

The private mint in economics: evidence from the American gold rushes[†]

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Prominent economists have supposed that the private production of full-bodied gold or silver coins is inefficient: due to information asymmetry, private coins will be chronically low-quality or underweight. An examination of private mints during gold rushes in the US in the years 1830–63, drawing on contemporary accounts and numismatic literature, finds otherwise. While some private gold mints produced underweight coins, from incompetence or fraudulent intent, such mints did not last long. Informed by newspapers about the findings of assays, money-users systematically abandoned substandard coins in favour of full-weight coins. Only competent and honest mints survived.

Although not as prominent in economics textbooks as the case of the lighthouse scrutinized by Ronald Coase, the precious metallic mint has also played the role, in the writings of some economists, of what Coase called ‘an example of something which has to be provided by government rather than by private enterprise’.¹ Henry Sidgwick offered both the lighthouse and the mint as examples.²

What economists have usually had in mind, regarding the mint, is that asymmetric information about coin quality will make it privately profitable to issue substandard coins, generating net social cost. William Stanley Jevons invoked Gresham’s Law to argue that ‘those who sold light coins at reduced prices’ would drive good coins out of circulation.³ More recently, Goodhart has worried that the private mint operator ‘will always be tempted to debase the currency in pursuit of a quick and immediately larger return’, while Quinn has elaborated the view that ‘private mints need to be prohibited because their inferior coins will create a negative externality when they undermine confidence in the quality of the circulating coins’.⁴

A number of prominent economists, including Sidgwick, Jevons, and (in passing) Alfred Marshall, have argued the social inefficiency of private mints in purely theoretical fashion, without discussing any evidence on their historical performance. On the other side, Herbert Spencer defended competitive private

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¹ Coase, ‘Lighthouse in economics’, p. 357.

² Sidgwick, *Principles*, pp. 412–13, 450–2.

³ Jevons, *Money and the mechanism*, p. 64.

⁴ Goodhart, ‘Two concepts’, p. 412; Quinn, ‘Dutch bank finance’, p. 66.

enterprise in coinage, but he too argued his case deductively without reference to actual mints.⁵

Although most mints have been public enterprises, owned and operated by local or national governments, there have been significant exceptions. These exceptions give us evidence on whether information asymmetry problems have in fact made markets fail in precious metallic coinage. Here we examine the private mints that arose during gold rushes in the US. There were three distinct regional gold rushes with private mints: the southern Appalachians in 1830–51, California in 1849–54, and Colorado in 1860–2.

Only gold mints are examined here, but experience with the private minting of copper coins also provides important evidence.⁶ Our subject is distinct from private token coinage.⁷ An important earlier episode of decentralized mints that merits study is that of fifth- to eighth-century Merovingian France. In the absence of a strong central state, as described by Robert S. Lopez, ‘the barbarian rulers had allowed the art of striking coins to become a private industry’ consisting of coiners who were ‘free entrepreneurs’.⁸

A gold mint is an enterprise that turns irregular gold into coins, adding value to the metal by making it more suitable for use as a medium of exchange. Stamping ‘5 dollars’ (for example) on a gold coin certified the mass of pure gold it contained, while other features on the faces and edges made shrinkage by wear or tampering evident. Many of the American private gold mints also produced ingots for their customers, stamped to indicate the mass and fineness of the gold they contained. The ingots were typically sold to goldsmiths or exported to foreign mints, but those in round numbers sometimes served as media of exchange. Unlike coins, they lacked indicators of wear or tampering.

An 1837 visitor described a scene at the rustic Bechtler mint in North Carolina: several ‘country people’ brought in ‘rough gold’, which the mintmaster weighed and recorded in his book, while ‘to others he delivered the coin he had struck’, net of fees, from the gold that they had previously brought. The visitor aptly likened the mint’s operations to ‘those at a country grist mill, where the miller deducts the toll for the grist he has manufactured’.⁹ The mintmaster’s revenue likewise consisted of fees deducted from metal he coined.

Before local mints opened, miners and panners could barter their gold dust for goods, but uncertainty about its fineness (percentage gold content) meant that gold dust was commonly accepted in trade only at a significant discount from the value of the pure gold it contained. Alternatively, a miner could ship gold dust via an express service to the US Mint in Philadelphia or New Orleans (opened in 1838) to be coined, but would then have to bear a heavy cost for round-trip shipping and insurance, and wait many weeks to receive US coins in return. Alternatively he could sell the dust to a local assayer or banker who would pay immediately (and who could ship the gold to the US Mint more cheaply in bulk), but at a price appropriately discounted for the time and expense of sending the gold to a distant

⁵ Sidgwick, *Principles*, pp. 450–2; Jevons, *Money and the mechanism*, pp. 63–6; Marshall, *Money, credit, and commerce*, p. 57; Spencer, *Social statics*, pp. 401–3.

⁶ Selgin, *Good money*.

⁷ As discussed by Sumner, ‘Privatizing the mint’, and White and Boudreaux, ‘Nonprice competition’.

⁸ Lopez, ‘Aristocracy’, pp. 3, 11; see also Babelon, *Les origines*, pp. 124–7.

⁹ Featherstonhaugh, *Canoe voyage*, p. 329.

mint to be coined. In this setting, a local private mint could profitably bring the mint to the miners. As long as its coining costs were less than round-trip shipping costs to the nearest US Mint, the first private mint could produce coins worth more than the price it had to pay for the gold dust used plus the expense of coining it. Competition among private mints, and with other assayers, drove up the local price of gold dust, benefiting the miners.

To put numbers on the historical situation: in western North Carolina's gold country in 1831, according to a newspaper advertisement for the Bechtler mint, banks were paying \$16.80 per ounce for fluxed gold (with non-metallic impurities removed) of uncertain fineness (without assay), which the advertisement assumed to range from 22 to 23 carats.¹⁰ The official US Mint value in 1831 was \$19.39 per troy ounce of 24 carat gold. Ounces of 22 and 23 carat gold had corresponding mint values of \$17.74 and 18.58. Bechtler's charge for coining fluxed gold was 2.5 per cent, or 46.45 cents per ounce of 23 carat gold. His assaying charge (\$1 for up to 20 ounces of fluxed gold) was 5 cents per ounce in volume. All told, Bechtler thus offered \$18.02 per ounce, or \$1.27 per ounce more than the reported local bank price, assuming that the coins he produced circulated at par with official coins. For 22 carat gold, by the same reckoning, he paid \$17.30, or 50 cents more.

In San Francisco in 1849, before any mints had opened, one troy ounce of raw gold dust could reportedly be bartered for \$13–16 worth of goods from merchants, or sold to an assayer or bank for silver dollars at \$10–11 per ounce, whereas its value at the US Mint in New Orleans or Philadelphia averaged around \$18.¹¹ After competition from private mints drove the price of gold dust up to something approaching a competitive equilibrium, San Francisco private mints in 1852 reportedly paid \$14 to \$17.50 per ounce after fluxing and assaying, depending on fineness.¹² The standard gold content of the US dollar after the Coinage Act of 1834 corresponded to \$20.67 per troy ounce of pure gold. Fluxed Californian gold dust averaged about 88 per cent gold and 12 per cent silver (21.6 carat). \$20.67 times 0.880 equals \$18.19 per ounce. A mint paying \$17.25 per ounce of 0.880 gold dust thus had a margin of \$0.94 per ounce to cover other costs of minting including a return on investment. This figure lies between Bechtler's inferred margins on 22 and 23 carat gold.

The most important private mint in Colorado was established in 1860 by a Kansas banking and assaying firm (Clark, Gruber & Co.). They established a private mint in Denver to save the 10 per cent round-trip express company charges for shipping gold dust from Colorado to their premises in Leavenworth, Kansas, and government coin back to their purchasing agent, plus the cost of hiring their own guards for the shipments.¹³

A private gold mint accordingly did not need to produce substandard coins to make a profit. A policy of deliberately issuing substandard coins would earn a greater profit per coin, as theoretical critics have noted, but only until the ruse was

¹⁰ The advertisement is reproduced by Kagin, *Private gold coins*, p. 29.

¹¹ Adams, *Private gold coinage*, p. viii. Kagin, *Private gold coins*, p. 54, refers to California miners receiving only \$6–8 per ounce of gold dust, but I have not found any newspaper reports of prices that low.

¹² Anon., 'Currency and banking in California', *Bankers' Magazine and Statistical Register*, 2 (1852), p. 77.

¹³ Knox, *History*, pp. 829–30.

discovered. The company and market histories reviewed here indicate that fraud by some private mints was initially a problem, but also that the spread of information made honesty come to dominate as a strategy for profit maximization.

After reviewing the three American episodes in chronological order, we discuss in detail the light they shed on the hypotheses of the theoretical critics. To anticipate our findings: the accounts of contemporary newspapers and of numismatic historians show that some of the first private mints produced underweight coins, from incompetence or fraudulent intent. However they also show that such mints did not last longer than a few months. Once informed by newspapers about the findings of assays, ordinary money-users systematically abandoned substandard coins in favour of full-weight coins.

Some favourable accounts of private gold coinage have highlighted good mints and largely disregarded problematic mints. Charles A. Conant wrote that ‘California bristled with private mints after the gold discoveries, issuing fine gold coins bearing the names of the makers and passing without objection in exchange’.¹⁴ However, there were in fact complaints and objections to the substandard coins that some mints issued, and these objections were crucial to the process of driving substandard coins out of circulation. A fuller picture reveals a number of problematic mints, but also shows that problems of fraud and low-quality manufacturing—supposed by critics to be chronic—were transitory.

I. The southern Appalachians, 1830–51

Fifty or so small mines and numberless panning operations produced gold in the southern Appalachians (western North Carolina to north-east Georgia) during the first US gold rush. A sizeable share of the gold went into one of two private mints, sparing the miners or their agents a costly and time-consuming trip to the US Mint in Philadelphia to coin the gold.

The first private gold mint was operated by jeweller and assayer Templeton Reid in Gainesville, Georgia. It was short-lived, limited to three months in 1830. A letter soon appeared in a local newspaper saying that an assay at the US Mint had found his \$10 coin to contain about 5 per cent less gold than the official standard. Replying, Reid declared that the ‘\$10 piece I have estimated at 96 cents per dwt. [pennyweight]’, equivalent to \$19.20 per ounce (20 dwt. = 1 troy ounce). With the official mint value of pure gold equal to \$19.39 per troy ounce, Reid’s estimate implied that his coin was 99 per cent pure gold. The assay revealed that it was in fact only about 94 per cent pure (22.5 carat), about the average natural fineness of Georgia gold, which emerged from the mines mixed with about 6 per cent silver. Reid thus incompetently produced substandard coins because he over-estimated the purity of his gold. The total dollar face value that Reid coined before shutting down is not known, but has been estimated at only about \$7,000.¹⁵

Christopher Bechtler, a goldsmith and assayer, opened a much more successful and long-lived mint in Rutherfordton, North Carolina, in 1831. His son Augustus

¹⁴ Conant, *Principles*, p. 132. For other one-sided references, see Spooner, *Letter*, p. 79; Rothbard, *Government*, p. 20; Summers, ‘Private coinage’. Watner, ‘California gold’, provides a fuller popular account.

¹⁵ Kagin, *Private gold coins*, pp. 19–21; Templeton Reid, letter to the editor of the *Georgia Journal* (25 Aug. 1830).

took it over in 1842 and continued to do business even though a gold-coining branch of the US Mint had been established at Charlotte (about 70 miles east) in 1838.¹⁶ The Bechtler mint produced gold coins in denominations of \$5, \$2.50, and \$1 using a screw press.¹⁷ Each coin was also stamped with the Bechtler name and the legend ‘Carolina Gold’ (sometimes ‘North Carolina Gold’ or ‘Georgia Gold’). When the mint stopped production is not known precisely, its coins being undated, but probably between 1850 and 1852. The Bechtlers’ business proposition to miners was: you will get more money for your gold by bringing it to us to be physically transformed into coins than by selling it nearby. Implicitly, the price offered by other purchasers nearby fell below the US Mint value to reflect the time and expense of sending gold to the Mint in Philadelphia and waiting for its return in coined form.

Bechtler’s \$2.50 and \$5 coins were stamped to indicate weight (in gold grains) and fineness (20, 21, or 22 carats). Having less space, \$1 coins were stamped with weight but not fineness. Various reports indicate that Bechtler’s customers brought raw gold varying from 19 to 23.5 carats.¹⁸ By contrast, the US Mint produced all its gold coins in 21.6 carats (90 per cent gold). To produce coins of 21.6 carats from gold of lower average fineness, Bechtler would have had to separate out the silver from the natural alloy, a process that required expensive chemicals and specialized equipment. Instead, more cost-effectively, he used different dies to make heavier coins from 20 carat gold (and lighter coins from 22 carat gold) to include the same standard pure gold mass per coin. Since no customer’s gold was exactly 20 carats, Bechtler blended gold from different sources to produce coins of 20 carats. According to a newspaper account of his operations, ‘The greater part of the Carolina Gold is about 20 carats fine, and in coining it is all brought to that value’.¹⁹

The popularity and trustworthiness of the Bechtler coins was widely acknowledged. In an implied contrast to Templeton Reid, a local newspaper characterized Christopher Bechtler as ‘unquestionably a man of competent science and skill to assay and bring the gold of the mines to a standard value, in the form of coin’, and ‘a man of the strictest honesty’, adding: ‘and we trust, public confidence will not be disappointed in regard to him as it has been with some others who have attempted the assaying and stamping of gold’.²⁰ The superintendent of the Charlotte branch of the US Mint, John H. Wheeler, noted that Bechtler’s product ‘answered the purpose of trade, and the community having confidence in the purity of the metal, much of it is carried by travelers, traders, emigrants and others, into Kentucky, Tennessee and elsewhere ... it was certainly a safe currency’.²¹ US Representative James Graham of North Carolina, whose district encompassed the gold mining area, characterized Bechtler in a Congressional speech as ‘a very good

¹⁶ Barnard, ‘Use of private tokens’. A second branch US Mint for coining Appalachian gold opened in Dahlonega, Georgia, in 1838.

¹⁷ Kagin, *Private gold coins*, pp. 251–65, provides a photographic catalogue of all known Bechtler coins, and a photo of the press.

¹⁸ ‘Gold pieces’, *North Carolina Spectator and Western Advertiser* (2 July 1831), p. 3; ‘Very fine gold’, *North Carolina Spectator and Western Advertiser* (22 Oct. 1831), p. 3.

¹⁹ ‘Bechtler’s gold coin’, *Weekly Raleigh Register* (26 July 1836), p. 1.

²⁰ ‘Gold pieces’, *North Carolina Spectator and Western Advertiser* (2 July 1831), p. 3.

²¹ Wheeler, ‘Gold mines of North Carolina’, pp. 214–15.

assayer, and a very honest man'. He added that the Bechtler pieces 'passed very currently'.²²

There are some published reports of substandard Bechtler coins that call for explanation. In October 1831 at least two newspapers ran similar news items claiming that the Bechtler \$5 coin contained only \$4.86 worth of gold, but the author(s) based the calculation on a coin weight of 6 dwt., which seems to have been rounded downward if based on measurement at all. Surviving examples of the first and second 1831 series of the \$5 coin actually average 6.17 and 6.20 dwt., giving them values of \$5.00 and \$5.03 using the news item's posited value of 81 cents per dwt.²³

More notably, the assayers of the US Mint at Philadelphia, Jacob R. Eckfeldt and William E. Dubois, reported that the \$5 coins produced by Christopher Bechtler (1831–42) that were brought to the US Mint for recoinage were 'deficient from one to six per cent., averaging three per cent. or \$4.85'. Those produced by August Bechtler (1842 and later) varied 'from the full alleged value to a deficit of one and a half per cent', containing \$4.94 on average.²⁴ The assayers do not say whether the deficiency was due to low fineness (below that stamped on the Bechtler coins), or low weight. If the latter, simple wear from circulation of the coins after leaving the mint (rather than mint incompetence or dishonesty) can account for the deficiency. One newspaper put all the blame on low weight, attributable to innocent wear and possibly deliberate filing of the coin by sharp operators (Bechtler coins had beading around the perimeter of the face, but did not have reeded edges to reveal minor filing), maintaining that assays had 'invariably' shown the fineness 'to be strictly correct'.²⁵ The wear explanation is consistent with the older coins having a greater average deficiency.

The assayers did not report on whether US gold coins of similar ages brought in for recoinage were similarly worn. In the Mint Director's annual report for 1902, however, it is reported that 0.900 silver coins that were brought in for recoinage had on average lost 5.3 per cent of their weight.²⁶ Although gold coins generally suffered less loss in circulation than silver coins, because higher-valued coins changed hands less frequently, it is plausible that wear-and-tear could be responsible for an average 3 per cent loss on gold coins brought in for recoinage. Note that coins brought in for recoinage, because they were too obviously worn to pass at par, would be the most heavily worn of those in circulation.

According to Christopher Bechtler's own accounts, his mint produced \$2,241,840.50 in coins and \$1,384,000 in ingots between January 1831 and February 1840. Wheeler of the Charlotte US Mint estimated that total gold mine production in the region during the period was \$10 million, so that miners voluntarily brought 36 per cent of it to the Bechtler mint. During the year 1839, the first full year of operation for the Charlotte branch of the US Mint, miners took nearly as much to the Bechtler mint for coining (\$150,000) as to the Charlotte mint

²² J. Graham, 'Speech ... on the proposition to abolish the branch mints', *Highland Messenger [Asheville, NC]* (20 May 1842), p. 2.

²³ *Macon Telegraph* (8 Oct. 1831); *Dover [NH] Gazette and Strafford Advertiser* (18 Oct. 1831); Kagin, *Private gold coins*, p. 260.

²⁴ Eckfeldt and Dubois, 'New varieties', p. 175.

²⁵ 'Bechtler's gold coin', *Weekly Raleigh Register* (26 July 1836), p. 1.

²⁶ Secretary of the Treasury, *Annual report*, p. 292.

(\$162,767.50), despite the Charlotte mint's zero fees (its operations being funded by the federal government).²⁷

A diary-keeping English traveller named G. W. Featherstonhaugh went out of his way to visit and interview Christopher Bechtler in September 1837. His report of his visit provides first-hand details of the Bechtler mint's operations. He noted that the mint's popularity followed from its established honesty. Bechtler told the visitor that he had produced his first coins from gold that he himself had panned. After an assay by the US Mint in Philadelphia found the coins up to standard, 'all the gold finders in his vicinity, and indeed from greater distances, began to bring their gold to his mint to be coined. At the period of my visit, his gold coinage circulated more freely than that of the United States, which was very scarce'. Observing transactions between miners and Bechtler, Featherstonhaugh reported that 'the most perfect confidence prevailed betwixt them'.²⁸

Featherstonhaugh speculated that Bechtler could have increased his profits by producing coins with less gold but nearly the same weight (to avoid detection by weighing), and asked him why he did not. Bechtler 'answered that it was what an honest man would not do, and if any man were to do it, he would soon be found out, for the gold did not remain long in circulation, since it found its way very soon to the United States mint, where it was necessary for him to keep a good character'.²⁹

Its good character enabled the Bechtler mint to continue in business about 20 years, the volume of business presumably declining with the depletion of local gold sources (Wheeler named 1830–4 as the peak years for gold output from the area's mines).³⁰ Indirect evidence for closure in late 1851 or early 1852 is provided by 1852 being the year of peak volume at the Charlotte US Mint. The Bechtler coins remained popular after Christopher's death in 1842 and Augustus Bechtler's taking over. In 1844, the *Columbia [South Carolina] Chronicle* reported that 'we here make free use of the gold dollars issued by the private mint of the late Mr. Bechtler'.³¹ Indirect evidence of the coins' ongoing popularity can be found in scattered newspaper reports in 1848 and 1849 of attempts to pass counterfeits. Bechtler coins continued to circulate in the southern states even after the mint had closed, at least into the 1860s. One numismatist writes that 'many contracts and agreements of the sixties specified Bechtler gold coins as a consideration rather than the Confederate states currency, or the scant supply of Federal specie'.³²

II. California, 1849–54

Some 15 private mints produced coins from the gold extracted during the California gold rush, including one mint in Oregon and another in Utah. Whereas the Bechtlers' coinage over 20 years can be conservatively estimated at \$3 million, the private mints of the San Francisco area probably coined more than \$36 million

²⁷ Wheeler, 'Gold mines of North Carolina', pp. 216–17.

²⁸ Featherstonhaugh, *Canoe voyage*, pp. 327–30.

²⁹ *Ibid.*, p. 329.

³⁰ Wheeler, 'Gold mines of North Carolina', p. 214.

³¹ 'A gold dollar', reprinted in *Dover [NH] Gazette and Strafford Advertiser* (13 Jan. 1844).

³² C. Griffin, 'United States' first gold dollar minted near Rutherfordton', *Forest City [North Carolina] Courier* (17 Oct. 1929), pp. 14–15.

between 1849 and 1854.³³ The value of privately minted coins still circulating in California was estimated in 1856 at \$8 million, most of the rest having been recoined at one of the US Mints.³⁴

In response to the profitable opportunity to coin gold dust in California, according to numismatic historian Edgar H. Adams, 'The closing months of 1849 saw a perfect avalanche of private gold. Every big Company coming from the East, says one pioneer, brought machinery for coining'.³⁵ One such entrepreneur was John L. Moffat, a leading assayer in New York City, who boarded a ship at the foot of Wall Street in February 1849, bound for California. He had already announced his business plan and received testimonials from leading figures in the Wall Street gold market. The *New York Tribune* reported that Moffat, alert to the eagerness of miners for 'a certain medium of circulation, or a fixed standard for their gold-dust', sailed together 'with proper assistants, and most complete machinery and apparatus, to supply the want of Californians; in other words, to establish a sort of mint, to receive the gold-dust, smelt and assay it, and by their stamp to give it a currency and value, which must, in the absence of a Government character, be received by the merchants and consumers'.³⁶

The coins of Moffat & Co., first issued in July or August of 1849, were very close to full weight. A later assay found that the average gold content of their \$10 coins dated 1849 and 1850 was \$9.975. Despite their being slightly underweight, Adams comments, 'the coins of Moffat & Co. always enjoyed the greatest confidence on the part of the Californians and elsewhere'.³⁷

The coins of the Oregon Exchange Co. likewise 'held at par'.³⁸ The mint was established in February 1849 in Oregon City, Oregon Territory, to coin some part of the flood of gold dust brought by prospectors returning home from California. During its lifespan it produced \$58,500 in \$5 and \$10 coins, erring on the side of above-standard gold content.³⁹

There were also at least four bad apples among the 1849 mints. Coins from the Mormon Mint (made of California gold but struck in Salt Lake City) were soon discovered to be far underweight, and those from the Miners' Bank to be slightly so. What happened in response is crucial for understanding the dynamic operation of the market for private gold coins. San Francisco newspapers like the *Alta California* warned their readers about 'coins issued by irresponsible persons or firms', and cautioned them to 'look well to the lettering lest you be deceived'.⁴⁰ By Adams's account, the underweight coins 'speedily fell into disrepute'. The Mormon coins 'were refused by all, when their spuriousness was once revealed'. Coins from the Miners' Bank, which were about 1.5 per cent underweight, were 'only accepted at twenty per cent. discount. Both issues were soon driven from

³³ Anon., 'The San Francisco mint', *Hunt's Merchants' Magazine and Commercial Review*, 33 (1855), p. 363, estimates that San Francisco mints coined more than \$60 million in total before the San Francisco branch of the US Mint opened in 1854, while Mercantile Trust, 'Banks and banking', p. 122, attributes 39% of San Francisco coinage (during the first quarter of 1851, but I extrapolate) to the US Assay office.

³⁴ Adams, *Private gold coinage*, p. xxvii.

³⁵ *Ibid.*, p. ix.

³⁶ As quoted by *ibid.*, p. 90.

³⁷ *Ibid.*, p. 15.

³⁸ *Ibid.*, p. ix.

³⁹ Gilbert, *Trade and currency*, pp. 85–6.

⁴⁰ 'New coin—caution', *Alta California* (30 Nov. 1850).

circulation'. Holders of the discredited coins 'were forced to sell them at their bullion value and pocket the loss'.⁴¹ To put the size of losses in context, note that the loss incurred from receiving at par and selling at bullion value a coin found to be 1.5 per cent underweight is akin to the loss incurred on fiat money balances from a 1.5 per cent annual inflation rate, except that it is a one-time rather than annual loss, and few people would have held all their money balances in the coins of a single mint.⁴²

Less is known about two other issuers of coins dated 1849 that were found to be underweight, Ormsby & Co. of Sacramento and the Pacific Co. of San Francisco. They seem to have suffered similar fates, as they did not survive to issue coins dated 1850. These two mints lacked screw presses and made their coins by the cruder method of hammering. Assays found that the Ormsby mint's \$10 coins contained only \$9.37 of gold.⁴³

Adams names three more mints as having produced underweight coins in 1849 and then no coins in 1850: Cincinnati Mining and Trading Co., Templeton Reid, and Norris, Grigg [*sic*], and Norris.⁴⁴ However, the first two of these cases are of doubtful significance. No gold coins produced by the Cincinnati Co. have survived, only a few trial pieces struck in copper back east. Kagin speculates that the coin dies were 'probably' used in California to make gold coins for circulation, but even if so, their volume could not have large. Evidence of his continued presence in Georgia indicates that Templeton Reid never operated a mint in California. There are only two coins known to collectors with his imprint on California gold, which Reid probably struck in Georgia.⁴⁵

Reports on the coins of Norris, Gregg, and Norris are mixed. They produced coins that 'seem to have been well received by the general populace'.⁴⁶ Among the first to strike coins in 1849, stamped 'San Francisco' although produced in the outlying town of Benicia, the company then moved to Stockton, California, closer to the diggings, and minted there in 1850. The assayers of the US Mint in Philadelphia, however, reported that the fineness of the Norris, Gregg, and Norris coins varied from 0.870 to 0.892 in the three coins they assayed, so that only the third coin came up to \$4.98 in value (silver alloy included).⁴⁷ The coins were stamped 'California gold without alloy', meaning that their fineness would vary with the percentage of naturally alloyed silver in the gold samples used. Unlike the Bechtlers' mint, the Norris, Gregg, and Norris mint did not stamp its coins with a carat rating or make its lower-fineness coins heavier to compensate.

Moffat & Co., whose perceived honesty allowed them to continue minting, declared in an 1850 letter to a newspaper: 'In regard to the value of our coins, we assert, and submit it to the test of any assaying establishment, that each piece is worth more than it purports to be, and will pay a handsome profit to any one who will take them to the Government in bullion'. It was the firm's practice to give

⁴¹ Adams, *Private gold coinage*, p. ix. The 20% discounting of Miners' Bank coins was reported in two local newspapers; Kagin, *Private gold coins*, p. 102.

⁴² Rockoff, *Free banking era*, p. 151, likens the average loss on banknote defaults during the US 'free banking' era to a 2% inflation rate.

⁴³ Adams, *Private gold coinage*, pp. 61, 64; Kagin, *Private gold coins*, pp. 70, 98.

⁴⁴ Adams, *Private gold coinage*, p. ix.

⁴⁵ Kagin, *Private gold coins*, pp. 106, 67–8.

⁴⁶ *Ibid.*, p. 64.

⁴⁷ Eckfeldt and Dubois, 'New varieties', p. 175.

official silver coins on demand at their office in par exchange for their own gold coins.⁴⁸

It is impossible to say exactly what fraction of the private California gold coins put into circulation were substandard, because most mints' output quantities are not known. Entry into the minting trade was open, allowing fraudulent or incompetent minters to introduce substandard coins into circulation, but it is clear that such coins did not persist. Because Californian money users were free to discount or reject bad money, and soon learned which coins were underweight, the bad (underweight) money did not drive out the good (full-weight) money. The legally fixed exchange rate required for Gresham's Law to operate was absent. On the contrary, the good money drove out the bad. In Adams's estimation, 'the pieces struck by Moffat & Co. and their business successors probably exceeded both in number and value those of any of their competitors'.⁴⁹

At least five significant additional mints arose in San Francisco during 1850–3 to fill the gap created by the demise of the suspect issuers and the melting of their coins. Four of the five were honestly run.

Baldwin & Co. in 1850–1 produced something more than \$1 million face value in \$5, \$10, and \$20 gold coins. The US Assay Office in San Francisco (which had opened in September 1850) announced in March 1851 that its assay found the Baldwin coins about 2 to 3 per cent underweight, a finding soon reported by local newspapers. The firm suffered the same fate as bad-apple 1849 mints. Merchants immediately refused the coins except at a 5 per cent or greater discount. Many of the coins were taken to the US Assay Office to be re-struck into its octagonal \$50 coins, 'and by December there was little Baldwin coinage left in circulation'. Baldwin himself reportedly fled to Panama in April 1851.⁵⁰

Dunbar & Co. produced gold coins between January and April 1851. After the assay that discredited Baldwin coins, Dunbar himself sent his \$5 coins to the US Assay Office for evaluation, but the office declined to assay them. Had the Assay Office agreed, its certification might subsequently have been routinely sought by new private mints. Dunbar then wound his operation down, even though his coins were honestly made. A later assay by a former California state assayer found his \$5 coins to contain slightly more than \$5 worth of gold.⁵¹

The \$5 and \$10 coins of Dubosq & Co., issued in 1850 and 1851, initially 'enjoyed a wide circulation'. An assay at the US Mint rated their coins at par: a \$1,000 mixed parcel had a bullion value of \$1,000.20. A local assay, however, found \$5 and \$10 coins to have values of \$4.96 and \$9.93 respectively. Although the coins were worth a few cents more than their face values if one counted the value of the naturally alloyed silver in the coins as well, they nonetheless went out of circulation and their gold was recoined.⁵²

The reputable assaying firm of Wass, Molitor, & Co. issued \$5 and \$10 gold coins in 1852. The San Francisco *Herald* reported that its coins, in addition to being 'a beautiful specimen of art', were of a fineness and weight that the public would find 'highly satisfactory'. It added: 'The leading bankers, too, sustain and encourage this

⁴⁸ Adams, *Private gold coinage*, pp. xii, 17.

⁴⁹ *Ibid.*, p. 57.

⁵⁰ Adams, *Private gold coinage*, p. 73; Kagin, *Private gold coins*, pp. 109–13 (quotation p. 112).

⁵¹ *Ibid.*, p. 113.

⁵² *Ibid.*, p. 115 (quotation); Eckfeldt and Dubois, 'New varieties', p. 182; Adams, *Private gold coinage*, pp. 71–2.

issue, and will receive it on deposit'. The company continued in business for at least another three years. In 1855, Wass, Molitor & Co. issued \$20 and \$50 coins. The *Herald* reported: 'The coin is above the United States standard, and is confidently received throughout the State'.⁵³

The assaying firm of Kellogg & Co., headed by John Kellogg formerly of Moffat & Co., issued popular \$20 gold coins in 1854 and 1855. Their considerable output has been estimated at \$6 million worth in face value. The San Francisco *Bulletin* in April 1856 reported that 'the private coinage of Kellogg & Co. ... has always stood fair, and has never been questioned'.⁵⁴

Alongside the private mints of San Francisco, but not directly competing with them in the production of ordinary denominations of gold coins, the US government in 1851 opened an official Assay Office, run by Moffat & Co. under a contract from the US Treasury and supervised by a federally appointed US assayer, Augustus Humbert. Miners and merchants could take gold dust to be turned into coins and ingots of \$50 and higher. The \$50 coins were too high-valued for ordinary transactions, but were in demand because they were accepted (unlike private coins) in payment of import duties at the Customs House. The Assay Office gave way to a branch US Mint in 1854, which produced gold coins in a full range of denominations. The Mint purchased its building and machinery from Curtis & Perry, the successor firm to Moffat & Co. after John L. Moffat retired.⁵⁵ The US Mint assayed and coined fluxed gold at no charge to the bearer. The last of the private mints ceased issuing gold coins shortly after the opening of the branch US Mint.

III. Colorado, 1860–2

The California gold rush had a smaller echo in the Colorado gold rush beginning 1858. Colorado's gold miners were served by the private mint established in Denver by Clark, Gruber & Co., the aforementioned bankers who began as dealers in gold dust and nuggets. The company minted an estimated \$3 million in coins, in denominations of \$2.5, \$5, \$10, and \$20, dated 1860 and 1861. Their coins were quite popular, in part because they were known to contain (in unworn condition) a quantity of gold slightly above the US Mint's standard. A former US comptroller of the currency, John Jay Knox, wrote that the coins 'passed current throughout the mining region, and all bankers of the East to whom they were known paid a premium for them'.⁵⁶

An 1861 assay by the US Mint in Philadelphia confirmed that the Clark, Gruber & Co. coins were 'of professed value, or slightly over'. For example, their \$5 coin dated 1861 contained \$5.03 worth of gold. Their 1860 coins were minted from the natural gold-silver alloy found in Colorado, which was less fine (0.828) than the 0.900 standard of US Mint coins, but their mass was greater to compensate. The 1860 coins proving too prone to wear, the company modified the alloy to make

⁵³ *Ibid.*, pp. 79–80, 82.

⁵⁴ *Ibid.*, pp. 86, xxvi–xxvii.

⁵⁵ *Ibid.*, pp. 13, 52. The companies were partnerships, not corporations, and so had to be reconstituted on the death or retirement of a partner.

⁵⁶ Knox, *History*, p. 830.

its 1861 issues more durable.⁵⁷ The company appears to have stopped coining in 1862, and turned exclusively to producing gold ingots, coincident with negotiations having begun over selling its coinage operations to the federal government.⁵⁸ In 1863 the federal government bought Clark, Gruber & Co.'s mint operation and turned it into a US Assay Office.

Two other smaller operations, about which less is known, also briefly minted gold coins in Colorado towns near the gold fields south of Denver. John Parsons & Co. operated for only a few months of 1860. The *Rocky Mountain News* in September 1861 reported an assay finding that the \$5 coin of J. J. Conway & Co. had a bullion content of \$5.01.⁵⁹

The era of American private gold coins ended definitively in June 1864 when the US Congress prohibited the making or passing of private coins.⁶⁰ Before 1864 the US Mint did not have a legal monopoly. The US Constitution (article I, section 8) explicitly granted Congress the power 'To coin Money, regulate the Value thereof, and of foreign Coin', but not the exclusive power. It left the door open to private coinage and countenanced the continued use of foreign coins. The granted power has been broadly enough interpreted, however, to permit the 1864 legislation that banned private coinage, and even a Depression-era law that banned ownership of gold coins from 1933 until it was repealed in 1975.

Before 1864 the US Mint's seigniorage potential was not exploited. It charged zero fees for its standard coinage service and ran at a loss to taxpayers. This underpricing policy is enough to explain why the US Mint took business from private mints once it opened a branch mint or an assay office near enough to the gold fields. Furthermore, in San Francisco, tax policy generated a preference for official coins: only official coins were accepted in payment of customs duties on imported goods. That the federal government did not yet use money production as a source of revenue helps to explain why it tolerated private gold mints—until changing circumstances made private coins a threat to revenue. The 1864 prohibition came soon after the federal Treasury began issuing an irredeemable 'greenback' paper currency for revenue during the US Civil War. At that point the continued availability of gold coins as a substitute currency would to some extent have constrained the Treasury's real seigniorage revenue.

IV. Theoretical criticisms and the evidence

The influential utilitarian philosopher and economist Henry Sidgwick argued that private mints will chronically produce inefficiently low-quality coins because the social benefits of high-quality coins will not be taken into account by any individual user. Wrote Sidgwick:

The ordinary advantages to the community from competition, in the way of improving processes of manufacture, is hardly to be looked for in the case of coin. It is in the interest of the community that coins should be as far as possible hard to imitate, hard to tamper

⁵⁷ Robins, 'Clark, Gruber & Company'; Lee and Frajola, 'Gold coinage of Colorado'.

⁵⁸ Kagin, *Private gold coins*, pp. 229–30.

⁵⁹ *Ibid.*, pp. 219–24.

⁶⁰ Sanger, ed., *Statutes at large*, pp. 120–1. The prohibition remains in force, and was used in 2011 to convict an individual who had minted silver pieces of his own design intended for circulation; White, 'Troubling suppression'.

with, and qualified to resist wear and tear; but the person who procured the coin from the manufacturer—who would want, of course, to pass the money, and not to keep it—would be prompted by no motive of self-interest to aim at securing excellence in these points.⁶¹

Sidgwick erred. Precisely because the person (such as a gold miner) who procures coins wants to pass them on without difficulty, it is in that person's self-interest to procure coins from a mint whose coins are generally regarded as excellent, coins that hardly anyone is reluctant to accept out of concern for low quality. The interest of the community (that is, of other traders) in coins that are tamper-evident, wear-resistant, and hard to imitate is thereby brought to bear on the individual who chooses where to trade his gold dust for coins and on the private mints competing for that business. What Sidgwick thought were external benefits are actually internalized. To attract customers, private mints have to compete on the high quality of their coins.

Sidgwick's logic implies that almost nobody will reject or discount low-quality or substandard coin. Any transactor will readily take it at face value because she assumes that the *next* person to whom she wishes to pass it will do the same. No matter the coin's quality, the argument supposes, the probability that the next person will reject or discount it is negligibly low. But the people of California did in fact reject or heavily discount substandard coins. Mints that produced substandard coins saw acceptance dry up and their businesses fail once the word got out. Successful private mints, by contrast, produced full-weight coins no more susceptible to imitation, tampering, or wear than official coins. Recall that Clark, Gruber & Co. hardened their coins when they found that the early issues were too prone to wear. Issuing trustworthy coins was the only way to survive in a competitive minting business with a quickly informed public.

Conant quoted Sidgwick's argument and added a concern about fraud. The 'goldsmiths and private coiners' would deliberately 'reduce the amount of pure metal in the coin' because they 'presumed upon the general acceptability of money and the ignorance of many who received it'.⁶² But while some coiners tried this tactic, and others were incompetent, we have seen that their businesses did not survive. The 'ignorance of many' was dispelled once newspapers published the results of assays.

Carl Menger, despite having famously argued that money (and precious metallic coinage in particular) had emerged spontaneously from market exchange rather than from state edicts, thought it evident from 'wide experience' that 'private coinage has met the general requirements of trade only imperfectly'. He did not cite the American experience with private gold coinage, or otherwise indicate what experience he had in mind. Menger asserted that:

as a rule, only government has an interest in, and will even bear the cost of, continually supplying the economy with coin-money according to the requirements of trade; for only government also has the instruments of power at its disposal for effectively protecting the coinage against counterfeiting and the media of exchange in circulation against fraudulent reductions in weight and other kinds of violation harmful to trade.⁶³

⁶¹ Sidgwick, *Principles*, p. 452.

⁶² Conant, *Principles*, pp. 132–3.

⁶³ Menger, 'Money', pp. 45–6.

However, in the American experience, competing private mints did supply (because they *did* have an interest in doing so) all the coins demanded by gold miners and others at cost-covering fees. Given equal access to relevant coining technologies, there is no reason to think that privately minted coins would be easier to counterfeit, or to tamper with once in circulation. The profit motive incentivizes a private mintmaster to enhance demand for his coins by making them more difficult to counterfeit and more tamper-evident.

Menger elsewhere declared:

The best guarantee of the full weight and assured fineness of coins can, in the nature of the case, be given by the government itself, since it is known to and recognized by everyone and has the power to prevent and punish crimes against coinage. Governments have therefore usually accepted the obligation of stamping the coins necessary for trade.⁶⁴

However, government as law enforcer could prevent substandard products in coinage as it does other industries, by inspection and grading, or by prosecution of fraud after the fact, without itself minting coins. Menger thus committed a logical leap when he suggested that state powers against crime make it efficient for the state to mint coins, let alone to monopolize the minting of coins. Also, as we have seen in American private gold coins, the publication of assay results effectively drove substandard coins from the market in short order even without official inspection or legal prosecution.

Friedman and Schwartz similarly proposed that, in the production of widely trusted coins, 'the government's visibility and authority gave it an advantage over private mints even when it did not prohibit them'.⁶⁵ A level playing field with an unsubsidized government mint would be needed to test this hypothesis.

In response to Spencer's defence of private coinage as a matter of free-market principle, Jevons argued that coinage was 'an exceptional case' where the principle 'quite fails'. It fails because Gresham's Law shows 'that better money cannot drive out worse'. As a result, 'if coining were left free, those who sold light coins at reduced prices would drive the best trade'.⁶⁶ Jevons was confused about the content of Gresham's Law.⁶⁷ Gresham's Law does not say that bad money drives out good under free currency competition, but rather that legally overvalued money drives out legally undervalued money when authorities enforce a fixed exchange rate between two types of money (for example, 1:1 between worn and full-bodied coins, or 16:1 between silver and gold coins) that differs from the market exchange rate. The conditions for Gresham's Law did not apply to American private gold coins because they had no legally fixed value at the US Mint or in discharging dollar-denominated debts. Underweight coins were not accepted at par but were discounted.

Among recent economists, Goodhart has argued that the information asymmetry problem (together with the problem of defending a gold inventory against thieves) is responsible for coinage coming under government control: '[T]he costs of identifying the true value quality of the metals included in the minted coin leads

⁶⁴ Menger, *Principles*, pp. 282–3.

⁶⁵ Friedman and Schwartz, 'Government', p. 43.

⁶⁶ Jevons, *Money and the mechanism*, p. 64.

⁶⁷ As noted by Selgin, 'Gresham's Law'.

to time inconsistency. The mint operator ... will always be tempted to debase the currency in pursuit of a quick and immediately larger return'.⁶⁸ American private mints that tested the profitability of debasement, by contrast, did not earn larger returns. Newspaper reports about assays made it cheap for the public to learn the true bullion values of new brands of coins. Debasement was quickly exposed. Surviving mint operators attracted many more customers by not debasing.

Quinn offers a sophisticated statement of the asymmetric-information argument. The benefit of using trustworthy coins rather than raw gold dust is to avoid the costs of weighing and testing fineness in each transaction. The introduction of untrustworthy coins negates the benefit by requiring coin-users to 'either expend resources to assay coins or they avoid trading out of fear that they will be underpaid'. An information asymmetry ('the manufacturer knows the coin's metal content, and others do not') creates a moral hazard problem, allowing private mints to 'create coins with less metal and pass them off as having full metal'. In the manner of Akerlof's well-known 'lemons' problem, the information asymmetry also creates 'an adverse selection problem: people in the know will hoard coins with more metal and pass on coins with less metal'.⁶⁹

The American evidence, by contrast, indicates that coin-users can avoid being victimized by these potential moral hazard and adverse selection problems by recognizing when they are not 'in the know' about the true metallic content of coins being offered to them, and on such occasions refusing or discounting such coins heavily. This is the same strategy that merchants followed when offered payment in gold dust. It is the strategy that Californians adopted toward dubious brands of coins in the absence of a positive assay report in the newspapers.

Quinn goes on to argue conversely that good coins, widely known to be full-weight, create what he calls a positive 'network externality':⁷⁰ the more widely accepted a coin, the more useful it becomes. As he recognizes, however, a positive reputation will bring more customers and more profit to the mint. This profit means that the positive effect is internalized. Network effects are Pareto-relevant externalities only if they are uncaptured. The premium that people will pay for coins of a widely trusted brand is captured by the mint that provides them. These revenues incentivize the mint to produce trustworthy coins. Producing reputable coins in order to achieve large and lasting circulation networks was exactly the practice of successful private mints in the US such as the Bechtlers; Moffat & Co.; Wass, Molitor & Co.; Kellogg & Co.; and Clark, Gruber & Co.

Quinn recognizes the possibility that 'competition could solve the quality problem', noting that money-changers and other large-volume coin transactors have a significant incentive to scrutinize coin quality. He identifies the reputational mechanism that promoted honest coins in California: 'A reputation for less metal could lead to a mint gaining a bad reputation and becoming shunned'. But he imagines, based on events in the early modern Netherlands where multiple *state-owned* mints engaged in a race to the bottom, a scenario where reputational mechanisms do not work to ensure quality, because 'savvy customers strike deals with mints to produce debased, or light, coins: coins with less metal than expected',

⁶⁸ Goodhart, 'Two concepts', p. 412.

⁶⁹ Quinn, 'Dutch bank finance', pp. 65–6; Akerlof, 'Market for "lemons"'.
⁷⁰ Quinn, 'Dutch bank finance', p. 65.

sharing in the debasement profits at the expense of unwitting later recipients.⁷¹ The failure of reputation to ensure quality here depends on unwitting coin-accepters, who are persistently victimized yet do not or cannot gather information to remedy their own ignorance. California merchants, by contrast, were witting and able to gather information.

Quinn argues that the problem can persist when the cost of identifying the source of bad coins may be high. Aware that bad coins are a possibility, however, coin-users can (if not effectively prevented by law or government policy) refuse any coin that does not clearly identify where it was minted. They can insist on clearly branded coins. American private mints deliberately placed brand names on the faces of coins to attract customers by minimizing the customer's mint-identification cost. By contrast, in the early modern Netherlands case that motivates Quinn's concerns, coins from multiple sources were apparently not marked with distinguishing brand names. All the mints were *branches of the state mint*, and all 'offered the same coins'. If nothing on a coin identified which state branch mint had issued it, so that the coins effectively lacked distinguishing brand names, then coin-users had no way (short of assaying all coins) to refuse or discount coins from those state mints known to produce substandard coins. Reputation could not then prevent dishonest mintmasters and 'savvy customers' from making side deals to share debasement profits to be gained at the expense of unwitting customers. As Klein has stressed, however, freely competitive markets in money, as in other 'experience' goods where point-of-sale inspection does not establish quality, can use distinguishable brand names for quality assurance.⁷²

That a state monopoly with multiplier mints 'did not solve the cooperative debasement problem' does not then point to a problem with competing private mints. Coins in the Netherlands case lacked distinguishing brand names as a matter of government policy. By contrast, competition compelled American private mints to stamp coins with prominent brand names, which enabled the reputational mechanism that disciplined the mints.

Today we no longer have circulating gold coins, publicly or privately minted, but investors annually buy millions of dollars in gold coins and 'biscuits' from private firms like Credit Suisse, the Perth Mint, Johnson Matthey, and Engelhard (as well as from national mints). Their products are prominently stamped with the manufacturer's brand name as well as the weight and fineness (typically 0.999). The value of maintaining an honest brand reputation ensures that fraudulent underweighting or impurity is not a known problem when buying directly from reputable present-day private gold mints (although counterfeiting of their brand marks remains a problem in secondary markets).

V. Conclusion

In the American gold rushes, competing private mints that produced known high-quality and full-weight gold coins succeeded while mints that produced low-quality or underweight coins went out of business. This experience speaks against the hypothesis that private mints will chronically produce inefficiently low-quality

⁷¹ *Ibid.*, p. 66.

⁷² Klein, 'Competitive supply of money'.

or underweight coins. Contrary to Jevons, gold coinage was not an exceptional industry where competition failed. Fraudulent or incompetent production by private mints was a problem at first, but the rapid spread of assay results enabled the public to reject substandard coins. Only competent and honest mints survived longer than a few months. Problems associated with information asymmetry turned out to be transitory. The market for gold coins was not one where, in the words of Akerlof, 'dishonest dealings tend to drive honest dealings out of the market'.⁷³ It was rather a case where publicity and competition from honest mints drove out dishonest mints.

The American experience with private gold coins echoes the ancient Lydian experience with private electrum ingots as related by A. R. Burns. Asymmetry of information was present in the stamping of the ingots: the seal on an ingot might overstate its gold content 'in a manner difficult for the ordinary person to detect'. Some mints took advantage. To overcome the problem of falsely stamped ingots, Lydian traders learned which brand names could be trusted, and differentially accepted them over others: 'Marks which experience proved to be reliable would tend to gain this priority'. In the choice between private and public mints, 'There is no evidence that, as a general rule, the officers of the royal or public treasury, by their greater honesty, made the royal or civic seal a mark more reliable than the seals of the bankers'.⁷⁴

These findings may be seen as adding empirical evidence to the literature on the stability and efficiency of competitive money issue, which has focused mostly on bank-issued money (banknotes and transferable deposits). Historical work has mostly found that 'free banking' regimes of lightly regulated note-issuing banks were more growth-enhancing and more stable than banking regimes that restricted competition, supporting claims advanced early on by Adam Smith, though some authors have been sceptical.⁷⁵ Historical investigation of competition in the issue of metallic money has been rarer, with the conspicuous exception of Selgin's study of English copper coins during the industrial revolution.⁷⁶

Of course, a finding that private gold mints in the American experience overcame the information asymmetry problem hardly settles the general policy issue of market competition versus state monopoly in money, as many other arguments have been made against relying on a competitive private money regime, whether on a metallic or a non-metallic standard. In two recent contributions to the debate, Fernández-Villaverde and Sanches build a search model in which a 'purely private monetary system does not provide the socially optimum quantity of money', while in the model of Benigno and Robatto government provision of liquidity can increase welfare by supplementing private liquidity.⁷⁷

For research in monetary history, the absence of chronic market failure in American private gold coinage suggests that explanations for government monopolization of precious metallic mints should be sought elsewhere than in market failure scenarios where government steps in to improve the quality of coins.

⁷³ Akerlof, 'Market for "lemons"', p. 495.

⁷⁴ Burns, *Money and monetary policy*, p. 78.

⁷⁵ As surveyed by Briones and Rockoff, 'Economists', or White, 'Free banking in history'.

⁷⁶ Selgin, *Good money*.

⁷⁷ Fernández-Villaverde and Sanches, 'Currency competition', p. 9; Benigno and Robatto, 'Private money creation'.

An alternative reason for the state monopolization of precious-metallic coinage, at least in ancient and medieval times when government mints notoriously debased the silver coinage, can be found in the historical political economy literature that points to a fiscal motive, the seigniorage revenue to be derived from a state monopoly of the mints.⁷⁸ Why national mint monopolies persisted in specie-standard countries like the UK and the Dutch Republic, even after reforms that ended the use of debasement as a revenue device, is a question calling for further research.⁷⁹

Any relevance that the findings here have for contemporary policy issues, in a world of fiat money, is only indirect or by analogy. Still, with national central banks currently thinking about issuing a new product, ‘central bank digital currency’, it is useful to remind ourselves that, to benefit the public, such a project should be based on evidence rather than assumptions about the existence of a market failure in need of a remedy.

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Footnote references

- Adams, E. H., *Private gold coinage of California, 1849–55, its history and its issues* (Brooklyn, NY, 1913).
- Akerlof, G. A., ‘The market for “lemons”: quality uncertainty and the market mechanism’, *Quarterly Journal of Economics*, 84 (1970), pp. 488–500.
- Babelon, E., *Les origines de la monnaie considérées au point de vue économique et historique* (Paris, 1897).
- Barnard, B. W., ‘The use of private tokens for money in the United States’, *Quarterly Journal of Economics*, 31 (1917), pp. 600–34.
- Benigno, P. and Robatto, R., ‘Private money creation, liquidity crises, and government interventions’, *Journal of Monetary Economics*, 106 (2019), pp. 42–58.
- Briões, I. and Rockoff, H., ‘Do economists reach a conclusion on free-banking episodes?’, *Econ Journal Watch*, 2 (2005), pp. 279–324.
- Burns, A. R., *Money and monetary policy in early times* (1927).
- Coase, R. H., ‘The lighthouse in economics’, *Journal of Law and Economics*, 17 (1974), pp. 357–76.
- Conant, C. A., *The principles of money and banking*, vol. I (New York, 1905).
- Eckfeldt, J. R. and Dubois, W. E., ‘New varieties of gold and silver coins and bullion’, *Bankers’ Magazine and Statistical Register*, 1 (1851), pp. 175–91.
- Featherstonhaugh, G. W., *A canoe voyage up the Minnay Sotor*, vol. 2 (1847).
- Fernández-Villaverde, J. and Sanches, D., ‘Can currency competition work?’, *Journal of Monetary Economics*, 106 (2019), pp. 1–15.
- Friedman, M. and Schwartz, A. J., ‘Has government any role in money?’, *Journal of Monetary Economics*, 17 (1986), pp. 37–62.
- Gilbert, J. H., *Trade and currency in early Oregon* (New York, 1907).
- Glasner, D., ‘An evolutionary theory of the state monopoly over money’, in K. Dowd and R. H. Timberlake, Jr., eds., *Money and the nation state: the financial revolution, government, and the world monetary system* (New Brunswick, NJ, 1997), pp. 21–45.
- Goodhart, C. A. E., ‘The two concepts of money: implications for the analysis of optimal currency areas’, *European Journal of Political Economy*, 14 (1998), pp. 407–32.
- Jevons, W. S., *Money and the mechanism of exchange* (New York, 1875).
- Kagin, D., *Private gold coins and patterns of the United States* (New York, 1981).
- Karaman, K. K., Pamuk, S., and Yıldırım-Karaman, S., ‘Money and monetary stability in Europe, 1300–1914’, *VoxEU* blog (24 Feb. 2018), <https://voxeu.org/article/money-and-monetary-stability-europe-1300-1914> (accessed on 3 March 2021).
- Klein, B., ‘The competitive supply of money’, *Journal of Money, Credit and Banking*, 6 (1974), pp. 423–53.
- Knox, J. J., *A history of banking in the United States*, rev. and updated by B. Rhodes and E. H. Youngman (New York, 1900).

⁷⁸ Glasner, ‘Evolutionary theory’; Motomura, ‘Best and worst of currencies’; Selgin and White, ‘Fiscal theory’; Svensson, ‘Periodic recoinage’.

⁷⁹ Karaman, Pamuk, and Yıldırım, ‘Money and monetary stability’.

- Lee, L. and Frajola, R., 'Gold coinage of Colorado during the Territorial Period' (2008), <https://www.rfrajola.com/MayerGold/MayerGold.htm> (accessed on 3 March 2021).
- Lopez, R. S., 'An aristocracy of money in the early middle ages', *Speculum*, 28 (1953), pp. 1–43.
- Marshall, A., *Money, credit and commerce* (1923).
- Menger, C., *Principles of economics*, J. Dingwall and B. F. Hoselitz, trans. ([1871] New York, 1981).
- Menger, C., 'Money', L. B. Yeager and M. Streissler, trans., in M. Lätzer and S. W. Schmitz, eds., *Carl Menger and the evolution of payments systems: from barter to electronic money* ([1909] Cheltenham, 2002), pp. 25–107.
- Mercantile Trust Company of California, 'Banks and banking in California in the fifties', *Mercantile Trust Review of the Pacific*, 13 (1924), pp. 118–22.
- Motomura, A., 'The best and worst of currencies: seigniorage and currency policy in Spain, 1597–1650', *Journal of Economic History*, 54 (1994), pp. 104–27.
- Quinn, S., 'Dutch bank finance, 1600–1800', in G. Caprio, Jr., ed., *Handbook of key global financial markets, institutions, and infrastructure* (2013), pp. 65–71.
- Robins, W., 'Clark, Gruber & Company', in *Program of the 2012 American Numismatic Association Denver convention*, http://onlinedigitalpublishing.com/display_article.php?id=1048819 (accessed on 31 March 2021).
- Rockoff, H., 'The free banking era: a reexamination', *Journal of Money, Credit and Banking*, 6 (1974), pp. 141–67.
- Rothbard, M. N., *What has government done to our money?* (Auburn, Ala, 2010)
- Sanger, G. P., ed., *The statutes at large, treaties, and proclamations of the United States of America, from December 1863 to December 1865*, vol. XIII (Boston, 1866).
- Selgin, G., 'Gresham's law', in R. Whaples, ed., *EH.Net encyclopedia* (2003), <http://eh.net/encyclopedia/greshams-law/> (accessed on 31 March 2021).
- Selgin, G., *Good money: Birmingham button makers, the Royal Mint, and the beginnings of modern coinage, 1775–1821* (Ann Arbor, Mich, 2008).
- Selgin, G. and White, L. H., 'A fiscal theory of government's role in money', *Economic Inquiry*, 37 (1999), pp. 154–65.
- Sidgwick, H., *Principles of political economy* (1883).
- Spencer, H., *Social statics* (1851).
- Spooner, L., *A letter to Grover Cleveland* (Boston, Mass, 1886).
- Svensson, R., 'Periodic recoinage as a monetary tax: conditions for the rise and fall of the bracteate economy', *Economic History Review*, 69 (2016), pp. 1108–31.
- Summers, B., 'Private coinage in America', *Freeman*, 26 (1976), pp. 436–40.
- Sumner, S., 'Privatizing the mint', *Journal of Money, Credit and Banking*, 25 (1993), pp. 13–29.
- Wagner, C., 'California gold 1849–65', *Reason* (1976), <https://reason.com/1976/01/01/california-gold/> (accessed 31 March 2021).
- Wheeler, J. H., 'Gold mines of North Carolina: substance of a report ... dated February 10, 1840', in *The American almanac and repository of useful knowledge*, vol. 12 (Boston, Mass, 1841), pp. 211–17.
- White, L. H., 'The troubling suppression of competition from alternative monies: the cases of the Liberty Dollar and E-gold', *Cato Journal*, 34 (2014), pp. 281–301.
- White, L. H., 'Free banking in history and theory', in L. H. White, V. J. Vanberg, and E. A. Köhler, eds., *Renewing the search for a monetary constitution: reforming government's role in the monetary system* (Washington, DC, 2015), pp. 187–211.
- White, L. H. and Boudreaux, D. J., 'Is nonprice competition in currency inefficient?', *Journal of Money, Credit and Banking*, 30 (1998), pp. 252–60.

Official publication

Secretary of the Treasury, *Annual Report of the Secretary on the State of the Finances* (Washington, DC, 1902).