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Common Currency versus Currency Union: The U.S. Continental Dollar and Denominational Structure, 1775-1779

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Common Currency versus Currency Union: The U.S. Continental Dollar and Denominational Structure, 1775-1779

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I use denominational structure (the spacing and size of monetary units) to explain how the Continental Congress attempted to manage a successful common currency when sub-national political entities were allowed to have separate currencies and run independent monetary policies. Congress created a common currency that was too large to use in ordinary transactions. Congress hoped this currency would be held for post-war redemption and would not circulate as money during the war. As such, it would not contribute to wartime inflation. By contrast, individual state currencies were emitted in small enough denominations to function as the domestic medium of exchange.

At the beginning of the American Revolution, the Continental Congress created a common paper currency for the colonies/states in rebellion—the Continental dollar. Congress did not create a union of state currencies or a true currency union. Individual states retained their sovereign power to issue their own separate inside paper monies, and did so throughout the Revolution (Newman 2008; Ratchford 1941, p. 34). Congress overlaid a common currency onto a nation where sub-national political entities continued to operate independent monetary and fiscal policies and issue their own unique paper monies.[2] No exchange agreements existed between Continental dollars and the myriad of state currencies in the first years of the war.

I show how the initial circumstances of rebellion, and the secret political machinations of delegates to the Continental Congress, led to a common currency rather than a currency union. I use relative denominational structure to infer the monetary

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[2] All colonial, state, and congressional currencies were comprised of paper monies only. No coins in these currencies were created. Foreign coins, which were typically considered scarce, were the only coins in use in North America in this period.

policies adopted to make this common currency succeed. Congress understood the problems of creating a common currency where sub-national political entities were allowed to emit their own monies and run their own monetary policies. Given these circumstances and constraints, Congress made reasonable choices to maximize the system's chance of success. In the end, the demands of a long and expensive war overwhelmed this currency system. The adoption of the U.S. Constitution in 1789 ended the sovereign power of states to issue their own currencies, thus creating not only a common currency, but a currency union for the new nation (Grubb 2006).

The paper proceeds as follows: First, I explain the circumstances that led Congress to create a common currency rather than a currency union. Second, I explain how denominational structure reveals the intentions behind the monetary policies chosen. Third, I measure the denominational structure of the Continental dollar and show that it differed both from modern currencies and from contemporary American colonial and state currencies. I use this evidence to explain how Congress attempted to rationalize this common currency system and make it work. An epilogue assesses the outcome of Congress' efforts.

Common Currency or Currency Union?

The united colonies assembled in a Second Continental Congress in Philadelphia on 10 May 1775 to discuss a common response to the conflict between Massachusetts and the British Crown. The battles of Lexington and Concord had already occurred and the British forces, which had retreated to Boston, were now under siege by Massachusetts militia. Resources and men were on the move from other colonies to support the Massachusetts revolutionaries. Congress, with no legal authority, decided to make itself

the united revolutionary government. Congress' immediate problem was marshaling resources for a united effort against the British occupying Boston.

In the spring of 1775, independence was not yet the dominant sentiment. It would take a full year of open warfare—victory in the battle for Boston, the pending battle for New York, and the campaigns against British Canada—before Congress would declare independence on 4 July 1776 (Randall 1990, pp. 133-317; Tindall 1988, pp. 210-20). While the provision of congressional resources helped sustain the year-long siege of Boston, it quickly became clear that marshalling congressional resources for a united effort against the British would not be a one-off exercise.

As these events unfolded, Congress had to improvise a monetary and fiscal policy and do so under extreme wartime duress and questionable political legitimacy. It was an improvised extralegal revolutionary body without any constitutional structure of organization. As such, it exercised power by common consent of the colonies as represented by their delegates in Congress. Congress had no enforcement power to tax the public or the states. The *Articles of Confederation* were not laid before Congress until November of 1777, and they were not ratified by the states until March 1781 (*Journals of the Continental Congress* (*JCC* hereafter), v. 9, pp. 907-28; v. 19, p. 233; Tindall 1988, pp. 247-8).

On the second day of the Congress, with the war raging outside of Boston, the state of Massachusetts informed Congress that it was issuing interest-bearing bonds redeemable in two years at face value in specie to pay for its emergency war expenses. It asked Congress to receive these bonds and help give them a currency throughout the colonies (*JCC*, v. 2, pp. 24-6; Smith 1976, v. 1, pp. 470-1). In early June, New

Hampshire gave Massachusetts bonds legal tender status within New Hampshire.

In response to these developments, New York sent instructions to its delegation in Congress, instructions that were not to be made public or disclosed to the other delegates, to dissuade Congress from adopting the currencies emitted by individual states or in any way obligating states to accept other states' currencies. New York delegates opposed a union of state currencies or a currency union. Instead, New York's delegates were instructed to push Congress to issue its own common currency and obligate the "United States" as a group to its redemption. New York saw this as the best way to protect itself against unreasonable monetary obligations imposed on it by neighboring states (Bolles 1969, v. 1, pp. 24-32; Phillips 1866, pp. 17-24; Smith 1976, v. 1, pp. 419, 442; Sparks 1832, v. 1, pp. 38-40).

When Congress acted on 23 June 1775, it adopted what New York had recommended, namely an independent common paper currency issued by Congress and not a union of individual state paper monies (Grubb 2008, 2013; *JCC*, v. 2, pp. 105-6). This common paper currency—the Continental dollar—was to be redeemed at face value in specie equivalents after the war in prorated shares by each state. Continental dollars paid no interest between wartime emission and post-war redemption. They were, in effect, zero-coupon bonds (Grubb 2011a, 2013). Congress also obligated the states as a group to cover any shortfalls caused if some states failed to meet their post-war redemption obligations. Congress, however, had no power to enforce these obligations. In addition, each state remained free to issue its own separate paper money and run its own independent monetary and fiscal policy.

How could such a monetary system succeed? Was the Continental dollar doomed

at birth, or was there a rational monetary policy that offered some potential for success? The Second Continental Congress acted as if controlling denominational structure would give this currency system some prospect of success.

Denominational Structure

Denominational structure is the numerical spacing between denomination values, and the relative real value of the denominational set. I assume that the money creator selects a denominational structure to achieve some purpose. As such, the choices made can be used to infer monetary policy intentions, even when those intentions are not directly articulated by the money creator. Relative denominational structure is used to infer the monetary policy Congress selected to rationalize their currency system and give it some potential for success.

a. Denominational Theory

Denominational theory assumes the goal of the money creator is to minimize the cost of completing transactions, namely to minimize the cost of making change. This goal is the same as maximizing the medium-of-exchange usage of the money created. Telser (1995) mathematically shows that creating a currency with the fewest units needed to execute all transactions entails choosing a denominational spacing that has a factor of 3, namely 1, 3, 9, 27, and so on. The denominational spacing factor is found by taking the value of a given denomination and dividing it by the value of the immediately preceding denomination. Summing these factors over all sequential denominational pairings yields the average denomination factor for a given currency. The denomination factor, both for individual pairings and for the average of all pairings, has a lower bound of one.

Telser's analysis only considers minimizing the cost of producing the monetary

units needed to execute all transactions, and it assumes all monetary units have the same cost of production. By contrast, minimizing the cost of making transactions from the consumer's perspective entails incorporating computational ease and historical familiarity. Ease of computation puts considerable weight on units divisible by 5 and on having a denomination factor of 2. Such cost considerations push denominational structures, conditional on being able to make change in all transactions in said money, toward incomplete binary-decimal triplets, i.e. 1, 2, 5; 10, 20, 50; and so on. When such computational cost minimizing considerations are added to minimizing the cost of currency production, the full cost minimizing denominational spacing yields average denomination factors between 2 and 3 (Tschoegl 1997, Van Hove 2001, Wynne 1997).

For example, the modern U.S. dollar has the following spacing between denominations: 0.01, 0.05, 0.10, 0.25, 0.50, 1.00, 2.00, 5.00, 10.00, 20.00, 50.00, and 100.00. The denomination factors are: 5, 2, 2.5, 2, 2, 2, 2.5, 2, 2, 2.5, and 2, respectively, with an average of 2.41. The factor of 2 dominates—the mode factor, with an occasional higher factor that is the result of making the next higher denomination divisible by 5. The average denomination factor for the Euro is 2.18, and for the Yen is 3.06—with both currencies having a mode factor of 2.

Besides optimal denominational spacing, relative denominational size also matters in achieving the goal of maximizing the use of the currency as a circulating medium of exchange. If the smallest denominations of a currency are large relative to the value of goods being exchanged, then the ability to use that currency as the transacting medium is reduced. Either many transactions cannot take place or change must be made in some other money, barter goods, or book credit. If making change entails using

alternative monies, then these alternative monies will dominate the medium of exchange. The currency in question will be pushed toward being hoarded as a store of value, exported if it is outside money, or used only in the occasional large transaction. This outcome is the result of an indivisibility of the currency at the lower-valued end of its denominational range (Redish and Weber 2008, Sumner 1990, Wallace and Zhou 1997).

In summary, the objective of an optimal denominational structure, namely optimal spacing and value size, is to maximize the use of the currency as a circulating medium of exchange, i.e. to make it easy and feasible to execute all transactions in the economy with that money. This result also implies being able easily to make change in that money. The considerations that yield this outcome include minimizing the cost of making computations for consumers, minimizing the cost of monetary-unit production for the money creator, and setting the lower-valued denominations in the range of the value of most transactions desired by society.

Why create a currency with a denominational structure that makes it difficult to use as a medium of exchange? One answer would be to mitigate its effect on prices. Under the simple quantity theory of money, increases in the quantity of money (M_x), given the velocity of circulation of that money (V_x), must drive up prices (P) given production constraints on real output (Y), see equation 1 (Bordo 1987, Fisher 1912).

(1) $M_xV_x = PY$ (where M_x = money issued by a sub-national entities, V_x = the velocity of circulation of that money, P = prices expressed in that money, and Y = real output)

Suppose that M_x is not controlled by the central authority, but is controlled by sub-national political entities. How can the central authority create its own common currency, M_z, to pay for emergency military expenses, then overlay it on top of these sub-national currencies, but not affect P? Under the simple quantity theory of money, if the

central authority creates a currency whose circulation (V_z) is reduced to near zero by its denominational structure, P would not be affected.[3] Equation 2 adds M_z to equation 1. However, as $V_z \rightarrow 0$, equation 2 $\rightarrow$ equation 1, and there is little inflationary effect from adding M_z to the mix of currencies. The new common currency is held as a store of value for future liquidation. M_x continues to be the primary circulating medium of exchange.

(2) $M_xV_x + M_zV_z = PY$ (where M_z = money issued by the national authority, V_z = the velocity of circulation of that money)

For this strategy to succeed, money entrepreneurs must not be able to undo the denominational constraint placed on M_z's easy usage as a circulating medium of exchange. A money entrepreneur could undo the above strategy by accepting deposits of M_z bills that were denominationally difficult to circulate and, for a small fee, issuing private money claims on those deposits that were denominationally easy to circulate. The M_z bills taken on deposit provide the reserves, redeemable upon demand, for the private money issued. Even without a fractional reserve structure, namely even with 100 percent reserves backing this private money, this process puts the full value of M_z into circulation, thus undoing the effort to restrict M_z's contribution to wartime inflation.

This process is essentially what private and publically chartered banks do, namely take in deposits and issue their own banknotes as claims against those deposits, with the banknotes circulating as currency. Banks and banknotes, however, did not exist in colonial America, largely due to British restrictions on chartering corporations. The exigencies of war meant that even with the removal of British restrictions, banks were unlikely to form during the Revolution. The *Bank of North America*, chartered in 1781, was the first successful bank (Grubb 2016; Hammond 1991, pp. 3-67). Without money

[3] The simple quantity theory of money dominated American thinking in this era, see Bullock (1900, p. 65); Davis (1964); *JCC* (v. 9, p. 954); Sumner (1968, v. 1, pp. 43-4).

entrepreneurs, and the risk of their undoing a denominational control strategy, controlling the wartime circulation of M_z through selection of a restrictive denominational structure, thus mitigating M_z's contribution to wartime inflation, had some chance of success.

I show that the above strategy was chosen by the Continental Congress during the Revolution, and that it is consistent with Congress wanting to maximize the potential success of its common currency system. It was a rational strategy given the circumstances and constraints faced by Congress at the time and given state resistance to forming a true currency union. Its failure was not preordained.

b. American Colonial and Revolution Era Denominational Spacing

Congress established the denominational structure for each emission of Continental dollars in each emission's authorizing resolution. There were 11 separate emissions, the first being in 1775 and the last being in 1779. Appendix Table A1 reports the denominational structure separately for each of these 11 emissions in terms of the percent of units and the percent of their face value issued per each denomination for that emission, as well as for the cumulative total for all Continental dollars ever emitted.

Table 1 uses the data in Appendix Tables A1, A2, and A3 to construct the average, mode, and range of denomination factors for all Continental dollars ever emitted, and for the currencies issued by Virginia, Pennsylvania, New Jersey, and New York during the Seven Years War and during the first years of the American Revolution. For comparative purposes, Table 1 also reports similar information for the Euro, Yen, and U.S. dollar modern currencies. The comparison to state currencies during the Revolution is restricted to pre-1778 because on 22 November 1777 Congress asked the states to restrict their emission of large-valued bills, thus altering the desired denomination factor

Table 1 Denominational Spacing

Colony/ Nation Currency	Factor Average	Factor Mode	Factor Range
Modern Nations			
U.S. Dollar	2.41	2.00	2.00 to 5.00
Euro	2.18	2.00	2.00 to 2.50
Yen	3.06	2.00	2.00 to 5.00
1775-1779 (American Revolution)			
U.S. Continental Dollar	1.36	1.50	1.08 to 2.50
1775-1777 (American Revolution)			
Virginia Currency	1.39	1.25	1.20 to 2.00
Pennsylvania Currency	1.30	1.25/1.33	1.07 to 1.60
New Jersey Currency	1.84	2.00	1.25 to 2.00
New York Currency	1.60	1.50	1.33 to 2.00
1755-1764 (Seven Years War)			
Virginia Currency	1.82	2.00	1.25 to 2.00
Pennsylvania Currency	1.62	1.33/1.50	1.25 to 2.50
New Jersey Currency	1.84	2.00	1.25 to 2.00
New York Currency	1.73	2.00	1.25 to 2.00

Sources: Derived from Appendix Tables A1, A2, and A3.
Notes: The factor spacing is calculated by taking the value (X_t) of a denomination (d_t) at location (t) and dividing it into the value of the next higher denomination, i.e. ($X_{t+1}d_{t+1}$ / X_td_t). The average factor spacing is the summation of factor spacing across the full range of denominations emitted into circulation, i.e.

$$[\sum_{t=1}^{N} (X_{t+1}d_{t+1} / X_td_t)] / N$$ (where N = the complete sequential list of denominations)

for their post-1777 emissions (*JCC*, v. 7, p. 125; v. 9, pp. 955-6). The comparison to colonial currencies is restricted to the Seven Years War, 1755-1764, to have similar

circumstances to the Continental dollar, namely large emergency wartime paper money emissions that had occurred within the lifetime experience of most congressmen in 1775.

Compared with modern and contemporary North American currencies, the Continental dollar had a relatively low average, mode, and minimum denomination factor. Its denominations were more tightly spaced than other currencies. This pattern was not unique, however. The average, mode, and range of the Continental dollar's denomination factor were comparable to Virginia and Pennsylvania state currencies issued at the same time. It was, however, unprecedented in prior experience. Colonial paper money emissions under similar circumstances yielded denomination factors with substantially higher average and mode values.

While possessing lower average denomination factors than modern currencies, colonial currencies had the same mode factor as modern currencies. Comparing denomination factors, the Continental dollar had an 88 and 29 percent lower average, and a 33 and 25 percent lower mode, than that for modern and for recent colonial currencies, respectively. The denominational spacing of the Continental dollar was unusual.

A closer examination of the denominational spacing within individual emissions of Continental dollars in Appendix Table A1 reveals that the denominational spacing was odder than that revealed in Table 1. Each emission has a concentration of units in the denomination sequence of 2, 3, 4, 5, 6, 7, and 8. I have not found such a core denominational sequence for any other money. For eight of the first nine emissions, 78 to 88 percent of the units issued were in this sequence. For the total emission of Continental dollars, 53 percent of the units issued were in this sequence. This denominational spacing is not only unconventional and unprecedented, but downright bizarre and inexplicable.

What was Congress thinking? What were they up to?

The explanation for this bizarre denominational spacing cannot be simple ignorance. Most congressmen had either been closely involved with or lived under the paper money regimes of the colonies they represented. Congress selected the congressmen with prior experience with colonial paper monies to craft the Continental dollar, such as Benjamin Franklin and Richard Smith. In 1775 and 1776, Congress extensively debated how to structure the Continental dollar system it created (Grubb 2011a, 2013).

While the sequence, 2, 3, 4, 5, 6, 7, and 8, is generally an inexplicable denominational spacing, a reasonable explanation may be related to the fact that Continental-dollar bills were relative large in value (see the next section). Most of these bills were used to pay soldiers salaries. Soldiers' pay was fixed by Congress in June and July of 1775 at the same time it was deciding on the denominational structure of the initial emissions of Continental dollars (*JCC*, v. 2, pp. 89-90, 93-4, 209-10, 220-3; Grubb 2011a, 2013). Soldiers' pay absorbed nearly half of all Continental dollars emitted through 1776 (Grubb 2011b, p. 275). American army privates were paid $80 per year. Privates were the primary recipients of military pay, receiving 78 percent of the money paid to each military company.

The unusual denominational spacing of the Continental dollar becomes sensible if Congress intended to pay soldiers in the fewest bills necessary, and thus in large-valued bills that would be difficult to use as a circulating currency. Three month's pay for a private, $20, could be accommodated with one or various combinations of three, four, or five large-valued bills. One month's pay for a private after clothing deductions, $5, could

be accommodated with one or various combinations of two large-valued bills. For higher ranked military personal, paying them with a few large-valued bills was even easier. As such, the strange denominational spacing of the Continental dollar and its unusual denominational size were linked.

Congress' behavior is consistent with their hoping that soldiers would simply hold their pay, being in large-valued bills, as assets for future liquidation post-war. Congress' behavior is consistent with their thinking that soldiers spending their pay as money would be too difficult given the bills' large value. Thus, the emissions of Continental dollars would not function as a circulating medium of exchange for everyday transactions. As such, it would not contribute to wartime inflation.

c. American Colonial and Revolution Era Denominational Value Sizes

Appendix Tables A1, A2, and A3 convert the denominational units of the Continental dollar and of various colonial and state currencies into comparable values, namely Spanish silver dollars, pounds sterling, and 2012 U.S. dollars. Table 2 and Figure 1 use the conversion into 2012 U.S. dollars to compare the value of these denominations, as well as to provide a sense of the relative magnitude of these values. Table 2 and Figure 1 show that the Continental dollar consisted of relatively large-valued bills with 82 percent being over $50 and 69 percent being over $100 in value. Only 4 percent were under $10 and none were under $5 in value. Large-valued bills were difficult to use as a medium of exchange without making change in some other currency, barter goods, or book credit. Some sense of the large value of a Continental one-dollar bill can be taken from Congress' payment of one Continental dollar per week in 1775 to cover an enlisted man's entire weekly subsistence expense while waiting in quarters post-recruitment to

Table 2 Distribution of Denominational Sizes by Number of Units Emitted

Currency	Measured in 2012 U.S. Dollar Equivalents Percentage Below $5	$10	$15	$20	Percentage Above $50	$100
1775-1779 (American Revolution)						
U.S. Continental Dollar	0.00	3.69	7.38	11.07	81.91	69.27
1775-1777 (American Revolution)						
Virginia Currency	0.00	23.72	47.43	47.43	42.36	34.51
Pennsylvania Currency	56.00	65.40	72.90	74.80	18.70	11.40
New Jersey Currency	0.00	41.40	41.40	55.80	31.80	11.90
New York Currency	31.90	53.80	57.80	76.40	14.40	7.20
1755-1764 (Seven Years War)						
Virginia Currency	0.00	31.20	48.00	48.00	35.30	22.40
Pennsylvania Currency	26.80	38.80	50.20	50.20	36.10	14.20
New Jersey Currency	0.00	41.00	41.00	50.30	53.00	27.20
New York Currency	0.00	0.00	0.00	0.00	95.70	91.60

Sources: Derived from Appendix Tables A1, A2, and A3.

join the Continental army (*JCC*, v. 3, pp. 289, 309, 322, 415, 419).

By contrast, state currencies issued during the first years of the Revolution had a substantial proportion that were small-valued bills, e.g. 56 and 32 percent of Pennsylvania and New York bills were under $5 in 2012 U.S. dollar value, respectively, and 24 and 41 percent of Virginia and New Jersey bills were under $10 in value, respectively. State currencies during the Revolution were similar in value size to colonial currencies issued during the Seven Years War, with the exception of New York. New York only issued large-valued bills during the Seven Years War. New York's behavior

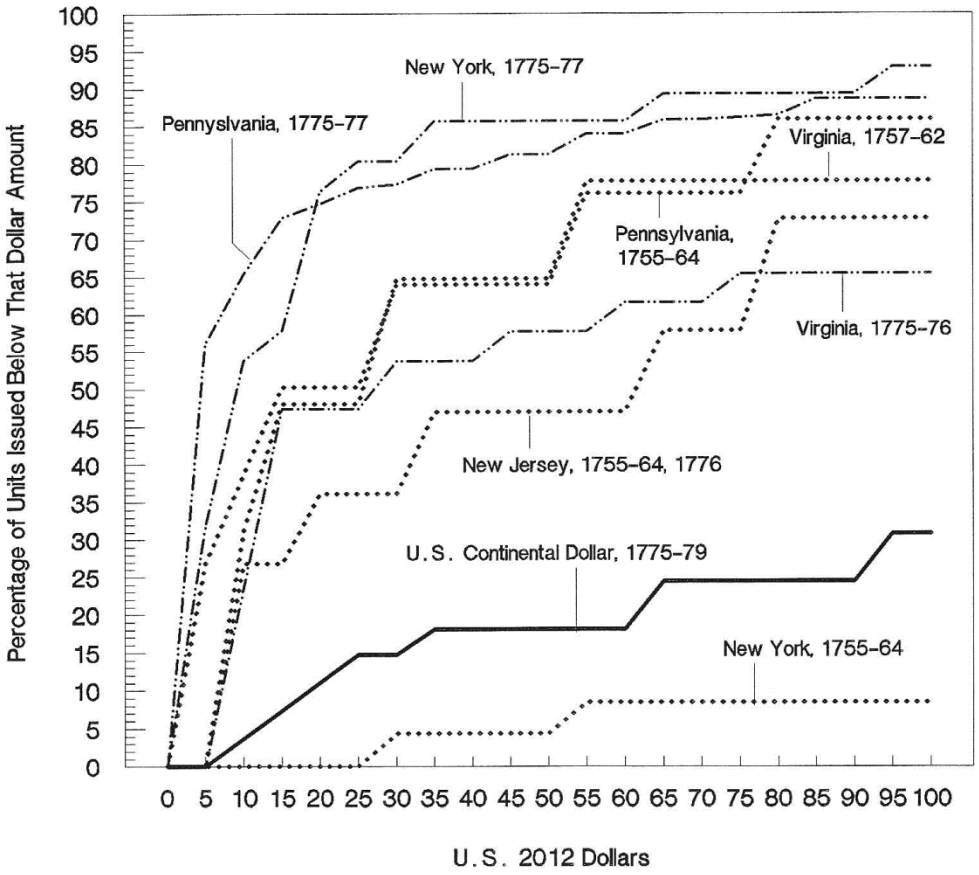

Figure 1 Percentage of Units Issued Below the Listed Value

Source: Derived from Appendix Tables A1, A2, and A3.
Notes: The lines are accumulated percentages to that point. 2012 U.S. Dollar equivalents are used to provide a common metric for comparison. Separate lines for New Jersey in 1755-64 and in 1776 were not drawn because they were approximately the same.

during the Seven Years War was the one exception to the general colony/state pattern of issuing a preponderance of small-valued bills. As such, it provides the one precedent for Congress issuing only large-valued bills during the Revolution.

Why New York issued only large-valued bills during the Seven Years War has not been previously noted nor the reasons behind it explained. Whether this example influenced Congress' denominational choice for the Continental dollar is unknown. While the coincidence is suggestive, the fact that New York shifted to small-valued bills

for its emissions in 1775-1777 mitigates this coincidence as an explanation for Congress' denominational choice for the Continental dollar.

John Hanson II (1979, 1980a, 1980b) noted the high proportion of small-valued bills issued by colonial governments and argued that this behavior was an intentional effort by each colony to make their paper money easy to use as a medium of exchange in local transactions. The corollary implication is that only issuing large-valued bills was an intentional effort to restrict the bills' use as a circulating medium of exchange. Several pieces of evidence are consistent with Congress intentionally making Continental dollars large-valued bills therefore hoping that the bills would not circulate as money, but instead be held like bonds for post-war liquidation.

First, as large-valued as the smallest Continental-dollar bill was in 1775, a congressional committee that included Benjamin Franklin recommended on 11 January 1776 that the first two emissions, totaling six million Continental dollars, be called in and replaced with even larger denominations (*JCC*, v. 3, pp. 367-8; Smith 1978, v. 3, p. 83). Second, Congress through the first seven emissions did not make, or request that the states make, the Continental dollar a legal tender. Without legal tender status, purveyors in the marketplace could refuse to accept payment in Continental dollars. In particular, they could refuse to make change in other currencies when offered large-valued Continental-dollar bills. Third, when Congress on 22 November 1777 asked the states to curtail their emission of state paper monies, Congress explicitly exempted the emission of small-valued state currencies from this request (*JCC*, v. 9, pp. 955-6).

Finally, colonial paper money acts often included a reserve sum of bills to be printed for the sole purpose of replacing worn, torn, and ragged bills that were no longer

fit to remain in circulation. Citizens would bring these unfit bills to the issuing treasury and receive new replacements, with the unfit bills being destroyed by the treasury. The size of these reserve funds provides a gauge of how extensively these bills were expected to circulate hand-to-hand, and thus experience wear and tear, as a local medium of exchange.

For example, the New Jersey emissions of 1733, 1737, and 1769 (the 1769 emission being disallowed by the Crown) each set aside enough extra bills to replace 25 percent of the amount authorized. These emissions had a 16- to 20-year circulation life (Bush 1977, pp. 427-8, 474-87; 1982, pp. 523-47). The New Jersey emission of June 1756 set aside enough extra bills to replace 20 percent of the amount authorized. This emission had a seven-year circulation life (Bush 1980, pp. 413-25). Finally, the New Jersey emission of 1746 set aside enough extra bills to replace 60 percent of the amount authorized (Bush 1980, pp. 21-8).

Maryland provides a similar example. The Maryland emission of 1733 initially set aside enough extra bills to replace 12 percent of the amount authorized (*Archives of Maryland*, v. 40, pp. 28-31, 266-9). The Maryland emission of 1770 set aside enough extra bills to replace 6 percent of the amount authorized. This emission had a 12-year circulation life. The Maryland treasury reported that 3.4 percent of this emission had been replaced within the first three years of being placed in circulation. This rate of replacement, if it continued, would exhaust the amount of extra bills set aside for that purpose well before the circulation life of that emission came to an end. As a result, Maryland increased the amount of replacement bills in its next paper money act. The Maryland emission of 1774 set aside enough extra bills to replace 28 percent of the

amount authorized. This emission also had a 12-year circulation life (Celia and Grubb, 2016). Such evidence makes it hard to deny that colonial paper money experienced extensive hand-to-hand usage as a medium of exchange.

By contrast, Congress only once authorized a reserve of Continental-dollar bills to be printed for the sole purpose of replacing worn bills that could no longer continue in circulation (Grubb 2008, pp. 283-4). On 5 January 1776 Congress authorized "the sum of ten thousand dollars, be struck, for the purpose of exchanging ragged and torn bills of the continental currency; that the bills, making this sum…be lodged in the treasury, to be applied to the sole purpose aforesaid." (*JCC*, v. 4, p. 32) A total reserve of 10,000 Continental dollars represented only 0.005 percent of the total emission of Continental dollars and only 0.17 percent of the 17 February 1776 emission of Continental dollars. This behavior is consistent with Congress expecting Continental-dollar bills not to experience significant hand-to-hand circulation as a medium of exchange and so not experience wear and tear.[4]

Epilogue

The Second Continental Congress chose to create a common currency rather than a currency union for the colonies/states in rebellion. They overlaid this common currency on top of states issuing their own monies and running their own fiscal and monetary policies. Congress' choice regarding denominational structure of its currency is consist with a rational strategy to maximize the prospects of success for the common currency system adopted. State monies were in low-valued denominations and so functioned as the local medium of exchange. Congress' Continental dollars were in high-valued

[4] Only a small amount of replacement bills would be required if the need was primarily to replace bills damaged in storage say due to water seepage, as opposed damaged by hand-to-hand circulation.

denominations and so were difficult to use as a medium of exchange. They were to be held as if they were bonds for liquidation after the war. Thus, the common currency would not contribute to wartime inflation. No linkages between state monies and the common currency were instituted before 1777. With a short war, this strategy had reasonable prospects of success. It, however, unraveled by mid-Revolution.

When the primary use of Continental dollars was to pay soldiers, no legal tender law was required. Soldier had to accept them as pay. If soldiers could not effectively spend them, but had to hold them as if they were bonds for post-war redemption, no congressional funding issues were threatened. After 1776, however, the majority of congressional spending was on military supplies purchased in the marketplace rather than on soldiers' pay (Grubb 2011b, p. 275). In the marketplace, purveyors could refuse Continental dollars because the bills had no legal tender status. Thus, Congress on 14 January 1777 asked the states to make Continental dollars legal tender within their respective states (*JCC*, v. 7, p. 36).

The states moved quickly to accommodate this request. For example, Pennsylvania made Continental dollars legal tender after 6 February 1777, Delaware after 22 February 1777, and Virginia after 5 May 1777. By the eighth new emission of Continental dollars, authorized on 22 May 1777, Continental dollars were a legal tender.[5] Once they were made legal tender, Continental dollars could be easily used as a medium of exchange. Purveyors could not refuse them nor refuse making change in other currencies when offered Continental dollars. The establishment of legal tender status

[5] See Cushing (1981, v. 2, part 1, pp. 599-602); Grubb (2011a); Hening (1969, v. 9, pp. 297-8); *Statutes at Large of Pennsylvania* (1903, v. 9, pp. 34-40). When a state made the Continental dollar a legal tender within its jurisdiction, this established a legal equivalence between Continental dollars and that state's paper money. The two monies were now linked, and the exchange of one for the other could be enforced.

helped make $V_z > 0$ which in turn allowed increases in Continental dollars to contribute to wartime inflation.

Second, the massive volume of Continental dollar emissions, given a long and costly war, overwhelmed Congress' denominational control strategy. By early 1779, some 200 million Continental dollars in face value had been emitted. If held and treated like bonds, the expected redemption of such a volume of bills was now so far in the future that it reduced the value of Continental dollars by 1778 to being small-valued bills in present value terms (Grubb 2008, 2011a, 2013). At these low present values, they could be easily used as a medium of exchange, especially in terms of making change. A quantity theoretic assessment yields the same outcome, namely an excessive amount of Continental dollars emitted would depreciate their value until they were now small-valued bills easily used as a medium of exchange.

The last emissions of Continental dollars were denominationally restructured to be even larger-valued bills (in face value). Congress, apparently, was trying to offset the loss of value discussed above and so make the bills large-valued again, see Appendix Table A1. This effort did not succeed. The Continental dollar collapsed to 2.5 percent of face value by 1780. It ceased to circulate shortly thereafter (Grubb 2011a, 2013).

The common currency versus currency union problem for the U.S. was finally resolved by the adoption of the U.S. Constitution in 1789. States lost the constitutional power to issue their own currencies. This led not only to a common currency, but to a true currency union for the new nation (Grubb 2006).

References

Archives of Maryland, vol. 1-72. 1883-1972. Baltimore: Maryland Historical Society.

Bolles, A. S. 1969. *The Financial History of the United States from 1774 to 1789, vols. 1-3*. New York: Augustus M. Kelly, [original 1884].

Bordo, M. D. 1987. Equation of exchange. In Eatwell, J., Milgate, M., and Newman, P., (eds.), *The New Palgrave: A Dictionary of Economics*. London: Macmillan, v. 2, pp. 175-177.

Bullock, C. J. 1900. *Essays on the Monetary History of the United States*. New York: Macmillan.

Bush, B. (ed.) 1977. *Laws of the Royal Colony of New Jersey, 1703-1745*. Trenton, NJ: New Jersey State Library, Archives and History Bureau.

Bush, B. (ed.) 1980. *Laws of the Royal Colony of New Jersey, 1746-1760*. Trenton, NJ: New Jersey State Library, Bureau of Archives and History.

Bush, B. (ed.) 1982. *Laws of the Royal Colony of New Jersey, 1760-1769*. Trenton, NJ: New Jersey State Library, Archives and History Bureau.

Celia, J. and Grubb, F. 2016. Non-legal-tender paper money: the structure and performance of Maryland's bills of credit, 1767-1775. *Economic History Review*, forthcoming.

Cushing, J. D. (ed.) 1981. *The First Laws of the State of Delaware, vol. 2, part 1*. Wilmington, DE: Michael Glazier, State Printer of Delaware.

Davis, A. M. 1964. *Colonial Currency Reprints, 1682-1751, vols. 1-4*. New York: Augustus M. Kelly.

Fisher, I. 1912. *The Purchasing Power of Money*. New York: Macmillan.

Grubb, F. 2006. The U.S. Constitution and monetary powers: an analysis of the 1787 Constitutional Convention and the Constitutional transformation of the U.S. Monetary system. *Financial History Review* 13, 43-71.

Grubb, F. 2008. The Continental dollar: how much was really issued? *Journal of Economic History* 68: 283-91.

Grubb, F. 2011a. The Continental dollar: initial design, ideal performance, and the credibility of congressional commitment. National Bureau of Economic Research, working paper #17276, http://www.nber.org/papers/w17276.

Grubb, F. 2011b. The distribution of Congressional spending during the American

revolution, 1775-1780: the problem of geographic balance. In S. Conway and R. Torres Sánchez (eds.). *The Spending of the States—Military Expenditure during the long Eighteenth Century: Patterns, Organisations, and Consequences, 1650-1815*. Saabrücken, Germany: VDM Verlag Dr. Müller GmbH & Co. KG, 257-284.

Grubb, F. 2013. The Continental dollar: how the American Revolution was financed with paper money—initial design and ideal performance. National Bureau of Economic Research, working paper #19577, http://www.nber.org/papers/w19577.

Grubb, F. 2016. Is paper money just paper money? Experimentation and variation in the paper monies issued by the American colonies from 1690 to 1775. *Research in Economic History*, forthcoming.

Hammond, B. 1991. *Banks and Politics in America*. Princeton, NJ: Princeton University Press [original 1957].

Hanson, J. R. II. 1979. Money in the colonial American economy: an extension. *Economic Inquiry* 17, 281-286.

Hanson, J. R. II. 1980a. Small notes in the American colonies. *Explorations in Economic History* 17, 411-420.

Hanson, J. R. II. 1980b. The economic development of the thirteen continental colonies, 1720 to 1775: a critique. *William and Mary Quarterly* 37, 165-175.

Hening, W. W. (ed.) 1969. *The Statutes at Large; being a Collection of all the Laws of Virginia from the First Session of the Legislature, in the Year 1619, Vols. 6-9.* Charlottesville, VA: University Press of Virginia [original: Richmond, VA: Franklin Press, 1819-1821].

Journals of the Continental Congress, 1774-1789, Vols. 1-34. 1904-1937. Washington D.C.: Government Printing Office (*JCC* in the text).

McCusker, J. J. 1978. *Money and Exchange in Europe and America, 1600-1775*. Chapel Hill, NC: University of North Carolina Press.

Newman, E. P. 2008. *The Early Paper Money of America*. Iola, WI: Krause Publications, (5th edition).

Phillips, H. Jr. 1866. *Continental Paper Money: Historical Sketches of American Paper Currency, Second Series*. Roxbury, MA: W. Elliot Woodward.

Randall, W. S. 1990. *Benedict Arnold: Patriot and Traitor*. New York: Barnes & Noble Books.

Ratchford, U. B. 1941. *American State Debts*. Durham, NC: Duke University Press.

Redish, A. and Weber, W. E. 2008. Coin sizes and payments in commodity money systems. *Federal Reserve Bank of Minneapolis, Research Department Staff Report 416.*

Smith, P. H. 1976-1994. *Letters of Delegates to Congress, 1774-1789, Vols. 1-21*. Washington, DC: Library of Congress.

Sparks, J. 1832. *The Life of Gouverneur Morris, with Selections from his Correspondence and Miscellaneous Papers in Three Volumes*. Boston: Gray & Bowen.

Statutes at Large of Pennsylvania, vols. 9-10. 1903-1904. Harrisburg, PA: W.M. Stanley Ray, State Printer of Pennsylvania.

Sumner, S. B. 1990. The transactions and hoarding demand for currency. *Quarterly Review of Economics and Business* 30, 75-85.

Sumner, W. G. 1968. *The Financier and the Finances of the American Revolution, vols. 1-2*. New York: Augustus M. Kelly [original 1891].

Telser, L. G. 1995. Optimal denominations for coins and currency. *Economic Letters* 49, 425-427.

Tindall, G. B. 1988. *America: A Narrative History*. New York: W. W. Norton, 2nd edn.

Tschoegl, A. E. 1997. The optimal denomination of currency. *Journal of Money, Credit and Banking* 29, 546-554.

Van Hove, L. 2001. Optimal denominations for coins and bank notes: in defense of the principle of least effort. *Journal of Money, Credit and Banking* 33, 1015-1021.

Wallace, N. and Zhou, R. 1997. A model of a currency shortage. *Journal of Monetary Economics* 40, 555-572.

Wynne, M. A. 1997. More on optimal denominations for coins and currency. *Economic Letters* 55, 221-225.

Appendix Table A1 Denominational Structure of the Continental Dollar in Face Values per Emission, 1775-1779

In $: Spanish Silver Dollars	In 2012 U.S. Dollars[a]	May 10, 1775 #1: $3,000,000 Units %	Value %	Nov. 29, 1775 #2: $3,000,000[c] Units %	Value %	Feb. 17, 1776 #3: 4,000,000[d] Units %	Value %	May 9, 1776 #4: $5,000,000 Units %	Value %	July22, 1776 #5: $5,000,000 Units %	Value %	Nov. 2, 1776 #6: $5,000,000 Units %	Value %	Feb. 26, 1777 #7: $5,000,000 Units %	Value %
0.17	5.2	….	….	….	….	18.85	2.50	….	….	….	….	….	….	….	….
0.33	10.3	….	….	….	….	18.85	5.00	….	….	….	….	….	….	….	….
0.50	15.5	….	….	….	….	18.85	7.50	….	….	….	….	….	….	….	….
0.67	20.7	….	….	….	….	18.85	10.00	….	….	….	….	….	….	….	….
1.00	31.0	11.21	1.63	12.50	2.78	4.10	3.26	12.50	2.78	….	….	….	….	….	….
2.00	62.0	11.21	3.27	12.50	5.56	4.10	6.52	12.50	5.56	12.50	3.08	12.50	3.08	12.50	3.08
3.00	93.0	11.21	4.90	12.50	8.33	4.10	9.78	12.50	8.33	12.50	4.62	12.50	4.62	12.50	4.62
4.00	124.0	11.21	6.53	12.50	11.11	4.10	13.04	12.50	11.11	12.50	6.15	12.50	6.15	12.50	6.15
5.00	155.0	11.21	8.17	12.50	13.89	2.05	8.15	12.50	13.89	12.50	7.69	12.50	7.69	12.50	7.69
6.00	186.0	11.21	9.80	12.50	16.67	2.05	9.78	12.50	16.67	12.50	9.23	12.50	9.23	12.50	9.23
7.00	217.0	11.21	11.43	12.50	19.44	2.05	11.41	12.50	19.44	12.50	10.77	12.50	10.77	12.50	10.77
8.00	248.0	11.21	13.07	12.50	22.22	2.05	13.04	12.50	22.22	12.50	12.31	12.50	12.31	12.50	12.31
20.00	620.0	2.70	7.87	….	….	….	….	….	….	….	….	….	….	….	….
30.00	930.0	7.63[b]	33.33	….	….	….	….	….	….	12.50	46.15	12.50	46.15	12.50	46.15
35.00	1,085.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
40.00	1,240.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
45.00	1,395.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
50.00	1,550.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
55.00	1,705.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
60.00	1,860.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
65.00	2,015.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
70.00	2,170.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
80.00	2,480.0	….	….	….	….	….	….	….	….	….	….	….	….	….	….
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix Table A1—Continued

May 20, 1777 #8: $16,500,000		April 11, 1778 #9: $25,000,000		Sept. 26, 1778 #10: $75,001,080		Jan. 14, 1779 #11: $95,051,695[e]		1775-1779 Total[f]		In $: Spanish Silver Dollars	In 2012 U.S. Dollars[a]
Units	Value	Units	Value	Units	Value	Units	Value	Units	Value		
%	%	%	%	%	%	%	%	%	%		
….	….	….	….	….	….	….	….	3.69	0.04	0.17	5.2
….	….	….	….	….	….	….	….	3.69	0.08	0.33	10.3
….	….	….	….	….	….	….	….	3.69	0.12	0.50	15.5
….	….	….	….	….	….	….	….	3.69	0.17	0.67	20.7
….	….	….	….	….	….	5.43	0.15	3.33	0.22	1.00	31.0
12.50	3.08	12.50	3.33	….	….	5.43	0.29	6.32	0.85	2.00	62.0
12.50	4.62	12.50	4.17	….	….	5.43	0.44	6.32	1.27	3.00	93.0
12.50	6.15	12.50	5.00	….	….	5.43	0.59	7.60	2.04	4.00	124.0
12.50	7.69	12.50	5.83	12.50	2.27	5.43	0.74	9.30	3.13	5.00	155.0
12.50	9.23	12.50	6.67	….	….	….	….	6.34	2.56	6.00	186.0
12.50	10.77	12.50	16.67	12.50	3.18	….	….	8.44	3.97	7.00	217.0
12.50	12.31	12.50	25.00	12.50	3.64	….	….	8.44	4.54	8.00	248.0
….	….	….	….	12.50	9.09	7.07	2.94	4.31	5.80	20.00	620.0
12.50	46.15	12.50	33.33	12.50	13.64	7.07	5.75	7.69	15.52	30.00	930.0
….	….	….	….	….	….	7.07	6.70	1.12	2.64	35.00	1,085.0
….	….	….	….	12.50	18.18	7.07	7.66	4.50	12.11	40.00	1,240.0
….	….	….	….	….	….	7.07	8.62	1.12	3.39	45.00	1,395.0
….	….	….	….	12.50	22.73	7.07	9.58	3.22	10.83	50.00	1,550.0
….	….	….	….	….	….	7.07	10.54	1.12	4.15	55.00	1,705.0
….	….	….	….	12.50	27.27	7.07	11.49	3.22	12.99	60.00	1,860.0
….	….	….	….	….	….	7.07	12.45	1.12	4.90	65.00	2,015.0
….	….	….	….	….	….	5.43	10.30	0.86	4.05	70.00	2,170.0
….	….	….	….	….	….	5.43	11.77	0.86	4.63	80.00	2,480.0
100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

Sources: *JCC* (v. 2, pp. 105, 207; v. 3, p. 398; v. 4, pp. 164, 381; v. 5, p. 651; v. 6, pp. 918, 1047; v. 7, p. 161; v. 8, pp. 377, 646; v. 9, pp. 873, 993; v. 10, pp. 28, 83, 175, 223, 309, 337, 365; v. 11, pp. 524, 627, 732; v. 12, pp. 884, 962, 1100, 1218; v. 13, pp. 64, 139, 209, 409; v. 14, pp. 548, 557-8, 688, 848-9; v. 15, pp. 1076, 1172, 1285, 1325); Newman (2008, pp. 62-73).

Notes: $ = Spanish silver dollars—what the Continental dollar, at face value, was denominated in.

[a] From http://eh.net "measuring worth—relative value of U.S. Dollars" using the 1775 to 2012 *CPI* conversion algorithm.

[b] On 25 July 1775, Congress ordered $1,000,000 struck in $30 bills (*JCC* v. 2, p. 207). This is not possible. Either $999,990 or $1,000,020 can be struck, but not $1,000,000. Which was done and whether other denominations from emission #1 were adjusted to accommodate the $1,000,000 target in $30 bills is not known. The number $999,990 is used here for percentage calculation purposes.

[c] Newman (2008, p. 64) presents erroneous denominational counts for the November 29, 1775 emission. See instead, *JCC* (v. 3, p. 398).

[d] Only $3,937,220 were printed. Which denominations were shorted is not known. The $4,000,000 number is used for percentage calculation purposes.

[e] This is a gross emission number (total bills printed). Out of this gross emission, $41,500,000 were swapped for the emissions of 20 May 1777 and 11 April 1777 (emissions #8 and #9), yielding a net new emission of $53,551,695. Which bills by denomination were swapped is not known, so the denomination structure is reported on the gross rather than on the net new emission total.

[f] This is out of total scheduled printings ($241,552,775) and not net new emissions ($199,989,995). Not all bills were printed, and some printed bills were simply swapped for other bills previously emitted, which explains the difference in these two sums. Which denomination totals were affected by nonprinting and currency swaps is unknown. See notes b, d, and e.

Appendix Table A2 Face Value Denominational Structure of Colonial Paper Monies during the Seven Years War, 1755-1764

Face Value in £S	$: Face Value in Spanish Silver Dollars	Value in 2012 U.S. Dollars	Virginia 1757-1762 Denominations £VA	560,107 Units %	£VA 370,588 Value %	Pennsylvania Denominations £PA, £NJ, & £NY	1755-64 1,307,931 Units %	£PA 550,000 Value %	New Jersey 1755-64 374,998 Units %	£NJ 347,603 Value %	New York 1755-64 72,600 Units %	£NY 340,000 Value %	Face Value in £S	$: Face Value in Spanish Silver Dollars	Value in 2012 U.S. Dollars
0.0400	0.1739	5.39	0.0500	15.6	1.2	0.0125	8.1	0.2	….	….	….	….	0.0094	0.0409	1.26
0.0500	0.2174	6.74	0.0625	15.6	1.5	0.0167	6.3	0.3	….	….	….	….	0.0125	0.0545	1.69
0.1000	0.4348	13.48	0.1250	16.8	3.2	0.0250	6.2	0.4	….	….	….	….	0.0188	0.0817	2.53
0.2000	0.8696	26.96	0.2500	16.8	6.3	0.0375	6.2	0.6	….	….	….	….	0.0282	0.1226	3.80
0.4000	1.7391	53.91	0.5000	12.9	9.7	0.0500	6.2	0.7	15.1	0.8	….	….	0.0376	0.1635	5.07
0.8000	3.4783	107.83	1.0000	12.9	19.4	0.0750	5.8	1.0	11.7	1.0	….	….	0.0564	0.2452	7.60
1.6000	6.9565	215.65	2.0000	2.8	8.5	0.1000	5.7	1.4	….	….	….	….	0.0752	0.3269	10.13
2.4000	10.4348	323.48	3.0000	2.8	12.8	0.1250	5.7	1.7	….	….	….	….	0.0940	0.4086	12.67
4.0000	17.3913	539.13	5.0000	2.8	21.3	0.1500	….	….	9.3	1.5	….	….	0.1128	0.4904	15.20
8.0000	34.7876	1,078.42	10.0000	1.1	16.2	0.2500	13.8	8.2	….	….	4.4	0.2	0.1880	0.8173	25.34
						0.3000	….	….	10.8	3.5	….	….	0.2256	0.9807	30.40
				100	100	0.5000	12.0	14.2	….	….	4.1	0.4	0.3759	1.6345	50.67
						0.6000	….	….	10.8	7.0	….	….	0.4511	1.9614	60.80
						0.7500	9.9	17.7	15.0	12.1	….	….	0.5639	2.4518	76.01
						1.0000	11.2	26.5	….	….	5.7	1.2	0.7519	3.2690	101.34
						1.5000	….	….	15.3	24.8	….	….	1.1278	4.9036	152.01
						2.0000	….	….	….	….	31.1	13.3	1.5038	6.5381	202.68
						2.5000	1.5	9.1	….	….	….	….	1.8797	8.1726	253.35
						3.0000	….	….	8.6	27.8	3.6	2.3	2.2556	9.8071	304.02
						4.0000	….	….	….	….	0.8	0.7	3.0075	13.0762	405.36
						5.0000	1.5	18.1	….	….	24.1	25.7	3.7594	16.3452	506.70
						6.0000	….	….	3.3	21.5	….	….	4.5113	19.6143	608.04
						10.0000	….	….	….	….	26.3	56.2	7.5188	32.6905	1,013.41
							100	100	100	100	100	100			

Sources: See the notes to Appendix Tables A1 and A3; Bush (1980, pp. 314-5, 348-9, 373-4, 417, 466, 501, 517, 549, 572-3, 631-2, 673-4; 1982, pp. 83-4, 135-6, 207-8, 299-300); Hening (1969, v. 7, pp. 82-3, 175, 259-60, 350, 360-1, 498); McCusker (1978, p. 10); Newman (2008, pp. 259-61, 281-3, 336-43).

Notes: Shillings and pence are converted to decimalized pounds. At face value, $1.25£_{VA} = 1£_S$ and $1.33(£_{PA}, £_{NJ}, £_{NY}) = 1£_S$. Pre-1772, $1£_S = \$4.34783$.

Appendix Table A3 Face Value Denominational Structure of State Paper Monies during the American Revolution, 1775-1777

Value In 2012 U.S. Dollars	New York Denominations $	New York 1775-77 757,868 Units %	New York $ 750,000 Value %	Pennsylvania Denominations £PA, & £NJ	Pennsylvania 1775-77 1,307,931 Units %	Pennsylvania £PA 550,000 Value %	New Jersey 1776 346,882 Units %	New Jersey £NJ 175,000 Value %	Face Value in £S	$: Face Value in Spanish Silver Dollars	Value in 2012 U.S. Dollars	Virginia Denominations £VA	Virginia 1775-76 460,796 Units %	Virginia £VA 447,404 Value %	Value in 2012 U.S. Dollars
2.02	0.0650	14.0	0.9	0.0125	14.0	0.6	….	….	0.0094	0.0427	1.32	0.0500	5.33	0.27	5.64
3.88	0.1250	17.9	2.3	0.0167	14.0	0.8	….	….	0.0125	0.0568	1.76	0.0625	18.39	1.18	7.05
5.17	0.1667	4.0	0.7	0.0250	14.0	1.2	….	….	0.0188	0.0855	2.65	0.1000	5.33	0.55	11.27
7.75	0.2500	17.9	4.5	0.0375	14.0	1.8	….	….	0.0282	0.1282	3.97	0.1250	18.38	2.37	14.09
10.33	0.3333	4.0	1.3	0.0500	4.7	0.8	23.4	2.3	0.0376	0.1709	5.29	0.2500	6.31	1.63	28.18
15.50	0.5000	18.6	9.4	0.0750	4.7	1.2	18.0	2.7	0.0564	0.2564	7.95	0.3750	3.90	1.51	42.27
20.67	0.6667	4.0	2.7	0.1000	4.7	1.6	….	….	0.0752	0.3418	10.60	0.5000	3.95	2.03	56.36
31.00	1.0000	5.3	5.3	0.1250	2.8	1.2	….	….	0.0940	0.4273	13.25	0.6250	3.90	2.51	70.45
62.00	2.0000	3.6	7.3	0.1500	1.9	1.0	14.4	4.3	0.1128	0.5127	15.89	1.0000	10.15	10.45	112.73
93.00	3.0000	3.6	10.9	0.2000	2.1	1.5	….	….	0.1504	0.6836	21.19	1.2000	5.33	6.59	135.27
155.00	5.0000	3.6	18.2	0.2500	0.4	0.3	….	….	0.1880	0.8545	26.49	1.5000	5.33	8.23	169.09
310.00	10.0000	3.6	36.5	0.3000	2.1	2.2	12.3	7.3	0.2256	1.0255	31.79	2.0000	5.00	10.30	225.45
		___	___	0.4000	1.9	2.7	….	….	0.3008	1.3673	42.39	3.0000	3.52	10.88	338.18
		100	100	0.5000	2.7	4.8	….	….	0.3759	1.7086	52.97	4.0000	0.43	1.79	450.91
				0.6000	1.9	4.0	10.8	12.9	0.4511	2.0505	63.57	5.0000	1.78	9.18	563.64
				0.7000	0.2	0.5	….	….	0.5263	2.3923	74.16	8.0000	1.31	10.80	901.82
				0.7500	0.4	1.0	9.1	13.6	0.5639	2.5632	79.46	10.0000	0.30	3.11	1,127.27
				0.8000	2.1	5.8	….	….	0.6015	2.7341	84.76	12.0000	1.35	16.62	1,352.73
				1.0000	4.6	16.1	….	….	0.7519	3.4177	105.95		___	___	
				1.5000	2.4	12.3	6.5	19.3	1.1278	5.1264	158.92		100	100	
				2.0000	3.2	21.9	….	….	1.5038	6.8354	211.90				
				2.5000	0.2	1.8	….	….	1.8797	8.5441	264.87				
				3.0000	….	….	4.5	27.0	2.2556	10.2527	317.83				
				4.0000	0.8	11.2	….	….	3.0075	13.6704	423.78				
				5.0000	0.2	3.7	….	….	3.7594	17.0882	529.73				
				6.0000	….	….	0.9	10.7	4.5113	20.5059	635.68				
					___	___	___	___							
					100	100	100	100							

Sources: See the notes to Appendix Tables A1 and A2; McCusker (1978, p. 10); Newman (2008, pp. 259-61, 286-90, 350-7, 444-6).

Notes: Post-1772, 1£$_S$ = $4.54545. For Virginia, to get the value in 2012 U.S. dollars, take the denomination value * 0.8 * 4.54545 * 31; For Pennsylvania and New Jersey, take the denomination value * 0.75188 * 4.54545 * 31. New York state money was denominated in Spanish silver dollars, thus to get the value in 2012 U.S. dollars, just take the denomination value * 31.

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