

The Free Silver Movement in America: A Reinterpretation

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Monetary historians have contended that Free Silver advocates were inflationists seeking debt reduction. We offer an alternative interpretation using a theory of money demand with differential returns on nominal units and a nonoptimum nominal money stock. Our explanation is more logically appealing and more consistent with contemporary evidence. The restrictive coinage laws of the period produced chronic shortages, and our empirical analysis provides clear evidence of these shortages. A shortage of coins valued at a half-day's wage and less, raised transactions costs, produced hardship and spawned protest.

Most investigators who have explored problems of monetary theory and history have concentrated on total money held and neglected the denominational distribution of money balances. As a result, occurrences such as currency reform, the existence of differential demands for nominal denominations of money, and shortages of nominal money have been studied only in terms of *ad hoc* theories.¹

The supporters of "cheap money," who formed the Free Silver movement, have historically been held to be inflationists who sought, within the logic of the quantity theory of money, to lower the real value of their debt burden by increasing the nominal money stock and thereby driving up prices.² This traditional explanation suggests that poor farmers in the West and South in the last half on the nineteenth century understood the Equation of Exchange. It is also inconsistent with much of the existing evidence and the substantive opinions of most advocates of Free Silver.

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¹ An important exception is the work of Sargent and Velde, *Big Problem*, on shortages of "small change in Medieval and Renaissance Europe."

² See Redish, *Bimetallism*, p. 209; Friedman and Schwartz, *Monetary History*, p. 115; and Laughlin, *History*, p. xi. By the same logic, it could be argued that creditors promoted a policy of deflation to reap its distributional effects. Before the middle of 1864, creditors lost due to unanticipated price changes and after the middle of 1864, they gained. See Mitchell, *History*, p. 364. Friedman, "Bimetallism," p. 85, presents the most positive modern assessment of bimetallism as a potential policy of monetary stability.

This article analyzes the Free Silver period of American history under circumstances where there are differential returns on nominal units of money in reducing the cost of exchange. The result is an optimum denominational structure of the money stock. We then apply the theory to data from the period and show that during the Free Silver period the country suffered from an acute shortage of small denominations of hand-to-hand money, which raised the costs of exchange and produced hardship, especially in the South and the West. Within the context of an optimally denominated money stock, the Free Silver movement is seen as an effort to eliminate a shortage of subsidiary coins rather than to increase the aggregate money supply. Because this shortage affected debtors and creditors alike, it is not surprising that cheap money policies in the areas of money shortage obtained widespread popular support. Not only do the existing data suggest such an explanation, but the proponents of cheap money stated it continuously, and the legal structure of coinage laws of the 1880s and 1890s could hardly have produced any other result. Our work suggests a new and more logically appealing explanation of the Cheap Money movement in America.

Our analysis is related to, but distinct from, the recent work by T. J. Sargent and F. R. Velde where shortages of small change in Medieval and Renaissance Europe resulted from the “debasement” of fractional currency.³ Interestingly, in their case debasement increased the holding cost of small change relative to larger coins, and the resulting effort to economize in the use of small change created a “shortage” of small change. In contrast, during the Free Silver period, the supply of subsidiary coins was artificially fixed by law and the shortage was exacerbated by a secular decline in prices that raised the purchasing power of a dollar and increased the demand for subsidiary coins to consummate retail trade.

NOMINAL MONEY AND THE FREE SILVER ERA

All estimates of the circulation of coins and coin substitutes in the United States prior to the mid-1870s are notoriously unreliable. As late as 1852, foreign coins circulated freely even in American cities. With a substantial increase in the minting of subsidiary coins (coins with denominated values of less than a dollar) in 1853, foreign coinage began to disappear from circulation.⁴ A large volume of subsidiary coins was minted each year between 1853 and 1861, and it seems virtually certain that the supply of coins in the United States at the beginning of the Civil

³ See Sargent and Velde, *Big Problem*.

⁴ See House Executive Document 42, 34th Congress, 3rd Session.

War was more plentiful and more homogeneous than at any other previous time in American history.⁵

In his 1862 report, Mint Director Pollock gave the most widely accepted estimate of the value of subsidiary silver coin in the country before the war as \$45 million.⁶ To obtain an accurate measure of the total value of money in circulation in denominations of less than a dollar we would have to add the portion of state bank notes in denominations equivalent to subsidiary coins, some as small as a dime, that circulated in 1861. As prices grew with the onset of the Civil War, the bullion value of subsidiary coins, which had always been perilously close to their denominated values, exceeded their denominated values and coins rapidly disappeared from circulation. Although some coins were undoubtedly hoarded, and perhaps melted down, the great bulk of American coinage was exported to Canada and Latin America. As shortages occurred, bankers and merchants paid substantial premiums for available coins, reaching 13 percent on 10 July 1862 in Chicago.⁷

After suffering a heavy decline in the volume of retail trade induced by the coin shortage, private firms, cities, and even some states began to issue coin substitutes. The federal government was unable to enforce its statutes prohibiting the private issuance of money, and the market system responded to the presence of the growing premium on coins through just such issues. States, banks, and business firms sold fractional currency “shinplasters” (privately issued notes); foreign coins, principally Old Spanish quarter dollars, came back into circulation; and greenbacks were cut into parts and circulated in measured portions.⁸ When the New York Supreme Court took the extraordinary action of declaring the federal law prohibiting private money issue unconstitutional on 7 July 1862, all further effort to enforce the federal restrictions was abandoned.⁹ Postage stamps, which had long been the customary means for making small payments by mail, came into general use as coin substitutes, and following the market’s lead the federal government began first to issue postal currency and then fractional currency. The demand for coin substitutes was so great that Treasury Secretary Salmon P. Chase reported, “It had been found impossible to keep pace with public demand for this [fractional] currency.”¹⁰

⁵ See Department of the Treasury and Bureau of the Mint, *Domestic and Foreign Coins*, pp. 25–27.

⁶ See Carothers, *Fractional Money*, pp. 151–52.

⁷ *Ibid.*, p. 157.

⁸ See Mitchell, *History* pp. 159–160.

⁹ See Carothers, *Fractional Money*, pp. 168–69.

¹⁰ See Mitchell, *History*, p. 163.

Silver, brought to the mints to be coined during the Civil War, never entered circulation and was either hoarded or exported. According to Carothers, “after the greenbacks fell to a discount in 1862, the profit on export [of coins] to Canada became large, and in a short while, Canada was overrun with United States silver.” Even larger amounts of American subsidiary coinage flowed into Latin America where “their half-peso and two-real pieces were almost identical to our half dollars and quarters in weight and gold values.”¹¹

While data on the total circulation of fractional notes is unreliable, it seems clear that the total circulation of fractional currency never approached the value of subsidiary coin that had been in circulation prior to the Civil War.¹² By 1873, \$45.9 million of fractional notes were officially outstanding, but the actual circulation was probably closer to \$30 million.

Since the demise of the Second Bank of the United States (70 percent of whose notes circulated in the South and West in 1832), the West and South had depended largely on state bank notes for the consummation of exchange.¹³ From the demise of the Second Bank until the turn of the century, the West and South never approached the East in currency convertibility and the development of banking facilities.¹⁴

The National Banking Act of 1866 had an extremely harmful effect on the West and South. After 1 July 1866 the 10-percent tax on state bank notes eliminated non-national bank note issue, most of which was in small denominations.¹⁵ Moreover, National Banks were concentrated in the industrial North and as a result, greenbacks became the principle hand-to-hand currency in the West and South.¹⁶ Prior to the institution of the 10-percent tax, state banks had issued notes in denominations as small as a dime. Because the West and South possessed little specie, these small notes found ready use in hand-to-hand exchange. State banks in the South and West found that they could reduce reflux and expand their steady-state note issue by issuing notes in very small denominations.¹⁷ Although greenbacks initially filled some of the void left by the vanishing state bank notes, they could not substitute for the fractional notes issued by state banks.

¹¹ See Carothers, *Fractional Money*, pp. 218–19.

¹² *Ibid.*, pp. 151–256.

¹³ See Muhleman, *Monetary and Banking Systems*, p. 57.

¹⁴ *Ibid.*

¹⁵ See Dewey, *State Banking*, p. 64.

¹⁶ See Anderson, “National Banking.”

¹⁷ There is record of state bank notes as small as six cents (Muhleman, *Monetary and Banking Systems*, p. 54). See Dewey, *State Banking*, p. 65; and Hepburn, *History*, pp. 84, 90, 94, 163, 181, and 308.

Throughout the period there was extraordinary antipathy toward subsidiary coins, fractional notes, and small denominations of currency. The reason for the antipathy toward the issue of small notes by state banks, national banks, and the federal government is an interesting study of popular misunderstanding. Under conditions of stable prices in the presence of a gold or bimetallic standard, metallic coin was supposed to furnish the requirements of hand-to-hand money for small transactions. During an inflation of paper currency, metallic coins disappeared and small denomination notes (usually state bank notes) came into general use.

To many observers, the coincidence of small note issue and inflation implied that it was the small notes that drove specie out of circulation and caused the suspension of specie payment.¹⁸ In reality, the inflation that occurred during this period resulted from the sheer quantity of these issues. The appearance of small denomination bank notes when specie payment was suspended and specie became “scarce” simply reflected the common need for a medium of exchange to handle nominal purchases and sales. Nonetheless, the obvious factual association between the absence of specie and the appearance of small notes served to endow the notes with an evil reputation. Although small notes were innocent of the general indictment they received, laws against their issuance became almost universal.¹⁹

It seems to have been generally recognized that banks preferred to issue small denomination notes in order to retard the “reflux of their circulation.”²⁰ Small notes, it was held, were more likely to continue circulating in a given local area than an equal value of larger notes. Therefore, “the smaller notes . . . were less likely to come back for redemption.” But scholars and politicians of the time seem never to have considered the fact that with universal convertibility, the composition of notes was completely demand-determined once the denominational structure of the issue was fixed. Any economy to the banks from issuing small notes must have been matched by a complementary economy on the part of households and businesses in holding and using them. The fact that small notes were convertible made demanders the sole determiner of the composition of the note issue.

After the demise of state bank notes, the legal money system could not respond to the excess demand for small denominations of notes, and premiums on coins produced little or no supply reaction. After the 10-

¹⁸ See Mints, *History*, p. 148.

¹⁹ Not only the federal government but states as well sought to restrict small note issue. See Hepburn, *History*, pp. 161–64.

²⁰ Dewey, *State Banking*, p. 64.

percent tax on state bank notes eliminated non-National bank note issue:

There were always a few unclaimed notes, the result of bank failures or voluntary surrenders, and a ready market existed for this circulation. But buying [state] bank notes at a premium was indeed paying “blood money” as one Kansas banker described it, and western bankers agitated for Congressional action to end the note famine.²¹

In his 1872 and 1873 Annual Reports on “shinplasters,” or privately issued money, Comptroller of the Currency John Jay Knox marveled at the circulation of notes issued by savings-banks, railroads, municipal and state corporations, and numerous private companies, none of which were legal tender.²² Knox called on Congress to “bridle this wild delirium which has seized upon these breakers and evaders of the law.”²³ It does not appear that Knox or any of those who shared his views ever stopped to ask why the public was eager to accept private money in exchanges.

Even after the issue of one and two dollar silver certificates was initiated, so short was the stock of small denominations that they sold at a 2-percent premium even in New York.²⁴ Prior to specie resumption, small numbers of silver coins were purchased with gold coin at substantial premiums.²⁵ This shortage brought an outcry from the silver-tongued orator William Jennings Bryan:

How can we pay our debts without selling something and how can we sell anything unless there is money in circulation to buy with.²⁶

To put the monetary problems of the Free Silver period in perspective, it is instructive to construct the purchasing power of a \$1 bill in that period as measured by year 2000 equivalent values. Figure 1 shows the value of a \$1 bill in the years 1869–1900 as measured by the number of days worked in manufacturing to earn \$1.

²¹ See Unger, *Greenback Era*, p. 63.

²² U.S. Congress, Annual Report of the Comptroller of the Currency, 1872, pp. 96–97; and Report of the Comptroller, 1873, p. 109.

²³ House of Representatives, Miscellaneous Document 48, p. 2. For an excellent discussion of these types of nineteenth century problems see Timberlake, “Denominational Factors.”

²⁴ See Bryan, *Speeches*, p. 127.

²⁵ See Carothers, *Fractional Money*, p. 250.

²⁶ See Bryan, *Speeches*, p. 128.

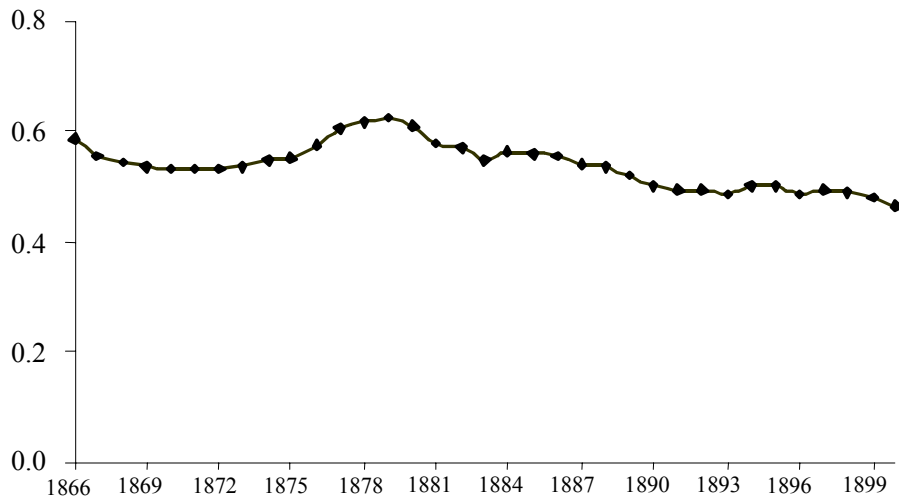


FIGURE 1
NUMBER OF DAYS WORKED IN MANUFACTURING TO EARN \$1

Note: The workday is assumed to be ten hours.

Sources: The data in Figure 1 are computed from wages (hourly wages in manufacturing) taken from *Historical Statistics of the United States: Colonial Times to 1957*, pp. 90–91 where data from series D573-577 are converted into hourly wages and spliced into series D589–602.

The fact that a dollar represented more value than a half-day's labor in the highest wage sector of the economy throughout most of the Free Silver period gives vivid meaning to Senator Morgan's contention that, "a twenty-dollar gold piece is the nucleus of a fortune."²⁷ By 1885, when the issue of greenbacks in denominations smaller than a \$5 bill ended, a \$1 bill was worth more than \$80 in today's equivalent work-day value.²⁸ On average, from 1869 to 1900, a \$1 bill in labor equivalence was equal in value to \$77 in today's currency. Even with our highly developed banking system and the wide use of debit and credit cards, an effort today to maintain a currency system where a \$50 bill was the smallest unit of money generally available would produce economic chaos and political upheaval.

Given the value of a \$1 bill during the Free Silver period, it appears likely that much of the notorious debt of rural Americans, especially those living in the South and West, must have been debt on accounts

²⁷ See Lauglin, *History*, p. 229.

²⁸ Calculated using the nominal hourly wages in manufacturing for the year 2000 taken from the U.S. Census Bureau, *Statistical Abstract of United States: 2001*, p. 391. The average hourly wage of \$14.38 is converted into a daily wage equivalent by multiplying by ten, the average number of hours in a work day during the 1880s and 1890s.

with merchants who used the running up of debt as a way to convert everyday transactions into values that could be settled with the available monies of the time. This running up of debt at the company store or general store must have contributed to the conception of cheap money advocates as debtors who hoped to benefit from rising prices through the debasement of the currency and a lowering of the real value of their debts. It seems likely, however, that the running up of debt on account was the product of a currency system with a significant shortage of coins valued at over half a day's wage and less.

The timing of the growth of support for the Greenback movement is important. Not until the panic of 1873 did substantial numbers of farmers support cheap money.²⁹ Garber has shown that, contrary to the traditional explanation, the evidence actually shows that the end of the free coinage of silver in 1873 did not result in a significant wealth transfer from debtors to creditors.³⁰ The demonetization of silver simply added, in a very visible way, to the nominal money shortage and trade contraction brought on by the panic of 1873. Not only does contemporary argument focus on a shortage of nominal money for hand-to-hand exchange, but recent studies have also confirmed this shortage. Selgin, for example, has estimated that, where as the *per capita* circulation in 1861 in the prewar Confederate states was \$7.29, the *per capita* circulation had fallen to \$0.89 by 1869.³¹

Although the famous Coinage Act of 1873 demonetized silver and ended the coinage of silver dollars, it did promote the coinage of subsidiary silver coins in two ways. First, subsidiary silver coins—halves, quarters, and dimes—were to be paid out in exchange for gold coins at par. Secondly, almost as an afterthought, a “provided” clause added that for two years subsidiary silver coins would be exchanged for silver bullion.³² In Texas and other southern states, subsidiary coins purchased at substantial premiums in gold and silver bullion under the 1873 act circulated in limited quantities for several years before specie resumption. As Senator Hamilton declared, “all through the southern states” subsidiary coins were worth almost as much as gold.³³

The relief was short lived. By 1875 the special provision allowing for the sale of subsidiary silver coins for silver bullion had expired and the gold bullion purchase provision was superceded by the 14 January 1875 act “Providing for Redemption of Fractional Notes with Silver Coin.”

²⁹ See Unger, *Greenback Era*, p. 195.

³⁰ See Garber, “Nominal Contracts,” p. 1013.

³¹ See Selgin, “Suppression,” p. 611.

³² See Sanger, *Statues*, pp. 428–29.

³³ See Carothers, *Fractional Money*, p. 250.

The 1875 act tied the issue of subsidiary silver coins to the redemption of fractional currency and “required [the Treasury] to redeem an equal amount of such fractional currency” as subsidiary silver coins were issued.³⁴ By 1876 the Joint Resolution Providing for Increased Issue of Silver Coin superceded the 1875 act by allowing the Treasury to issue up to \$10 million in silver coins in exchange for greenbacks, but set a new aggregate constraint that would hamper the issue of subsidiary coins for a quarter of a century. The 22 July 1876 Coin Act limited the aggregate “amount of subsidiary silver coin and fractional currency outstanding . . . [to] not exceed, at any time fifty million dollars.”³⁵

Given that the prewar circulation of subsidiary silver coins was estimated to be \$43 million and that there was a significant stock of coin denominated state bank notes that circulated widely in the west and south, it is almost certainly true that the 1876 Coinage Act capped the total circulation of subsidiary coin and coin substitutes at a lower level than existed before the Civil War. This is extraordinary, especially when taking into account the growth in the economy that had occurred over the ensuing quarter of a century. From 1859 to 1874 value added in agriculture in the United States grew by 66 percent. Value added in manufacturing and mining grew by 252 percent and 500 percent respectively.³⁶ The population of the United States grew by 60 percent from 1860 to 1880, and real income doubled from 1869–1878.³⁷ Yet, despite this extraordinary growth and the increase in the demand for subsidiary coin it must have engendered, federal statute froze the circulation of subsidiary silver coin and coin substitutes below the pre-Civil War level.

The desperate desire to enlarge the circulation of coin, especially in the small denominations a silver-based money would produce, is evident in the speeches in Congress of the supporters of free silver. Free silver advocates focused on the transactions return on subsidiary silver coins. The eloquent statement of Senator Morgan from Alabama is typical:

A twenty-dollar-gold piece is the nucleus of a fortune, to remain hid until some freak of fortune shall add other prisoners to its cell. But twenty dollars in silver dimes is the joy of the household, the substance of things hoped for, the evidence of things not seen. Silver is to the great arteries of commerce what the mountain-springs are to the rivers. It is the stimulant of industry and production

³⁴ *Ibid.*, p. 351.

³⁵ *Ibid.*, p. 353.

³⁶ See U.S. Census Bureau, *Historical Statistics of the United States: Colonial Times to 1970*, p. 239.

³⁷ On population, see U.S. Census Bureau, *Historical Statistics of the United States: Colonial Times to 1970*, p. 14. On real income, see Friedman and Schwartz, *Monetary History*.

in thousands of little fields of enterprise which in the aggregate make up the wealth of the nation.³⁸

We do not have to rely on what supporters claimed was the force behind free silver, however, because the market records shortages by the existence of premiums and the growth of substitutes. Not only did subsidiary coin and small notes command a premium during the Free Silver era, but also private currency substitutes circulated widely.³⁹ Some evidence of the macroeconomic impact of money substitutes and barter can be found in the decline in the measured velocity of money during the nineteenth century. Timberlake makes an appealing argument that the 50-percent decline in the measured velocity of money followed by stabilization in 1900 can largely be explained by nominal money shortages, the use of private money and the presence of barter.⁴⁰

In his study of the period, Taylor noted:

From the South and West, there comes constant complaint of inadequate currency facilities. According to common accounts, this lack of money not infrequently is so extreme as to make necessary the resort to barter or the substitution for money of store orders or some similar device.⁴¹

“By the end of 1876 more than \$15 million in fractional notes had been redeemed, and in October 1877 the total reached \$23 million.”⁴² In the winter of 1877 one of the most extraordinary events in the monetary history of the United States occurred when a significant portion of the subsidiary coins that had been exported during the Civil War suddenly reappeared in circulation. “They streamed in from Canada, Central America, South America and the West Indies. When specie payment was resumed on January 1, 1879, the coin supply consisted of those coins that had been issued in the mid-to-late 1870s and those that had returned to circulation that had been issued prior to and during the Civil War.”⁴³ For all practical purposes the issue of new subsidiary coins

³⁸ See Laughlin, *History*, p. 229.

³⁹ See Timberlake, “Significance” and “Private Production.”

⁴⁰ See Timberlake, “Denominational Factors,” pp. 844–50.

⁴¹ See Taylor, “Objects,” p. 312.

⁴² See Carothers, *Fractional Money*, p. 258.

⁴³ *Ibid.*, p. 260. Although Carothers’ description of the denuding of America of coin with the onset of the Civil War and the sudden reappearance of those same coins with the onset of specie resumption seems difficult to believe, a cursory review of the current value of American coins relative to the quantity minted suggests that Carothers was indeed correct. If coins minted before and during the Civil War had been melted down or otherwise lost, one would expect the value of American coins issued prior to and during the Civil War to be substantially higher for a given level of mintage than coins issued in the 1870s, but remarkably that is not the case. According to the November 2001 edition of *Coin Prices*, in 1855, 760,000 silver half dollars were

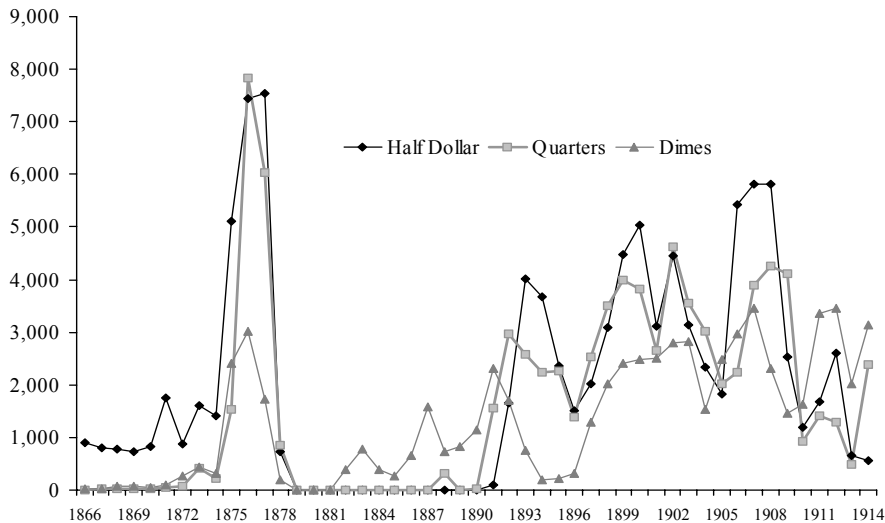


FIGURE 2
SUBSIDIARY SILVER COIN PRODUCTION, 1866–1914
(thousands of dollars)

Source: Data from Department of the Treasury and Bureau of the Mint, *Domestic and Foreign Coins*, pp. 27–28.

came to a halt in 1878 and no substantial amounts were produced again until the 1890s.⁴⁴

In Figure 2 we show the production of subsidiary silver coinage from 1866–1914. As is apparent from the Figure, after a surge in production to replace the fractional currency issued during the Civil War, subsidiary silver coinage virtually stopped for more than a decade. This pause in coinage is also apparent in Figure 3 which shows the total value of subsidiary coinage, including nickels and pennies. The virtual disappearance of new coinage coincided with the decade in American history that saw the rise of the Free Silver movement.

Circulation of subsidiary silver coins in the late 1870s and throughout the 1880s and 1890s was dominated by the return of old coins from abroad and by legal constraints on the aggregate circulation. The 1873

minted and one of those half dollars today is valued by collectors at \$60. In 1870, 635,000 silver half dollars were minted and one of those half dollars today is valued at \$65. The sole exception we have found to this general pattern is coins minted in 1861. It could be that those coins were in fact melted down, but it is equally probable that the current value reflects collector interest in the first silver coins struck during the Civil War.

⁴⁴ See Department of the Treasury and Bureau of the Mint, *Domestic and Foreign Coins*, p. 22.

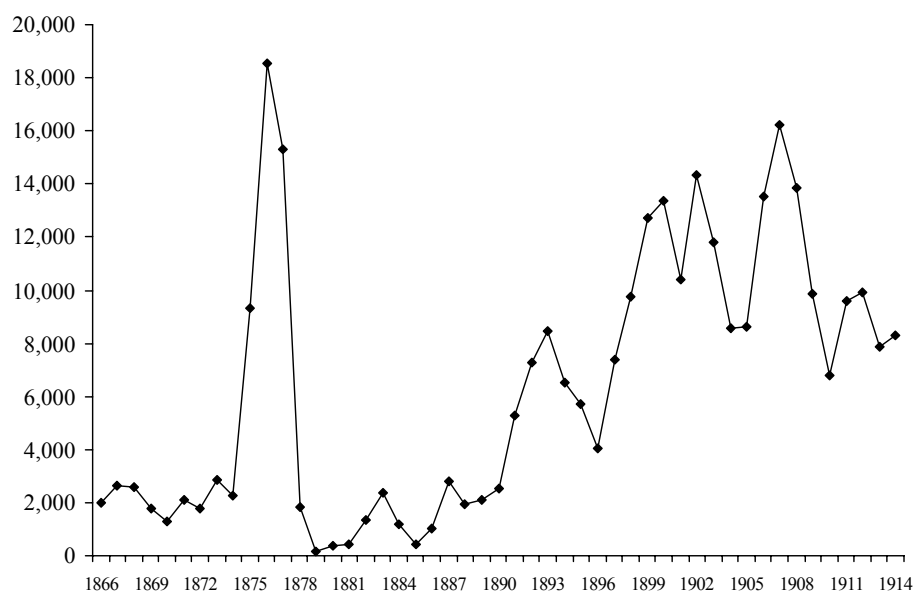


FIGURE 3
TOTAL SUBSIDIARY COIN PRODUCTION, 1866–1914
(thousands of dollars)

Source: Data from Department of the Treasury and Bureau of the Mint, *Domestic and Foreign Coins*, pp. 27, 28, and 34.

law placed no limits on the coinage and issuance of subsidiary silver, but “the law of 1876 which restored silver coinage limited to \$50 million the combined total of [fractional] notes officially outstanding and new coins issued”⁴⁵ Carothers, the preeminent authority on the period and this issue, describes the legislative limit as follows: “. . . it was a general restraining clause passed by a Congress that still thought of subsidiary coins as ‘debased’ standard coin.”⁴⁶

By 1878 the \$50 million limit was binding and “he [Treasury Secretary John Sherman] was obliged to stop coinage.”⁴⁷ Through a series of innovations first Secretary Sherman, and then each of his successors, sought to get around the \$50 million constraint, but not until 1900 was the limit legally raised, doubling to \$100 million. By 1905 the \$100 million limit had been exceeded, and Secretary Shaw appealed to the Attorney General who issued an opinion to the effect that the 1873 law took precedence over the laws of 1876, 1900, and 1903.⁴⁸ As a result,

⁴⁵ See Carothers, *Fractional Money*, p. 270.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

⁴⁸ See U.S. Congress, *Annual Report of the Secretary of the Treasury, 1906* and *Annual Report of the Directory of the Mint, 1906*.

“Coinage was resumed, and there has not been since that time any question of limitation on the issue of subsidiary coins.”⁴⁹

Temporary relief from the initial impact of the \$50 million limit on the circulation of subsidiary silver coin was provided by the reimportation of old coins and by Secretary Sherman’s “dubious interpretation which permitted an additional coinage of \$8 million” by deeming such coinage replacement for lost fractional currency.⁵⁰ For a short time there even appears to have been a surplus of coin as more and more coins returned to the United States. But the surplus did not last. By the early eighties shortages were back and by the mid-eighties calls for new coinage became “insistent,” with Secretary McCulloch in his annual report for 1884 making an “urgent plea” for general recoinage.⁵¹ Paradoxically, at this very time, “surpluses” of subsidiary silver coins were being held in the Treasury. The amount of old subsidiary silver coin in the Treasury vault reached \$30 million in 1885 as the circulation was held near \$50 million.⁵² Over the next “eighteen years all the coinage was produced in violation of the law.”⁵³

WHEN NOMINAL MONEY MATTERS

Contemporary monetary theory treats the cost incurred in trading, transactions costs, as a function of the buying and selling done and real money balances held.⁵⁴ In this context, the holder of money is assumed to be indifferent about the composition of nominal money holdings. There is no differential return on the holding and use of coin, currency, or demand deposits, and one thousand pennies yield the same transactions services as a ten dollar bill. Taken to the extreme, the contemporary model assumes that all the world’s commerce could be transacted with a penny if the price level were sufficiently close to zero.⁵⁵

Clearly carried to the extreme, the assumption that demanders of money are indifferent about the nominal stock of money they hold is invalid, and the assumptions of the standard model are intended to apply only when the various denominations of money can be freely exchanged at par. In the analysis of any period of monetary upheaval,

⁴⁹ See Carothers, *Fractional Money*, p. 271.

⁵⁰ *Ibid.*, p. 270.

⁵¹ *Ibid.*, p. 269.

⁵² *Ibid.*, p. 268.

⁵³ *Ibid.*, p. 271.

⁵⁴ See Saving, “Transactions Costs”; and Dutton and Gramm, “Transactions Costs.”

⁵⁵ See Saving, “Transactions Costs”; and Dutton and Gramm, “Transactions Costs.”

where there are artificial restrictions on the supply of specific denominations or types of money, we are required to recognize public differentiation among nominal units and types of money.

If various denominations and types of money are not freely exchanged at par, then the conventional model must be adapted to recognize that in such periods of disequilibrium, nominal money matters. The holdings of various denominations of money in such periods can and generally will deviate from those which would be chosen if convertibility at par were preserved.

If convertibility at par is not maintained and the monetary authority follows some rule other than reflux minimization in issuing the various denominations of money, society can possess a nonoptimal mix of money and rising transactions costs will lower welfare. Supply and demand for the denominations in excess demand can be equated only by some implicit or explicit premium. Such a premium may be in the form of extra transactions time entailed in acquiring the denomination which is in excess demand or the actual paying of a premium to acquire and hold denominations in relative short supply.

It is clear from the conventional transactions-cost model of the demand for money that a premium on a given denomination of money will reduce the demand for that denomination. The premium will drive up the cost of using the denomination of money on which the premium occurs and reduce wealth. The decline in wealth will lower demand for the denomination if it is a normal good. In most circumstances, however, we would be assured that in any case the substitution effect dominates the small wealth effect that would be generated by a premium on a given denomination of money.⁵⁶ It is also clear by the same logic that a premium on a given denomination of money would cause the demand for the denomination that is the best available substitute to rise. In the case of the Free Silver period, we would expect a shortage of subsidiary coins to generate a premium on subsidiary coins that would raise the cost of using them and reduce the optimum amount held. We would also expect an increase in the holding and use of dollar coins and bills, the closest available legal substitute.

Therefore, if acute shortages of subsidiary coins existed during the Free Silver period and premiums existed on subsidiary coins during that period, we would expect to find that the ratio of subsidiary coins relative to the holding of all hand-to-hand money, subsidiary coins, ones, twos, fives, tens and twenties, would have been lower during the Free Silver period than in periods where greater convertibility existed. Further, because dollar coins and dollar bills would have been the closest available legal sub-

⁵⁶ See Dutton and Gramm, "Transactions Costs," p. 658.

stitutes for subsidiary coins, we would also expect to find that the ratio of ones to the total level of hand-to-hand money was higher during the Free Silver period than in periods when greater convertibility existed.

AN EMPIRICAL ANALYSIS OF THE DEMAND FOR SUBSIDIARY COINS IN THE UNITED STATES 1866-1914

Contemporary evidence of a shortage of subsidiary coins abounds during the last 30 years of the nineteenth century. Not only did subsidiary silver coins command a premium and trade at near par with gold before specie resumption, but one and two dollar notes, the best available, legal substitutes for subsidiary coins, often traded at a premium as well.⁵⁷ Unclaimed state bank notes, resulting from bank failures or notes for which the redemption date had past, continued to circulate and be voluntarily accepted in exchange.⁵⁸ The annual reports of the Comptroller of the Currency marvel at the circulation of a vast array of private, municipal, and state money substitutes that circulated widely even though these issues were neither legal tender nor legal.⁵⁹

Despite the explosion of the economy during the Civil War and in the 25 years afterward, federal statute capped the circulation of subsidiary coin at a level below the effective circulation which had existed before the war started.⁶⁰ Citizens clamored, Congress debated, and the Treasury issued coins in circumvention of the letter of the law.⁶¹ The measured velocity of money declined by 50 percent and stabilized only when subsidiary coins were produced in volume, strongly suggesting the large scale presence of money substitutes and barter throughout the period.⁶² When the legal limit on the aggregate value of outstanding subsidiary coins was finally doubled in 1900, the public eagerly accepted the new issue and by 1905 the new limit was exceeded.⁶³ But as pervasive as the evidence is, it is not readily subject to empirical analysis, and in the absence of a theory that nominal money can matter, it is not very meaningful.

⁵⁷ See Carothers, *Fractional Money*, p. 250; and Bryan, *Speeches*, p. 127. Also see Timberlake, "Significance" and "Private Production."

⁵⁸ See Unger, *Greenback Era*, p. 63.

⁵⁹ See U.S. Congress, *Annual Report of the Comptroller of the Currency, 1872*, pp. 96–97, and *Report of the Comptroller, 1873*, p. 109; and House of Representatives, *Miscellaneous Document 48*, p. 2. Also see Timberlake, "Denominational Factors."

⁶⁰ See Friedman and Schwartz, *Monetary History*, p. 30. Also see U.S. Census Bureau, *Historical Statistics of the United States: Colonial Times to 1970*, pp. 239 and 14. See Carothers, *Fractional Money*, p. 270.

⁶¹ See Carothers, *Fractional Money*, p. 271.

⁶² See Timberlake, "Denominational Factors," p. 258.

⁶³ See Carothers, *Fractional Money*, p. 271.

Using the available data on the circulation of subsidiary coins and the circulation of other denominations of coin and currency used in hand-to-hand exchange (i.e., twenty dollars and smaller), we looked at the composition of the demand for money for the period 1866–1914, with special attention to the Free Silver period (1880–1896). If subsidiary coins were in very short supply and exchanging at a premium during the Free Silver period, we would expect that during that period the stock of subsidiary coins in circulation, relative to all hand-to-hand money, would have been lower than during periods where convertibility at or near par existed. From the theory presented, we would also expect that the ratio of one dollar bills and coins to other coin and currency used in hand-to-hand exchange would have been higher during the period when subsidiary coins were in short supply, as they were the closest available legal substitutes for subsidiary coin.

Because of the substitution between subsidiary coins and dollars we test these hypotheses by simultaneously estimating the following two equations using Zellner's seemingly unrelated regression (SUR) version of generalized least squares

$$\gamma_t = \alpha_0 + \alpha_1 r_t + \alpha_2 w_t + \alpha_3 w_t^2 + \alpha_4 P_t + \alpha_5 GNP_t + \alpha_6 FS + \varepsilon_{1t} \quad (1)$$

$$o_t = \beta_0 + \beta_1 r_t + \beta_2 w_t + \beta_3 w_t^2 + \beta_4 P_t + \beta_5 GNP_t + \beta_6 FS + \varepsilon_{2t} \quad (2)$$

where γ and o , are respectively the ratio of subsidiary coins and one-dollar bills and dollar coins to all hand-to-hand money. Subsidiary coins consist of the circulation of all silver coins less than a dollar in denominated value plus the circulation of fractional notes, which functioned as subsidiary coin substitutes prior to specie resumption. All hand-to-hand money consists of all subsidiary coins plus all dollar bills and dollar coins, two dollar bills, and five, ten, and twenty dollar bills and coins in circulation. The remaining variables are as follows: r is the real interest rate, w is real hourly wages, P is the price level, GNP is real gross national product, and FS is a dummy variable that takes the value of unity during the Free Silver period (1880–1896) and zero elsewhere. The time period covered in the regression is from 1869 to 1914.

A priori, one would expect that if convertibility is maintained, the real interest rate, the cost of holding money balances, would not affect the desired composition of money demand. However, during a period where a shortage of subsidiary coin existed and premiums existed, increases in real interest rates should increase the relative demand for subsidiary coin and decrease the relative demand for ones, the closest

substitute. The effect of real wages has two offsetting components. First, as real wages increase, individuals engage in larger transactions, increasing the demand for larger denominations and decreasing the ratio of subsidiary coins to all money. Second, as real wages increase, more transactions are conducted with money, and initially such transactions are conducted with subsidiary coin, increasing the ratio of subsidiary coin to all money. Decreases in the price level increase the real value of all denominations of money, allowing the same transactions to be conducted more efficiently with ever smaller denominations of money. As a result, a decrease in the price level, which occurred throughout the Free Silver period, should be expected to increase the ratio of subsidiary coins to all money.

Gross national product is a proxy for the total level of transactions activity. Finally, if there was a significant shortage of subsidiary coin during the Free Silver period, as is suggested by all of the anecdotal evidence, then the coefficient of the Free Silver dummy variable should be negative and significant in the subsidiary coins ratio equation and positive and significant in the one dollar ratio equation.

In Table 1 we show the results of the SUR estimation of equations 1 and 2. For the subsidiary coin ratio equation 1, the statistically significant coefficients are the interest rate, the price level, and the Free Silver dummy variable. Most importantly for our hypothesis that the Free Silver movement was about a shortage of subsidiary coins is the sign and significance of the Free Silver dummy variable--negative and significant. Thus, during the Free Silver Period, it does, in fact, appear that there was a quantifiable shortage of silver subsidiary coins. As compared to the whole 1866–1914 period, the data suggest that during the Free Silver period the public held fewer subsidiary coins than they would have held if there had been free convertibility at par. Such a shortage would have resulted in a premium on subsidiary coins, higher transaction costs, and lower welfare.

Most of the other coefficient values are consistent with what was anticipated. The real interest rate coefficient is positive and statistically significant. The price level coefficient is negative and significant, while the per capita GNP coefficient is positive but insignificant. Wages are insignificant, perhaps indicating that the effect of increased market transactions and the size of transactions effect offset one another.

TABLE 1
REGRESSION ANALYSIS

	Coinage Ratio			Dollar Bill Ratio		
	Coefficient	Standard Error	t-stat	Coefficient	Standard Error	t-stat
<i>Interest Rate</i>	0.0009**	0.0003	3.19	-0.0001	0.0001	-1.12
<i>Real Wage</i>	-1.1137	0.7017	-1.59	1.3434**	0.2178	6.17
<i>Real Wage</i> ²	1.3305	1.3361	1.00	-2.4432**	0.4148	-5.89
<i>GNP</i>	0.0009	0.0005	1.63	0.0003*	0.0002	2.07
<i>Price Level</i>	-0.0009**	0.0003	-2.89	0.0005**	0.0001	5.32
<i>Free Silver</i>	-0.0214**	0.0044	-4.86	0.0069**	0.0014	5.03
Constant	0.2998**	0.1028	2.92	-0.1630**	0.0319	-5.11
R ²	0.74			0.96		

* Significant at the 5-percent level.

** Significant at the 1-percent level.

Sources: Subsidiary Coin in circulation is constructed as the total of Subsidiary Silver circulation plus Fractional Currency circulation. Subsidiary Silver circulation and Fractional Currency circulation are taken from *Historical Statistics of the United States: Colonial Times to 1970*, pp. 994–95. Silver Dollar circulation is taken from *Historical Statistics of the United States: Colonial Times to 1970*, pp. 994–95. The circulation of one, two, five, ten, and twenty dollar U.S. notes, Treasury Notes, Gold and Silver and currency certificates is taken from the *Annual Report of the Secretary of the Treasury*, 1892, pp. 69–72 for the years 1866–1892 and from the *Annual Report of the Secretary of the Treasury*, 1916, pp. 330–31 for 1893–1914. National Bank Notes outstanding for each of the denominations is taken from the *Annual Report of the Comptroller of the Currency*, 1892, pp. 142–44; and *Annual Report of the Secretary of the Treasury*, 1916 pp. 333–34. Data on the interest rate (Yields on American Railroad Bonds) are taken from *Historical Statistics of the United States: Colonial Times to 1970*, p. 1003. Price level (Wholesale Price Index) is taken from *Historical Statistics of the United States: Colonial Times to 1970*, pp. 200–01 and Series E40–51 and Series E52–63 spliced together in 1890. Wages (hourly wages in manufacturing) is taken from *Historical Statistics of the United States: Colonial Times to 1957*, pp. 90 and 91 where data from series D573–577 are converted into hourly wages and spliced into series D589–602. Real GNP is taken from Romer, “Prewar Business Cycle,” pp. 22–23.

In the one dollar ratio equation 2, the statistically significant coefficients are real wages, the square of the real wage, real GNP, the price level, and the Free Silver dummy variable. The coefficient of the Free Silver period dummy variable is positive and highly significant. Thus, during the Free Silver period, it appears that the demand for ones relative to all hand-to-hand money increased significantly as compared to the period as a whole. A shortage of subsidiary coins would have been expected to cause the public to hold more of the closest available substitute. This finding seems to confirm F. W. Taussig’s observation that “when it appeared that new notes of small denominations were no longer to be supplied, the old ones were kept in use long after they had become unfit for circulation,”⁶⁴ and when small denomination silver

⁶⁴ See Taussig, *Silver Situation*, p. 579.

certificates were issued in 1886 they “were rapidly, almost eagerly, absorbed by the public as fast as they could be printed.”⁶⁵

As expected, the coefficients on the other explanatory variables are the opposite in sign to those in the subsidiary coin regression. There existed a quadratic relation between real wages and the one dollar ratio, where higher wages increased the predicted ratio with a diminishing impact as wages increased. The turning point of the concave function, where increased wages would begin to decrease the predicted dollar bill ratio, was at 27.5 cents (wages were lower than this until 1912). Both the price level and real GNP are positive and significant.

The results presented in Table 1 strongly support the anecdotal evidence that the Free Silver movement was at least in part the result of a shortage of subsidiary coins and not just the lobbying of silver producers and debtors.

SUMMARY AND CONCLUSIONS

Monetary historians have long contended that Free Silver advocates were simply inflationists who sought a redistribution of wealth by lowering the real burden of their debts through inflation. Friedman and Schwartz followed the same argument as Laughlin, Hepburn, and numerous others when they concluded⁶⁶

Debtor farmers in the Middle West and South, who had no interest in a higher price for silver, joined the silver producers, in the belief that “free coinage” or “free silver,” as they termed it, would increase the money supply and thereby lower the real burden of their debt.⁶⁷

In the context of traditional monetary theory, where the cost of exchange depended only on real money balances, no other explanation offered itself for the Free Silver movement. The fact that evidence of nominal money shortages abounded did not change the fact that such evidence made no sense without some theory that nominal money mattered. When we take into account the differential returns on nominal units of money when convertibility at par does not occur, an alternative (or at least complementary) explanation of the moving force behind the Free Silver movement is manifested. Not only does the theory suggest

⁶⁵ Ibid., pp. 41–42.

⁶⁶ See Laughlin, *History*, p. 217. The domain of the dispute according to Laughlin was: “Money has three—chief functions to perform; as a medium of exchange (to transfer value), as a common denominator of value (to compare value) and as a standard of deferred payments. Now, bimetalism is concerned mainly with the last function” (p. xi). See Hepburn, *History*.

⁶⁷ See Friedman and Schwartz, *Monetary History*, p. 115.

the possibility of the existence of a nonoptimum nominal money stock during the Free Silver period, but evidence of shortages of small denominations of money abound; the stated goals of the Free Silver groups reflect these shortages; the coinage laws of the 1870s de-linked coinage from any measure of the economic requirements for subsidiary coinage and virtually guaranteed that the actual circulation would not meet the needs of trade; and empirical analysis using existing data confirms that shortages did in fact exist.

It was this shortage of circulating subsidiary coin and the cost it imposed that was the real impetus of the Free Silver movement. By impeding trade and lowering welfare, the shortage of small units of hand-to-hand money induced general support for coinage in the areas of monetary deprivation. This support was from debtors and creditors alike. Had free coinage of silver existed, the increase in the value of coins relative to bills that occurred during the 1880s and 1890s would have brought silver to the mint and coinage would have risen until convertibility was restored. This would have allowed demanders to once again determine the denominational structure of the money supply. Under the restrictions imposed by law from 1876 to 1900 this could not happen.

Although a western farmer was not likely to recognize a relation between government monetary policy and the real value of his debts, it took no economic sophistication to recognize that the denominations of money normally used to consummate sales and purchases circulated at a premium. The resort to tokens or barter added to exchange costs, impeded trade, and produced hardships. In those areas of the country where the shortages were greatest there was a public outcry. By ascribing this outcry only to debtors seeking relief, for a hundred years historians and economists have largely been forced to accept an explanation of the Free Silver periods that assumes that ordinary people in the nineteenth century understood the Equation of Exchange. From the analysis presented, it appears likely that at least a part of the debt burden of farmers in the South and West was debt on account accumulated because of a shortage of denominations of money valued at a half a day's wages and less. This shortage forced them to use credit to build up the volume of transactions to a level that could be consummated with a dollar that had a value of over \$80 in today's wages. Paradoxically, farmers in the South and West were then, to some degree, debtors because of the dearth of silver coins and not advocates of silver coinage because they were debtors.

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