

slender but densely packed book is a significant contribution to Marshall studies and has benefited greatly from his keen grasp of philosophical thought.

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Thomas J. Sargent and François R. Velde's *The Big Problem of Small Change* (Princeton and Oxford: Princeton University Press, 2002), pp. xxii+405, \$55. ISBN 0-691-02932-6.

A small problem of small change occurred sometime during the Great Inflation of 1967–82. Along with prices generally, the price of copper rose until, briefly, the copper in a U.S. penny was more valuable than the penny itself. Predictably, a shortage of pennies followed as pennies began to be hoarded for their copper. The problem appears paradoxical from the point of view of the quantity theory of money. An *excess* of money generates rising prices, but high prices produce a shortage of money—at least in small denominations. It was a small problem: In the short run, changes in the relative price of copper reduced the commodity value of the penny fairly quickly below its face value. In the longer run, the copper content of the penny was reduced. In any case, pennies were inessential. They might be needed for gumball machines, but even gumballs could be purchased in larger quantities for larger coins in the 7–11.

Although small, this problem gives the flavor of the monetary dysfunction at the center of Sargent and Velde's beautiful book. Sargent and Velde use the history of recurrent shortages of small coins and the political and commercial reactions to them as a window on the development of the monetary system from the Middle Ages up to the mature form that it took under the gold standard by the end of the nineteenth century.

The common currency of Europe in the period after Charlemagne was the silver penny. Despite its small sounding name, the silver penny was a valuable coin. Eventually, fractional coins were introduced, but they were still more valuable than our modern coins: In Florence in the second half of the fourteenth century, the smallest silver coin was the *grosso* . . . : it could purchase 5 liters of the cheapest wine, 1 kg of mutton, 20 eggs, or 1 kg of olive oil; or pay a month's rent for an unmarried laborer . . . (p. 48). The penny was nonetheless too small for larger trade, so states introduced larger coins, sometimes gold, sometimes silver. The larger coins generally were regarded as the primary currency—the units of account. But in many cases, even when the larger coins were themselves made of silver, the value of the metal diverged from the face value. Had coins

always traded at their commodity value, this would not have presented any problem, but if coins traded at tale, the problem of small change could arise with any general inflation, owing either to influx of bullion or to debasement of the principal coinage. Sargent and Velde argue that the monetary system was now beset by a *big* problem of small change. Crisis after crisis was met with various temporizing solutions: for example, siege monies or privately issued tokens.

Ultimately, the big problem was solved as countries adopted the "standard formula," a large denomination coin—in England the gold guinea, in France the napoleon—served as legal tender so long as it maintained full weight. The fractional coinage was a pure token consisting of overvalued, non-monetary metal. Except in rare cases, such as the copper penny in the small problem mentioned at the outset, inflation could no longer generate a shortage of small coins.

The historical puzzle is why this formula took so long to become standard. One factor was the need for advances in the technology of minting. Early coins were struck by hand with a hammer and pile. Not only were the coins irregular in shape, they were inconsistent. When their metal was valued, it was easy to clip or shave them. And, even when they were pure tokens, they were easy to counterfeit. Eventually, the crude hammer and pile gave way in turn to the screw press, the cylinder press, and the steam press. With higher capital costs, minting became a much more restricted technology. With more sophisticated methods of minting, full-bodied coins could have milled edges, and tokens could be struck that were costly to counterfeit.

A second factor was intellectual (legal and economic). So, long as "real" money was commodity silver or gold, tokens whose substance was cheaper than face value seemed a cheat. Sargent and Velde nicely document the philosophic and legal discussions surrounding medieval monetary theory. Jurists had to resolve, for example, whether a contract specified in a particular coin (a Florentine *florino* or a French *sou*) had to be settled in coins of the same name or in coins of the same metallic content as when the parties first engaged. These theoretical discussions and legal judgments eventually drove a wedge between the value of money *qua* money and the value of money *qua* commodity.

Although at the start of their story, money already has a long history, Sargent and Velde do an excellent job of conveying both its institutional complexity and its continuous evolution. They provide a nice antidote to plausible Mengerian fairy tale—highly appealing to economists of the Austrian school and other libertarians—in which commodity money arises perfectly spontaneously in private trade and is captured by the king, who provides the minor service of stamping the coins with a recognizable standard, while opening the currency up to the major liability of inflationary mischief. Sargent and Velde's account provides a more nuanced tale in which the State and the courts (especially in the guise of contract law), as well as custom and commercial necessity, play complexly interwoven parts.

Ultimately, the monetary system is a technology with technological progress. Precious metal is not money; it is only one input into the production of the monetary system. This history of Technology is both a history of things and a

history of ideas. Sargent and Velde's book is a contribution to economic history, but it is of interest to the historian of economics, because it demonstrates that economic theory was not a passive onlooker but an essential part of the story.

In deference to the economic style for which Sargent is well-known, the history in the book is buttressed by a formal monetary model characterized by two cash-in-advance constraints—one for goods that can be purchased only with small coins and one for goods that can be purchased with either small or large coins. The chief advantage of the models is that they give results of the right flavor: general price inflation leads to shortage of small coins. The use of cash-in-advance monetary models, however, points to one shortcoming of the book. It is hard to believe that having cash in advance was a barrier to effective transactions. Aside from any particular historical evidence, just the fact that even small coins in the Middle Ages were large, relative to incomes and day-to-day expenditure, suggests that trade credit was common. The failure to locate the monetary system in a larger credit system is a standing problem in monetary economics. With merchants extending credit to regular customers, Sargent and Velde's big problem could easily turn out to be a small one after all.

Coins are beautiful objects that fascinate collectors. Let me end in praise of this volume as one that lives up to the aesthetic standard of its subject. It is printed spaciously, in an attractive font, on a pleasing heavy, buff paper. The wide margins are adorned with notes serving as guideposts to the text in the style familiar from seventeenth and eighteenth century books. There are a number of attractive illustrations. Such books are one of the small pleasures of scholarship. They remind me why the internet is unlikely to drive the book completely away.

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Lawrence H. White, ed., *The History of Gold and Silver* (London: Pickering & Chatto, 2000) 3 vols; Volume 1, pp. xxxiii + 249; volume 2, pp. 1–267; volume 3, pp. 1–231, \$480. ISBN 1-851-196517-3

We live so much in the world of fiat money that it is hard to recall that the gold standard finally ended only in the collapse of the Bretton Woods system just over thirty years ago (the U.S. dollar became inconvertible in 1971). Modern textbooks treat metallic money, implicitly, at least, as the "barbarous relic" that Keynes believed it to be. To be sure, for some—the denizens of right-wing talk radio and some Austrians, among others—*real* money always is, and always was, gold or silver. The age of the gold was the apogee of economic civilization; its death calls for perpetual lamentation, not celebration. The sad history of inflation from WWII through the mid-1980s can be blamed on fiat money. The advocates of gold forget that the age of the classic international gold standard was itself short, really only from the 1870s through 1913, and that the gold standard, in its heyday, was not a purely self-regulating system, but one that required central banks to play by the "rules of the game." Before this period, monetary standards

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