at the end of 2004.²¹ This amount of currency would be insufficient

¹⁹ A. H. Cole, *Wholesale Commodity Prices in the United States, 1700–1861: Statistical Supplement, Actual Wholesale Prices of Various Commodities* (Cambridge, MA, 1938), pp. 31–2.

²⁰ R. Cameron, 'England, 1750–1844', in R. Cameron, O. Crisp, H. T. Patrick and R. Tilly (eds.), *Banking in the Early Stages of Industrialization: a Study in Comparative Economic History* (New York, 1967).

²¹ I obtained this estimate by multiplying the sterling equivalent of £0.4 in 1750 by the 6.15 per cent total increase in English consumer prices between 1750 and 1900, converting to 1900 US dollars using the exchange rate of \$4.87/£1, and multiplying the result by the 18-fold increase in US prices that occurred between 1900 and 2004. I built a continuous index of English prices using *Historical Statistics* by ratio-splicing the Schumpeter-Gilboy index for 1750–1819 (table 14.1.B, pp. 719–20) with Rousseaux's index for 1820–45 (table 14.3, p. 722) and the Sauerbeck-Statist index for 1846–1900 (table 14.4, p. 725).

for an individual in the United States today to complete weekly cash purchases without using cheques and/or credit cards (i.e. instruments of a modern financial system), even if consumption possibilities were limited to those available to the colonists. Indeed, the US monetary base (currency and coin) now exceeds \$2,000 per person, and M1 money stock (i.e. currency and deposits) exceeds \$4,000 per person.

The per capita stock of paper money in New Jersey, given by the dotted line in Figure 1, was more variable than that of Pennsylvania but has the same downward trend from 1725 to the start of the Seven Years' War. New York, given by the solid line, was more successful in monetising between 1710 and 1760, but bills of credit per capita were still only £1.1 in sterling equivalent by 1750. These figures all suggest, given reasonable conjectures about velocity of money at the time and the amount of specie likely to have been in circulation, that many of the economy's transactions had to have occurred outside of the formal monetary system.

Figure 2 shows that the New England colonies also had difficulties in monetising.²² These series were constructed with the same methodology used for the mid-Atlantic colonies in Figure 1, except that the sterling exchange rate for Massachusetts was also applied to the paper money stocks of Connecticut, New Hampshire and Rhode Island. This is reasonable because the bills emitted by the New England colonies before 1750 were generally accepted across colonial borders at par with the home colony's own currency.

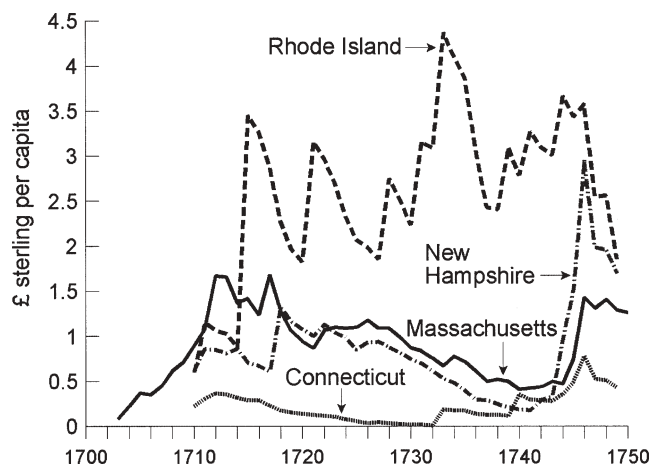


Figure 2. Bills of credit outstanding per capita in the New England colonies, 1703–49

²² Bills of credit for the New England colonies are from Brock, 'Colonial currency', table 1. Populations are from *Historical Statistics*, p. 1168, series Z-3, Z-6, Z-7, Z-11, and use constant growth rates to interpolate between decadal benchmarks. Sterling exchange rates are annual averages of local currency per £100 sterling from McCusker, *Money and Exchange*, table 3.1, pp. 138–45.

A few observations can be made at this point. First, the per capita stock of paper money declined in Massachusetts, New Hampshire and Connecticut through the 1720s and 1730s. By 1740 it had fallen to less than £0.5 sterling in all three. Second, the behaviour of Rhode Island's currency stock was much different, following an upward trend from 1710 through 1747. This small state, with a population of 25,000, one-sixth that of Massachusetts, had discovered that it could issue paper money that would depreciate only to the extent that it undermined confidence in the money stock of the entire *region*, which in effect allowed Rhode Island to levy taxes indirectly on its neighbours. Finally, when the New England colonies all began to emit larger quantities after 1745 to pay for King George's War (1745–8), the ensuing expansion of the region's money supply led to a runaway inflation.

Recognising its failure with paper money, Massachusetts reformed its currency between 1749 and 1754, at first using specie shipments from England that were belated compensation for expenditures made during King George's War to repurchase bills of credit. After the bills were collected and burned, Massachusetts issued only 'treasurer's certificates', which bore interest and were redeemable on demand in silver. This effectively placed Massachusetts on a specie standard for the remainder of the colonial period. Connecticut, though slower than Massachusetts in getting started, enacted similar currency reforms to extinguish its bills of credit. New Hampshire, a colony that increased emissions sharply in the late 1740s, while not officially opposing currency reform, in fact did not proceed with it quickly at all, and was still working on it in the early 1760s. Rhode Island's direct resistance to currency reform hastened the Currency Act of 1751, a directive from the crown that forbade further issues of legal tender bills in the New England colonies, but currency reform commenced even in Rhode Island by 1763.

Rhode Island's ability to exploit the system of currency finance for its own gain underscores an important disadvantage of monetary independence within a tightly wound regional economy – the domestic value of one currency becomes dependent on actions taken by other members of the 'union'. The forbidding of state note issues, formation of a central bank, and growth of the banking system early in the federal period can be viewed as an attempt to reduce the possibility of these problems arising.²³ And though banks were known to have over-issued notes over the nation's first half-century as well, and especially during the 1830s, most of the time there was a central bank that could impose some discipline on note issues by collecting them and then presenting them at the issuing bank for redemption in specie. Excessive note issues by soon-to-be-insolvent banks in one region could disrupt the economy generally if they undermined confidence in other banks, but over-issues by one bank, unlike that of a single colony, would be unlikely to disrupt the entire system.

Of all the colonies, South Carolina had the most tumultuous experiences with paper money. Figure 3 shows its bills of credit per capita along with those of North

²³ Rolnick, Smith and Weber, 'More perfect monetary union', pp. 2–3.

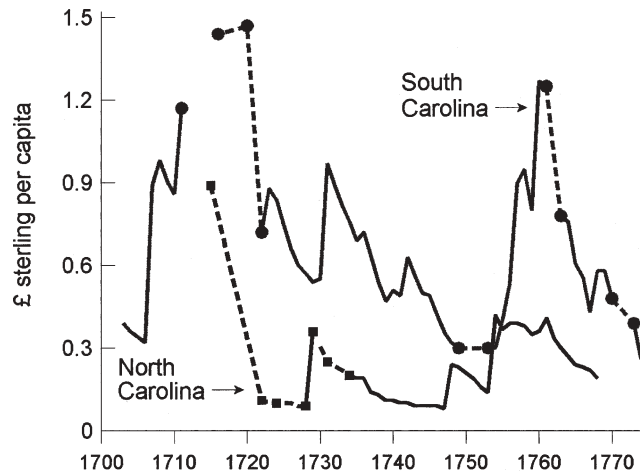


Figure 3. *Bills of credit outstanding per capita in the Carolinas, 1703–74*

Carolina, again in sterling equivalents.²⁴ It is likely that conflicts with neighbouring Indian tribes and the Spanish, both potential and actual, justified the first two waves of emissions in South Carolina, but the ability to extract seigniorage successfully through currency issues does not necessarily represent an effective monetary policy. Rather, the currency expansions were needed to compensate for the inability to raise revenues by other means. The situation in North Carolina was less fantastic but followed a similar rhythm.

III

The available data suggest that the colonies had difficulty monetising, but a non-increasing stock of real money might still promote growth of a modern (i.e. market-oriented) sector if it expanded enough to absorb the volume of transactions in that sector. One such modern-sector activity was international commerce. Large trade deficits affected the stock of specie because sterling bills of exchange would become scarce and specie would have to go abroad in settlements. With an elastic supply of paper money, fresh paper issues could replace the remitted specie until

²⁴ I constructed the sterling value of outstanding bills for North and South Carolina from records of issues and likely redemptions in Brock, *Currency of the American Colonies*, pp. 108–29. Populations (including slaves) are from *Historical Statistics*, p. 1168, series Z-15 and Z-16, and use constant growth rates to interpolate between decadal benchmarks. Sterling exchange rates are annual averages of local currency per 100, sterling from McCusker, *Money and Exchange*, table 3.11, pp. 217–9, and table 3.12, pp. 222–6. Linear interpolations between missing exchange rates were used if they facilitated additional observations for the sterling equivalent currency stock. Dashed lines connect endpoints of gaps in data. The plotted series for South Carolina excludes observations of £3.14 in 1712, £2.78 in 1713, £1.84 in 1714 and £1.71 in 1716.

more could be obtained in the course of trade with South America and the West Indies or through military reimbursements from England.

The colonies, however, were unable to control the supply of paper money with any precision because the equivalent of today's 'open-market purchases' involved collecting taxes for which bills of credit were an accepted and desirable medium of payment and then destroying the bills. Unfortunately, bills were rarely redeemed according to schedule. The ability to expand the nominal money stock readily, especially to meet the needs of war, combined with an inability to contract it quickly, imparted an inflationary bias to colonial monetary policy. When public confidence in the resolve to extinguish the bills in a timely manner fell, this bias would make the value of paper money difficult to sustain.

This is not to say that the money supply in some colonies showed no signs of elasticity. Figure 4, for example, shows some co-movement between per capita bills of credit and per capita trade (the sum of exports and imports) with England for Pennsylvania, New York and New Jersey combined. The coefficient of correlation between the series is 0.50.²⁵ Of course, the correlation of the overall trade *deficit* and the stock of paper money would be a more useful measure of elasticity, but we just do not know the net payments position of the individual colonies with respect to their trading partners other than England. It is reasonable to operate under the working assumption, however, that larger trading volumes for the mid-Atlantic and New England colonies were correlated with larger deficits. I say this because the mid-Atlantic and New England colonies ran a substantial deficit with England in every year for which data are available, and the inflow of specie from Latin

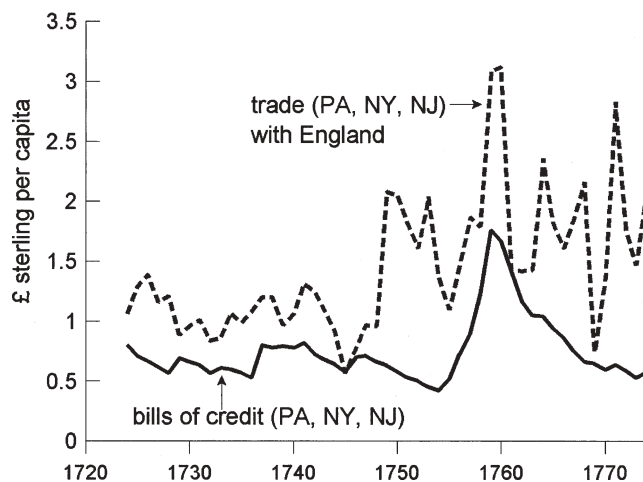


Figure 4. *Bills of credit outstanding and trade with England, mid-Atlantic colonies, 1723–75*

²⁵ The value of exports to and imports from England by New York and Pennsylvania are from *Historical Statistics*, series Z217–Z220, p. 1176. The foreign commerce of New Jersey was carried on through the New York and Philadelphia ports (Brock, 'Colonial currency', p. 13).

America was unpredictable.²⁶ All of this suggests that the supply of paper money in the mid-Atlantic colonies was 'responsive' to fluctuations in the flow of trade. By this same metric, however, Figure 5 suggests that the New England colonies, with a correlation between the monetary and trade series of less than 0.01, did not have an elastic currency. Figure 6 shows that the money stock of the Carolinas could also be characterised as inelastic (correlation coefficient of -0.17 for 1734–68), though these colonies did run trade surpluses with England in the 1720s and 1730s.²⁷

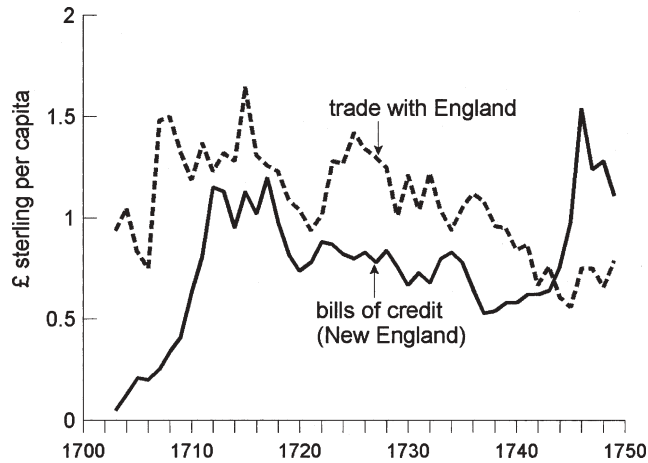


Figure 5. *Bills of credit outstanding and trade with England, New England, 1703–49*

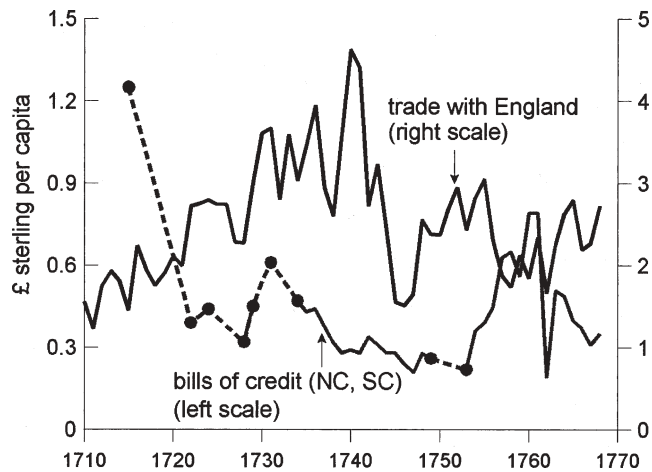


Figure 6. *Bills of credit outstanding and English trade in the Carolinas, 1710–68*

²⁶ See Figures 7, 8 and 9 below for a comparison of exports and imports for the mid-Atlantic colonies, the New England colonies and the Carolinas, respectively.

²⁷ See Figure 9 below for a comparison of exports and imports for the Carolinas. The value of exports to and imports from England by North Carolina and South Carolina combined are from *Historical Statistics*, series Z223–Z224, pp. 1176–7.

Overall, the inelasticity of the colonial money supply was unlikely to have created conditions that were favourable for economic development.

In fairness, however, problems with an 'inelastic' currency persisted well beyond the colonial period, and solving them was among the stated objectives of the Federal Reserve Act of 1913. Even then, failure to expand the money supply adequately remains a leading candidate explanation for the impulse that started the Great Depression. But the inelasticity in the New England colonies and the Carolinas was unfortunate since an ability to manipulate the money supply on both margins could have provided greater price stability when catastrophic depreciations were not uncommon and the money stock would often swing rapidly due to events such as widening trade deficits, large repayments of war expenses in specie from England, or more favourable trade balances with Latin America and the West Indies. Expansion of the nominal money supply was rarely difficult in the colonial period, but supporting its value through commitments to rein it back in without extraordinary measures proved to be nearly impossible. This stands in rather stark contrast with the system of banks that developed in the United States over the first half of the nineteenth century. These banks could more easily issue and redeem notes, thereby allowing the money supply to fluctuate in closer harmony with the needs of commerce.

IV

Inelasticity of the money supply was an inconvenience for the American colonists, but it was probably not the greatest problem of the monetary system. Rather, it was inadequate growth in the real money supply that suppressed the emergence of a modern sector, even in those colonies where paper money systems operated adequately. The inability to modernise, of course, may have had as much or more to do with the extractive orientation of England's economic policies than with deficiencies in monetary arrangements. Nonetheless, the ability of the colonies to use paper money to cope with restrictions imposed by the Crown would have been, in retrospect, at best a weak endorsement of it for use in the period following the adoption of the Federal Constitution.

Studies of financial development and growth in the macroeconomics literature have identified measures such as the ratio of broad money to gross domestic product as indicative of financial sophistication and the extent to which an economy has monetised.²⁸ Unfortunately, the available data for the colonial period are inadequate for investigating this type of relationship econometrically. Even if a measure of colonial output were available, it would include the subsistence sector of a largely

²⁸ See, for example, R. King and R. Levine, 'Finance and growth: Schumpeter might be right', *Quarterly Journal of Economics*, 108 (1997); P. L. Rousseau and P. Wachtel, 'Financial intermediation and economic performance: historical evidence from five industrialized countries', *Journal of Money, Credit and Banking*, 30 (1998).

agricultural economy that operated for the most part outside of the formal market. Thus, a narrower measure of modern sector activity, such as trade or commerce, might be a more appropriate normalisation for the volume of money. In this section, I use the ratio of bills of credit to trade with England to gain insights about the long-run evolution of financial depth.

Figure 7 shows this ratio for Pennsylvania, New York and New Jersey combined from 1724 to 1774. The series exhibits wide fluctuations throughout, and especially a sharp decline in the late 1740s and a rebound from 1754 to 1761; yet the long-run trend is clearly negative. Indeed, the ratio of money to trade is 64 per cent lower in 1774 than it was in 1724. Even though the commercial sector grew over this period, finance failed to keep pace in the absence of banks and securities markets.

The ratio for the New England colonies, shown in Figure 8, has a slight downward trend from 1710 to 1745, but then rises rapidly, presumably due to the flood of paper money that was issued in the midst of King George's War. Had these issues retained their value, some benefits of monetisation might have been felt in the modern sector, but public confidence in the new bills deteriorated quickly. When provisions for their retirement were made in 1749, the depreciation slowed as the bills were taken out of circulation and the region's experiment with legal-tender paper money came to an end. Prior to issuances of the late 1740s, then, it appears that New England's bills of credit were able to keep up with commercial expansion, though the very low correlation in Figure 5 suggests that the timing was imprecise.

The conditions for North Carolina and South Carolina differed from those in the mid-Atlantic and New England colonies in that exports made up a larger portion of the total trade with England for the Carolinas. At the same time, Figure 9 shows that the ratio of bills of credit to trade fell from 1720 until the start of the Seven Years' War. At that time fresh currency issues raised the measures of financial depth temporarily, but they quickly fell again to their pre-war levels by 1763.

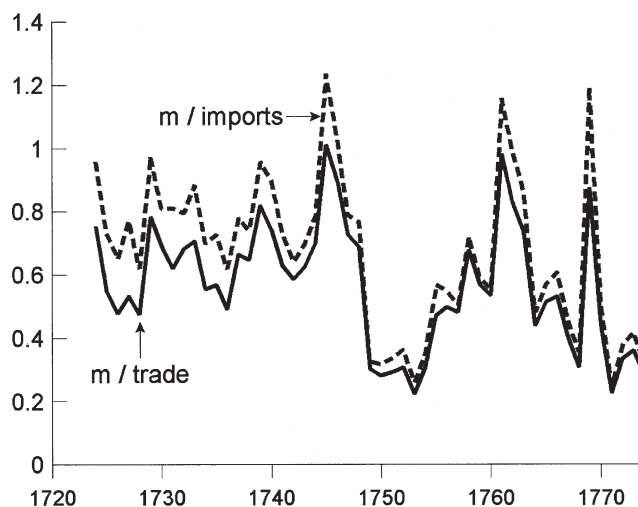


Figure 7. *The ratio of bills of credit in the mid-Atlantic colonies to trade with England, 1724-74*



Figure 8. Ratio of bills of credit in New England to trade with England, 1710–49

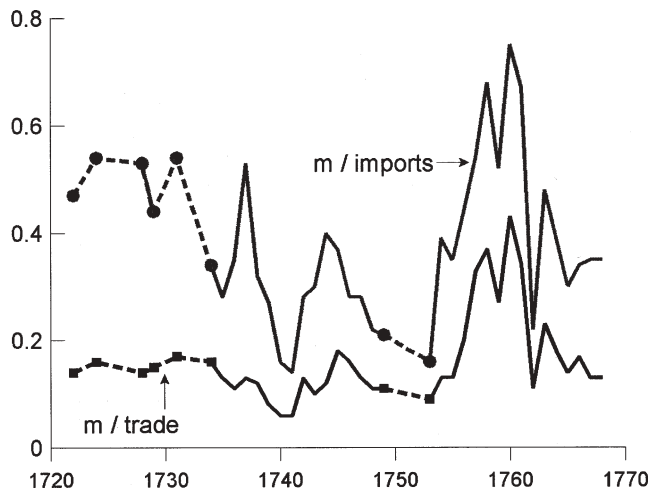


Figure 9. Ratio of bills of credit in the Carolinas to trade with England, 1722–68

V

In Sections II–IV, I have offered some evidence to contradict the view, recently revived by Grubb, that monetary conditions in the colonial period were conducive to long-run growth.²⁹ Rather, currency finance seems to have been a reasonable response to restrictions imposed by England, but was hardly a desirable long-run monetary arrangement. Indeed, the colonial period from a monetary standpoint can

²⁹ Grubb, 'Creating the US dollar'.

best be viewed as one of weak performance and frequent regression. Attempts to expand the money supply to meet transaction demands and the needs of commerce in the course of making advances on land and paying for military operations may have been well meant, but the lack of a credible policy for redeeming currency issues at well-defined points in the future led them to lose value, sometimes catastrophically. In all of the colonies examined here, including the mid-Atlantic successes, the money stock can be seen as inelastic and insufficient to support the formation and growth of a modern economy.

In an earlier paper, Richard Sylla and I describe five components of a 'good' financial system as (1) sound public finances and public debt management; (2) stable monetary arrangements; (3) a variety of banks, some with domestic and some with international orientations; (4) a central bank to stabilise domestic finances and manage international relations; and (5) well-functioning securities markets.³⁰ And though these criteria by no means represent the final word on what a 'good' financial system might include, it is worthwhile to observe that the American colonies did not develop any of these components.

To be more specific, currency issue was the principal vehicle for public finance, and managing redemptions proved to be difficult at times and impossible at others. This led to monetary arrangements that were highly unstable, as evidenced by the evolution of the volume of bills of credit in New England and the Carolinas. The only 'banks' in existence at the time were land offices that allocated the public credit towards largely agricultural pursuits with little consideration of building a modern sector. There was no central bank, but rather a group of politician-statesmen who managed the money supply with little apparent concern for the effects that their actions might have outside of their respective colonies. Finally, securities markets, to the extent that they existed in New England and elsewhere, were at best thin and local in character.³¹ Modern securities markets were a mere vision in the minds of the men who would soon begin the process of transforming the United States over the next century into the world's leading economy.

The period of the Revolutionary War and the provisional government under the Articles of Confederation, though ending in military and political triumph for the former colonies, saw further deterioration of monetary control. Calomiris, Perkins, and Michener and Wright, among others, describe how the Continental Congress, a political body that lacked the power to ensure redemption by levying taxes, authorised the issue of fiat currency to finance the conflict.³² Given the history of problems that the colonies had faced in redeeming their bills of credit, even with the

³⁰ P. L. Rousseau and R. Sylla, 'Financial systems, economic growth, and globalization', in M. Bordo, A. Taylor and J. Williamson (eds.), *Globalization in Historical Perspective* (Chicago, 2003), pp. 374–5.

³¹ See W. Rothenberg, 'The emergence of a capital market in rural Massachusetts, 1730–1838', *Journal of Economic History*, 85 (1985).

³² Calomiris, 'Institutional failure'; Perkins, *American Public Finance*; Michener and Wright, 'State "currencies"'.

authority to impose taxes, it is in retrospect not at all surprising that the new paper quickly depreciated virtually to the point of worthlessness.

The saga of the 'Continental' currency is a classic example of what economists refer to as 'time inconsistency' in monetary policy. The burden of financing the war, which was much greater than experienced in the Seven Years' War, and with no possibility of repayments from England, called for drastic measures. The former colonists had never experimented with a common currency, and when debt proved difficult to raise domestically, fiat money became a viable option for financing the War of Independence. Uncertainty about the size of the new issues, and perhaps even misplaced optimism about the terms of their redemption, allowed the bills to retain their value long enough to support expenditures in the first few years. When the paper depreciated, however, the federal legislature could not successfully turn to the device a second time. The Continental was officially devalued at 40:1 in 1781, which helped to encourage its use in tax payments, and in the end Alexander Hamilton's funding plan of the 1790s provided for redemption of the remaining bills at a ratio of 100:1.³³

The thirteen states also issued their own fiat currencies during the War of Independence, and rapid depreciation commenced on these as well. By the mid-1780s, seven states had reissued fiat currencies that were backed by future tax collections, but these never managed to circulate at par. Pennsylvania, for example, which is often credited with having among the more stable of these later monetary arrangements, saw its currency value depreciate by 20 per cent against sterling between November 1780 and June 1785.³⁴ At the same time, the federal government was in default on its foreign debts, primarily to the French government and to Dutch investors. The 1780s saw attempts by financial leaders such as Robert Morris and Alexander Hamilton to hasten the privatisation of the financial system by establishing the nation's first real banks in the commercial centres of Philadelphia and New York.³⁵ Political opposition to these banks was strong, however, and they were at that time unable to serve as much more than a model for the changes that were to come.

In other words, the ability of the young United States to finance its military efforts in the War of Independence does not imply that its earliest monetary policies were optimal or stable. After all, an ability to write-down (and effectively write-off) state and federal obligations at pennies on the dollar can hardly be considered a desirable policy – even among a general population that was reluctantly willing to accept the issues as the taxes that they were. Further, the depreciating currency, in the absence of a banking system or organised and liquid securities markets, was forced to perform the function of a store of value for many of the colonists. It is clear why savings and capital accumulation were stunted under such conditions. In all, currency managed

³³ Perkins, *American Public Finance*, pp. 97–8.

³⁴ Bezanson, *Prices and Inflation*, p. 346.

³⁵ See Perkins, *American Public Finance*, especially ch. 6.

to function as a medium of exchange during the war and confederation periods, but failed as a store of value, and as a unit of account suffered from instability and confusion associated with a multiplicity of issues.

VI

By any standards, the US economy experienced a near-miraculous turnaround in the last decade of the eighteenth century, when it made the transition from a defaulting debtor awash in obligations left over from the Revolutionary War to a haven for international capital flows. Any skeptic of the importance of monetisation and finance in promoting economic growth must come to grips with the sweeping change that followed the adoption of the Federal Constitution in 1789. At no other point in history did the five elements of a 'good' financial system develop so rapidly. Much of the credit for what Sylla has termed the 'Federalist financial revolution' seems appropriate to bestow upon the nation's first secretary of the treasury, Alexander Hamilton.³⁶ Hamilton's reforms affected the real side of the economy quickly, but were perhaps not fully felt for another quarter century when the 'modern' sector began to emerge.

The chartering of a national bank, the First Bank of the United States, and Hamilton's idea of allowing federal debt securities to be tendered for shares therein by 1791, had raised to par and above the restructured US debt, which included assumed state debts as well as federal domestic and foreign debts. Securities markets in New York, Philadelphia and Boston quickly sprang up to trade these securities and others associated with internal improvements. Hamilton also established a federal mint, bringing order to the collection of foreign coins and various issues of paper currency that had previously comprised the nation's money stock under a bimetallic standard, and formally introduced the dollar as the common unit of account. These path-breaking accomplishments set the stage for the Second Bank of the United States to further the monetary and financial integration of the nation as a whole.

The banking sector and securities markets, however, while having their origins in Hamilton's policies, suffered setbacks over the 60 years that followed. The trade embargoes of the Jefferson administration and the War of 1812 disrupted the course of commerce and slowed the spread of commercial banking. The demise of the First Bank of the United States effectively left the nation without a central bank for nearly a decade in the very midst of these disruptions, and severe financial panics in 1819, 1837 and 1839 combined with defaults on state debts in the 1840s to erode some confidence in the system. At the same time, the reputation of the nation's banking system, both domestically and abroad, facilitated some success in decentralising in the 1830s following President Jackson's refusal to renew the charter of Second Bank of the United States. The still-young US needed to absorb and multiply substantial

³⁶ Sylla, 'US securities markets'.

inflows of specie in the 1830s, which increased pressure on the banking system generally and contributed to the instability of the period, but banks rebounded after the downturn and were soon able to support a real money stock that had existed at the peak of the expansion. It is perhaps this resiliency of the financial system that is Hamilton's true legacy. In any event, the banking system would grow rapidly over this period, with the number of banks rising from a mere three in 1791 to more than 800 by 1840, and the paid-in capital of the banking system would increase 100 times over.

As we will see, however, it was not so much growth in the amount of currency available for transactions that promoted the modernisation of the US economy as it was the way in which it grew, in particular by increasing opportunities for private sector credit through the banking system. Rather than having a system in which government officials and politicians controlled the money supply process and the direction of credit – largely to the agricultural sector – banks were able to amass private capital and issue notes that could promote investment and foreign trade. This shift in emphasis to private sector credit helped to poise the nation for industrialisation by 1815, a feat that would have been more difficult had the money supply remained under the control of state legislatures. In the remainder of this section I will focus on comparing quantitatively the financial system of 1790 to 1850 with the colonial arrangements that existed prior to the War of Independence.

The starting point for my comparison is an examination of the per capita money stock. And though it is difficult to measure the quantity of specie in the hands of the public with confidence, Rousseau and Sylla use the available data to extend Peter Temin's series, which begins in 1820, back to 1790 by replicating Temin's method as closely as possible.³⁷ The resulting series includes obligations of banks to the public and specie outside of banks, and thus represents assets that are either acceptable or quickly convertible for use in market transactions. Increases in the real value of these assets reflect more widespread use of the market economy, and might be plausibly linked to modern sector activity such as trade and investment.

Figure 10 presents the money stock for 1790–1850, using Temin's estimates for the post-1820 period and expressing the stock in per capita sterling equivalents using the official exchange rate of \$4.87 per pound sterling. The conversion allows comparisons with the levels achieved by the various colonies prior to Independence. A trend line for the full period would indicate an average growth rate of 0.8 per cent per year. And though not immediately obvious from Figure 10, growth was quite rapid in the first 15 years after Hamilton's plans were enacted, with trend growth reaching 1.7 per cent per annum. Per capita money also rose rapidly after 1830. With the exception of one year, the per capita money stock always exceeded its 1790 level. The mean of the series is £2.1, or about \$10.23 per person.

³⁷ Appendix A of the NBER working paper version of Rousseau and Sylla, 'Emerging financial markets' (1999) describes the data and methods used to construct the annual series for the US money stock. See also Peter Temin, *The Jacksonian Economy* (New York, 1969).

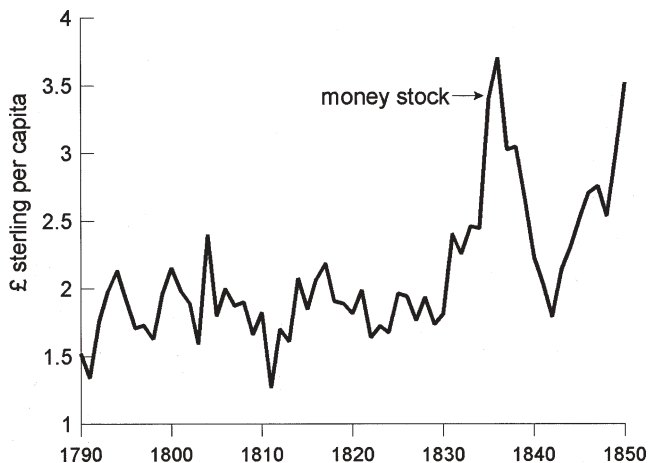


Figure 10. *The per capita stock of money in sterling equivalents, 1790–1850*

In the colonial period, bills of credit per capita for the mid-Atlantic colonies, as shown in Figure 1, averaged £0.65 (\$3.17) for Pennsylvania (1723–74), £0.88 (\$4.29) for New York (1709–74) and £0.70 (\$3.41) for New Jersey (1724–74). For the mid-Atlantic colonies as a whole, trend growth in bills per capita was only 0.6 per cent per annum from 1724 to 1774 (Figure 4). For New England, the mean level of bills per capita for 1710–49 was £0.85 (\$4.14) and the trend growth rate was slightly negative (Figures 2 and 5). The Carolinas (1722–68) had a mean holding of £0.41 (\$2.00) per capita and experienced negative trend growth (Figures 3 and 6).³⁸ These colonial levels appear to have been well below those achieved in the early federal period. For example, after taking into account a 20 per cent increase in the English price level between 1730 and 1850, specie would have to have comprised 63 per cent of Pennsylvania's money supply on average from 1723 to 1774 in order to match the national average achieved between 1790 and 1850.

Using the same metric to capture modern sector activity as for the colonial period, Figure 11 shows the ratio of the money stock to the market value of imports and total foreign trade in the United States from 1790 to 1850.³⁹ The regression lines that accompany the series indicate an upward trend for both, with identical trend growth rates of 2.1 per cent per year. This stands in sharp contrast to the mid-Atlantic colonies, for which trend growth was -0.7 per cent per year for the ratio of bills of credit to total trade with England from 1724 to 1774 and -1.0 per cent for the ratio of bills of credit to imports. In the New England colonies from 1710 to 1749, annual trend growth was 2.1 per cent for the ratio of bills to trade with England and

³⁸ I computed the times series mean of bills of credit for the Carolinas using only actual observations rather than including the interpolated values in Figure 6.

³⁹ Foreign trade is the sum of total exports and imports from *Historical Statistics*, series U1 and U8, pp. 865–6.

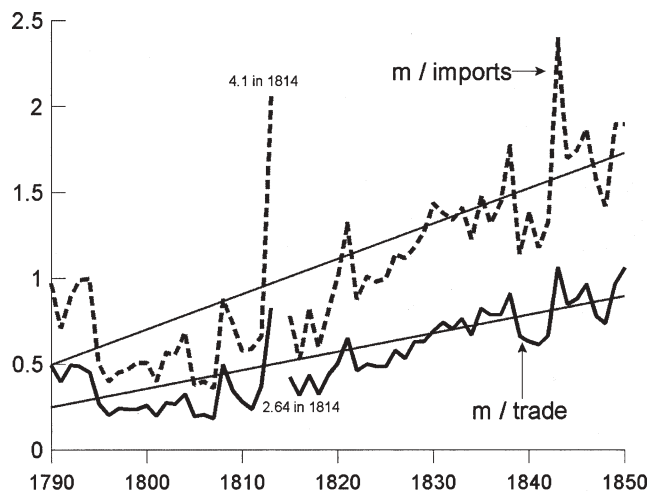


Figure 11. *The ratio of money to imports and foreign trade, 1790–1850*

1.6 percent for the ratio of bills to imports. Since the ratios have a downward trend before 1740, the positive trend growth over the entire 1710–49 period can be wholly attributed to large currency issues in the midst of King George’s War.

Figures 10 and 11 underscore the importance of the *way* that the money supply grew. Though holdings per capita were relatively flat overall from 1790 to 1830 or so, the real money supply did keep pace with the nearly 3 per cent annual growth in population experienced during this period. In the colonial period the general trend of per capita bills of credit was downward along time paths that for the most part saw wide fluctuations. At the same time, the money supply did advance in the early federal period relative to foreign commerce, which I take as a key measure of modernisation. Overall the steady progress of the US economy in monetising, as measured by the stock of money per capita, appears to have also provided financial depth where it was most needed.

VII

Limitations of the available data on macroeconomic outcomes for the colonies render a systematic investigation of empirical links between the money stock and measures of the modern sector such as output, investment and commerce not possible using modern econometrics. The main problems are incomplete figures on foreign trade and insufficient information to estimate the stock of specie from colony to colony. Fortunately, better data are available to measure development of the ‘modern’ sector in the early federal period, at least if we consider private domestic investment and foreign trade as broadly reflective of activity in that sector. This section reports the results of an investigation of links between monetisation and growth from 1790 to 1850. Figure 12 shows foreign trade and private domestic investment in real 1840 US dollars. The series rise slowly in real terms until 1815 and

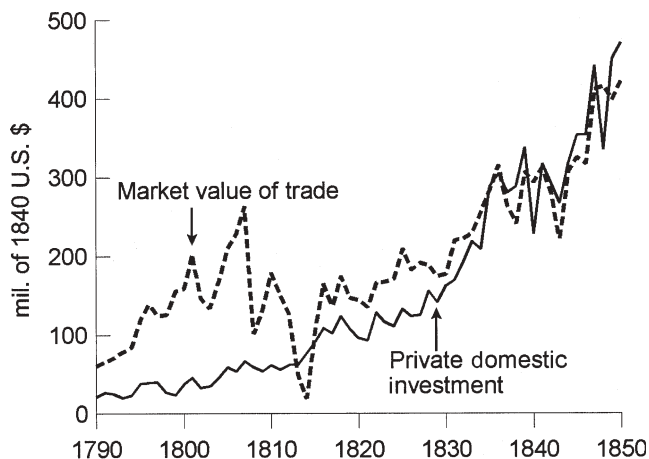


Figure 12. *Investment and foreign trade in the United States, 1790–1850*

then begin to accelerate, which is consistent with the rise of a modern sector at about this time.

On the financial side, Figure 13 shows the money stock, also in 1840 US dollars, as well as the number of securities listings that appeared in the financial press of three major cities (New York, Philadelphia and Boston) near the end of each calendar year. Rousseau and Sylla describe the construction of both series in detail.⁴⁰ In the regression approach that I will take, including the number of securities in the empirical model controls for the size (and perhaps the sophistication) of the financial system that existed outside of banking, and may better isolate the independent impact of monetisation on the real sector aggregates given that banks and securities markets appear to be complementary inputs to the growth process.⁴¹ Both money and securities listings grow slowly until about 1815 and then begin to rise quickly. The average growth rates of both series from 1790 to 1850 are about 4.5 per cent per year, which is higher than the 1.9 per cent growth rate of GDP calculated using data from Thomas S. Berry, and implies rapid financial deepening.⁴²

To explore links between the financial and real sector variables described above, I start with a vector autoregressive (VAR) specification that includes measures of investment, trade and monetisation. I will then add the number of listed securities to this system to measure their additional impact and, more importantly, to observe the effects of their inclusion on the strength of links from the money stock to real activity.

⁴⁰ Rousseau and Sylla, 'Emerging financial markets', pp. 6–10.

⁴¹ R. Levine and S. Zervos, 'Banks, stock markets, and economic growth', *American Economic Review*, 88 (1988); P. L. Rousseau and Wachtel, 'Equity markets and growth: cross country evidence on timing and outcomes, 1980–1995', *Journal of Banking and Finance*, 24 (2000).

⁴² T. S. Berry, 'Production and population since 1789: revised GNP series in constant dollars', Bostwick Paper No. 6 (Richmond, VA, 1988).

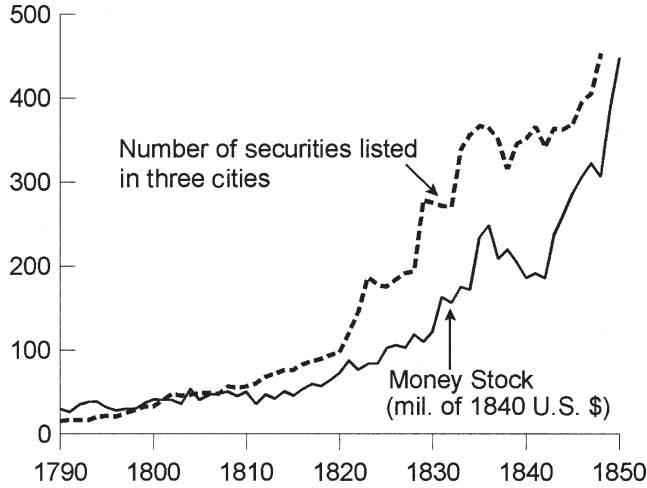


Figure 13. Monetary and financial aggregates, United States, 1790–1850

The VAR approach facilitates investigation of dynamic interactions in stationary multivariate systems of time series without imposing *a priori* structural restrictions. To investigate the relationship between, say, real investment, foreign trade and the money stock, a VAR would include a separate equation for each variable in the system and then regress each of the variables on its own lags and those of the other variables:

$$\begin{aligned}
 x_{1,t} &= a_{1,0} + \sum_{i=1}^k a_{1,i}x_{1,t-i} + \sum_{i=1}^k b_{1,i}x_{2,t-i} + \sum_{i=1}^k c_{1,i}x_{3,t-i} + u_{1,t} \\
 x_{2,t} &= a_{2,0} + \sum_{i=1}^k a_{2,i}x_{1,t-i} + \sum_{i=1}^k b_{2,i}x_{2,t-i} + \sum_{i=1}^k c_{2,i}x_{3,t-i} + u_{2,t} \\
 x_{3,t} &= a_{3,0} + \sum_{i=1}^k a_{3,i}x_{1,t-i} + \sum_{i=1}^k b_{3,i}x_{2,t-i} + \sum_{i=1}^k c_{3,i}x_{3,t-i} + u_{3,t}
 \end{aligned}
 \tag{1a,b,c}$$

where x_1 is the time series for investment, x_2 is foreign trade, x_3 is the money stock and k is the number of lags in the system. Note that the right-hand side is the same in each regression equation, and that only past (i.e. predetermined) values of the regressors are included.

Stationarity of a VAR is important in interpreting tests for Granger non-causality, that is, the hypothesis that past values of a variable do not jointly improve, one-step ahead, forecasts of another. Specifically, the null hypothesis implies the following joint restrictions on the coefficients in (1):

$$\hat{l}_{j,j} = \hat{l}_{j,j+1} = \dots = \hat{l}_{j,k} = 0 \quad l = a, b, c; j = 1, 2, 3.
 \tag{2}$$

In general, the distributions of these tests are non-standard when the VAR contains variables with unit roots (i.e. that are non-stationary), and differencing is usually required to ensure stationarity. Christopher A. Sims, James H. Stock and Mark W. Watson show, however, that tests for Granger causality conform to standard distributions in VARs with unit roots, so long as a cointegrating relationship exists among the variables.⁴³ This means that the variables in the system are related in a long-run sense, so that even though they are non-stationary by themselves there exist linear combinations of them that are stationary. I apply this result in the systems that I examine here because the null hypothesis of a unit root cannot be rejected with standard tests for any of the variables and there appears to be a cointegrating relationship in each system.⁴⁴ Running a VAR in levels is advantageous because it allows joint evaluation of short- and long-term effects of movements in one variable upon others in the system.

Granger-causality tests must be interpreted cautiously because rejecting the block exclusion restrictions does not necessarily imply causality in an economic sense. This is because the validity of the test is predicated on the inclusion of the full information set in the VAR. Since this condition is violated in any finite regression framework, especially when the available data do not precisely reflect the desired theoretical constructs, the results presented below are only suggestive of the nature of linkages between finance, trade and investment in the early federal period.

Table 1 presents the results from the VARs. Each cell includes the sum of the estimated coefficients for the variable listed in the respective column heading, with the p-value for the null hypothesis of Granger non-causality of that variable in parentheses. The equation numbers from the text are noted in the left-hand column. In the upper panel of Table 1, the null hypothesis that lags of the money stock do not Granger-cause real investment can be rejected at the 2 per cent level (top line, third column) and the null hypothesis that money does not Granger-cause the value of real trade can be rejected at the 1 per cent level (second line, second column). These results are consistent with the monetisation of the US economy having a positive effect on real activity in the modern sector. There is no evidence of any feedback from trade to the money stock (i.e. the null hypothesis of Granger non-causality cannot be rejected for lags of trade in equation (1c)), and investment Granger-causes money at the 8 per cent level. Trade Granger-causes investment at the 10 per cent level, but has a negative overall effect, which suggests that increases in the import component of trade may have to some degree 'crowded out' investment.

⁴³ C. A. Sims, J. H. Stock and M. W. Watson, 'Inference in time series models with some unit roots', *Econometrica*, 58 (1990).

⁴⁴ Augmented Dickey-Fuller tests show that the four series that I consider are indistinguishable statistically from unit root processes. Tests described in S. Johansen, 'Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models', *Econometrica*, 59 (1991), with a constant and trend in the specification indicate that the two systems that I estimate are cointegrated, which points to running the VARs in levels form.

Table 1. VARs of financial and real activity, United States 1790–1850

<i>Eq.</i>	<i>Investment</i>	<i>Market value trade</i>	<i>Money stock</i>	<i>No. listed securities</i>	<i>Adjusted R²</i>
1a	0.717(0.000)	-0.266(0.094)	0.423(0.018)		0.964
1b	-0.239(0.799)	0.377(0.001)	0.549(0.010)		0.663
1c	0.154(0.075)	0.037(0.958)	0.840(0.000)		0.973
<i>Eq.</i>	<i>Investment</i>	<i>Market value trade</i>	<i>Money stock</i>	<i>No. listed securities</i>	<i>Adjusted R²</i>
1a	0.245(0.570)	-0.253(0.025)	0.281(0.009)	0.470(0.005)	0.972
1b	-0.050(0.918)	0.373(0.001)	0.597(0.004)	-0.185(0.391)	0.664
1c	0.089(0.168)	0.032(0.961)	0.823(0.000)	0.074(0.669)	0.971
1d	-0.053(0.772)	-0.013(0.879)	-0.015(0.662)	1.042(0.000)	0.991

Note: Equation numbers correspond to those in the text. The VARs use four lags that were selected using nested likelihood ratio tests. The data are in real log levels. The table reports the sum of the regression coefficients for each variable block, with the significance level of the F-test for Granger non-causality in parentheses beneath the coefficient sums. The dependent variables for equations (1a), (1b) and (1c) are the respective column headings from left to right. The lower panel reports results from a four-dimensional system, which requires an extra equation (1d) in the VAR.

In the lower panel, I add the number of listed securities to the VAR to see if the effects of money on trade and investment are diminished by its inclusion. One might expect this to happen if money and securities markets development are collinear due to bias caused by omitting the number of securities from the system in the upper panel. Interestingly, the inclusion of the number of listed securities, though it Granger-causes investment at the 1 per cent level in its own right, only makes the effects of money on investment and trade stronger. It also eliminates any feedback at all from investment to money. Listed securities do not Granger-cause trade, however, which suggests that the rise of securities markets had its largest effect in the domestic capital market. I interpret this as reasonably strong evidence that monetisation exerted an effect on the emergence of the modern sector independent of other developments in the early US finance.

VIII

In this article I organise the existing data on bills of credit, exchange rates and the extent of trade for the colonial period of US history (1703–74), estimate annual series of the currency stock for nine of the colonies in sterling equivalents, and compare their implications for monetisation and economic modernisation with those obtained for the early federal period (1790–1850) by employing new estimates

of the aggregate money stock. I find that colonial monetary arrangements worked reasonably well at times, even showing some elasticity with respect to foreign trade in the mid-Atlantic colonies, but were for the most part inadequate, leaving the colonies with a circulating medium that was often in short supply and could not serve as an effective store of value due to concerns about its depreciation. These conditions were not conducive to growth in international trade and commerce and in the modern sector more generally.

The changes of the early federal period, which brought with it a central bank and a system of note-issuing banks, were a considerable improvement over the arrangements that had existed previously. Privatisation of banking and the process of credit allocation allowed the young United States to make more efficient use of the financial resources that were available to it. Descriptive statistics show that monetisation proceeded at a faster pace from 1790 to 1805, and indeed over the entire 1790–1850 period, than it did in the colonies prior to the War of Independence. Econometric evidence indicates a leading role for expansion of the money stock in the emergence of the modern sector over the 60 years following the adoption of the Federal Constitution.

The backing of the US money supply with a specie base rather than vague promises about its eventual retirement through tax collections created confidence in the nation's currency and ultimately in its creditworthiness. Fiat currency works in the United States today because the country got its financial house in order early on and over time achieved the five components of a good financial system that I have outlined above. Having a well-organised central bank that is committed to maintaining monetary control through the market for government bonds and the banking system is the key factor behind the success of today's fiat standard. Colonial legislators, subject to political pressures, could not make such commitments and thus could not devise an effective arrangement with fiat money. With the nation on the brink of bankruptcy, Hamilton's campaign to restore confidence in the US financial system had a firmly backed currency as its core. It was a solution that was necessary at the time the Constitution was ratified and that remained necessary for another century and a half. The US economy would not have grown so rapidly in its early history without it.

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