

# Chapter 1

## Money

Bitcoin is the newest technology to serve the function of money—an invention leveraging the technological possibilities of the digital age to solve a problem that has persisted for all of humanity's existence: how to move economic value across time and space. In order to understand Bitcoin, one must first understand money, and to understand money, there is no alternative to the study of the function and history of money.

The simplest way for people to exchange value is to exchange valuable goods with one another. This process of *direct exchange* is referred to as barter, but is only practical in small circles with only a few goods and services produced. In a hypothetical economy of a dozen people isolated from the world, there is not much scope for specialization and trade, and it would be possible for individuals to each engage in the production of the most basic essentials of survival and exchange them among themselves directly. Barter has always existed in human society and continues to this day, but it is highly impractical and remains only in use in exceptional circumstances, usually involving people with extensive familiarity with one another.

In a more sophisticated and larger economy, the opportunity arises for individuals to specialize in the production of more goods and to exchange them with many more people—people with whom they have no personal relationships, strangers with whom it is utterly impractical to keep a running tally of goods, services, and favors. The larger the market, the more the opportunities for specialization and exchange, but also the bigger the problem of *coincidence of wants*—what you want to acquire is produced by someone who doesn't want what you have to sell. The problem is deeper than different requirements for different goods, as there are three distinct dimensions to the problem.

First, there is the lack of coincidence in scales: what you want may not be equal in value to what you have and dividing one of them into smaller units may not be practical. Imagine wanting to sell shoes for a house; you cannot

buy the house in small pieces each equivalent in value to a pair of shoes, nor does the homeowner want to own all the shoes whose value is equivalent to that of the house. Second, there is the lack of coincidence in time frames: what you want to sell may be perishable but what you want to buy is more durable and valuable, making it hard to accumulate enough of your perishable good to exchange for the durable good at one point in time. It is not easy to accumulate enough apples to be exchanged for a car at once, because they will rot before the deal can be completed. Third, there is the lack of coincidence of locations: you may want to sell a house in one place to buy a house in another location, and (most) houses aren't transportable. These three problems make direct exchange highly impractical and result in people needing to resort to performing more layers of exchange to satisfy their economic needs.

The only way around this is through *indirect exchange*: you try to find some other good that another person would want and find someone who will exchange it with you for what you want to sell. That intermediary good is a *medium of exchange*, and while any good could serve as the medium of exchange, as the scope and size of the economy grows it becomes impractical for people to constantly search for different goods that their counterparty is looking for, carrying out several exchanges for each exchange they want to conduct. A far more efficient solution will naturally emerge, if only because those who chance upon it will be far more productive than those who do not: a single medium of exchange (or at most a small number of media of exchange) emerges for everyone to trade their goods for. A good that assumes the role of a widely accepted medium of exchange is called money.

Being a medium of exchange is the quintessential function that defines money—in other words, it is a good purchased not to be consumed (a consumption good), nor to be employed in the production of other goods (an investment, or capital good), but primarily for the sake of being exchanged for other goods. While investment is also meant to produce income to be exchanged for other goods, it is distinct from money in three respects: first, it offers a return, which money does not offer; second, it always involves a risk of failure, whereas money is supposed to carry the least risk; third, investments are less liquid than money, necessitating significant transaction costs every time they are to be spent. This can help

us understand why there will always be demand for money, and why holding investments can never entirely replace money. Human life is lived with uncertainty as a given, and humans cannot know for sure when they will need what amount of money.<sup>1</sup> It is common sense, and age-old wisdom in virtually all human cultures, for individuals to want to store some portion of their wealth in the form of money, because it is the most liquid holding possible, allowing the holder to quickly liquidate if she needs to, and because it involves less risk than any investment. The price for the convenience of holding money comes in the form of the forgone consumption that could have been had with it, and in the form of the forgone returns that could have been made from investing it.

From examining such human choices in market situations, Carl Menger, the father of the Austrian school of economics and founder of marginal analysis in economics, came up with an understanding of the key property that leads to a good being adopted freely as money on the market, and that is *salability*—the ease with which a good can be sold on the market whenever its holder desires, with the least loss in its price.<sup>2</sup>

There is nothing in principle that stipulates what should or should not be used as money. Any person choosing to purchase something not for its own sake, but with the aim of exchanging it for something else, is making it *de facto* money, and as people vary, so do their opinions on, and choices of, what constitutes money. Throughout human history, many things have served the function of money: gold and silver, most notably, but also copper, seashells, large stones, salt, cattle, government paper, precious stones, and even alcohol and cigarettes in certain conditions. People's choices are subjective, and so there is no “right” and “wrong” choice of money. There are, however, consequences to choices.

The relative salability of goods can be assessed in terms of how well they address the three facets of the problem of the lack of coincidence of wants mentioned earlier: their salability across scales, across space, and across time. A good that is salable across scales can be conveniently divided into smaller units or grouped into larger units, thus allowing the holder to sell it in whichever quantity he desires. Salability across space indicates an ease of transporting the good or carrying it along as a person travels, and this has led to good monetary media generally having high value per unit of weight. Both of these characteristics are not very hard to fulfill by a large number of

goods that could potentially serve the function of money. It is the third element, salability across time, which is the most crucial.

A good's salability across time refers to its ability to hold value into the future, allowing the holder to store wealth in it, which is the second function of money: *store of value*. For a good to be salable across time it has to be immune to rot, corrosion, and other types of deterioration. It is safe to say anyone who thought he could store his wealth for the long term in fish, apples, or oranges learned the lesson the hard way, and likely had very little reason to worry about storing wealth for a while. Physical integrity through time, however, is a necessary but insufficient condition for salability across time, as it is possible for a good to lose its value significantly even if its physical condition remains unchanged. For the good to maintain its value, it is also necessary that the supply of the good not increase too drastically during the period during which the holder owns it. A common characteristic of forms of money throughout history is the presence of some mechanism to restrain the production of new units of the good to maintain the value of the existing units. The relative difficulty of producing new monetary units determines the hardness of money: money whose supply is hard to increase is known as *hard money*, while *easy money* is money whose supply is amenable to large increases.

We can understand money's hardness through understanding two distinct quantities related to the supply of a good: (1) the *stock*, which is its existing supply, consisting of everything that has been produced in the past, minus everything that has been consumed or destroyed; and (2) the *flow*, which is the extra production that will be made in the next time period. The ratio between the stock and flow is a reliable indicator of a good's hardness as money, and how well it is suited to playing a monetary role. A good that has a low ratio of stock-to-flow is one whose existing supply can be increased drastically if people start using it as a store of value. Such a good would be unlikely to maintain value if chosen as a store of value. The higher the ratio of the stock to the flow, the more likely a good is to maintain its value over time and thus be more salable across time.<sup>3</sup>

If people choose a hard money, with a high stock-to-flow ratio, as a store of value, their purchasing of it to store it would increase demand for it, causing a rise in its price, which would incentivize its producers to make more of it. But because the flow is small compared to the existing supply, even a large

increase in the new production is unlikely to depress the price significantly. On the other hand, if people chose to store their wealth in an easy money, with a low stock-to-flow ratio, it would be trivial for the producers of this good to create very large quantities of it that depress the price, devaluing the good, expropriating the wealth of the savers, and destroying the good's salability across time.

I like to call this the *easy money trap*: anything used as a store of value will have its supply increased, and anything whose supply can be easily increased will destroy the wealth of those who used it as a store of value. The corollary to this trap is that anything that is successfully used as money will have some natural or artificial mechanism that restricts the new flow of the good into the market, maintaining its value across time. It therefore follows that for something to assume a monetary role, it has to be costly to produce, otherwise the temptation to make money on the cheap will destroy the wealth of the savers, and destroy the incentive anyone has to save in this medium.

Whenever a natural, technological, or political development resulted in quickly increasing the new supply of a monetary good, the good would lose its monetary status and be replaced by other media of exchange with a more reliably high stock-to-flow ratio, as will be discussed in the next chapter. Seashells were used as money when they were hard to find, loose cigarettes are used as money in prisons because they are hard to procure or produce, and with national currencies, the lower the rate of increase of the supply, the more likely the currency is to be held by individuals and maintain its value over time.

When modern technology made the importation and catching of seashells easy, societies that used them switched to metal or paper money, and when a government increases its currency's supply, its citizens shift to holding foreign currencies, gold, or other more reliable monetary assets. The twentieth century provided us an unfortunately enormous number of such tragic examples, particularly from developing countries. The monetary media that survived for longest are the ones that had very reliable mechanisms for restricting their supply growth—in other words, *hard money*. Competition is at all times alive between monetary media, and its outcomes are foretold through the effects of technology on the differing

stock-to-flow ratio of the competitors, as will be demonstrated in the next chapter.

While people are generally free to use whichever goods they please as their media of exchange, the reality is that over time, the ones who use hard money will benefit most, by losing very little value due to the negligible new supply of their medium of exchange. Those who choose easy money will likely lose value as its supply grows quickly, bringing its market price down. Whether through prospective rational calculation, or the retrospective harsh lessons of reality, the majority of money and wealth will be concentrated with those who choose the hardest and most salable forms of money. But the hardness and salability of goods itself is not something that is static in time. As the technological capabilities of different societies and eras have varied, so has the hardness of various forms of money, and with it their salability. In reality, the choice of what makes the best money has always been determined by the technological realities of societies shaping the salability of different goods. Hence, Austrian economists are rarely dogmatic or objectivist in their definition of sound money, defining it not as a specific good or commodity, but as whichever money emerges freely chosen on the market by the people who transact with it, not imposed on them by coercive authority, and money whose value is determined through market interaction, and not through government imposition.<sup>4</sup> Free-market monetary competition is ruthlessly effective at producing sound money, as it only allows those who choose the right money to maintain considerable wealth over time. There is no need for government to impose the hardest money on society; society will have uncovered it long before it concocted its government, and any governmental imposition, if it were to have any effect, would only serve to hinder the process of monetary competition.

The full individual and societal implications of hard and easy money are far more profound than mere financial loss or gain, and are a central theme of this book, discussed thoroughly in [Chapters 5, 6, and 7](#). Those who are able to save their wealth in a good store of value are likely to plan for the future more than those who have bad stores of value. The soundness of the monetary media, in terms of its ability to hold value over time, is a key determinant of how much individuals value the present over the future, or their *time preference*, a pivotal concept in this book.

Beyond the stock-to-flow ratio, another important aspect of a monetary medium's salability is its acceptability by others. The more people accept a monetary medium, the more liquid it is, and the more likely it is to be bought and sold without too much loss. In social settings with many peer-to-peer interactions, as computing protocols demonstrate, it is natural for a few standards to emerge to dominate exchange, because the gains from joining a network grow exponentially the larger the size of the network. Hence, Facebook and a handful of social media networks dominate the market, when many hundreds of almost identical networks were created and promoted. Similarly, any device that sends emails has to utilize the IMAP/POP3 protocol for receiving email, and the SMTP protocol for sending it. Many other protocols were invented, and they could be used perfectly well, but almost nobody uses them because to do so would preclude a user from interacting with almost everyone who uses email today, because they are on IMAP/POP3 and SMTP. Similarly, with money, it was inevitable that one, or a few, goods would emerge as the main medium of exchange, because the property of being exchanged easily matters the most. A medium of exchange, as mentioned before, is not acquired for its own properties, but for its salability.

Further, wide acceptance of a medium of exchange allows all prices to be expressed in its terms, which allows it to play the third function of money: *unit of account*. In an economy with no recognized medium of exchange, each good will have to be priced in terms of each other good, leading to a large number of prices, making economic calculations exceedingly difficult. In an economy with a medium of exchange, all prices of all goods are expressed in terms of the same unit of account. In this society money serves as a metric with which to measure interpersonal value; it rewards producers to the extent that they contribute value to others, and signifies to consumers how much they need to pay to obtain their desired goods. Only with a uniform medium of exchange acting as a unit of account does complex economic calculation become possible, and with it comes the possibility for specialization into complex tasks, capital accumulation, and large markets. The operation of a market economy is dependent on prices, and prices, to be accurate, are dependent on a common medium of exchange, which reflects the relative scarcity of different goods. If this is easy money, the ability of its issuer to constantly increase its quantity will prevent it from accurately reflecting opportunity costs. Every unpredictable change in the quantity of

money would distort its role as a measure of interpersonal value and a conduit for economic information.

Having a single medium of exchange allows the size of the economy to grow as large as the number of people willing to use that medium of exchange. The larger the size of the economy, the larger the opportunities for gains from exchange and specialization, and perhaps more significantly, the longer and more sophisticated the structure of production can become. Producers can specialize in producing capital goods that will only produce final consumer goods after longer intervals, which allows for more productive and superior products. In the primitive small economy, the structure of production of fish consisted of individuals going to the shore and catching fish with their bare hands, with the entire process taking a few hours from start to finish. As the economy grows, more sophisticated tools and capital goods are utilized, and the production of these tools stretches the duration of the production process significantly while also increasing its productivity. In the modern world, fish are caught with highly sophisticated boats that take years to build and are operated for decades. These boats are able to sail to seas that smaller boats cannot reach and thus produce fish that would otherwise not be available. The boats can brave inclement weather and continue production in very difficult conditions where less capital-intensive boats would be docked uselessly. As capital accumulation has made the process longer, it has become more productive per unit of labor, and it can produce superior products that were never possible for the primitive economy with basic tools and no capital accumulation. None of this would be possible without money playing the roles of medium of exchange to allow specialization; store of value to create future-orientation and incentivize individuals to direct resources to investment instead of consumption; and unit of account to allow economic calculation of profits and losses.

The history of money's evolution has seen various goods play the role of money, with varying degrees of hardness and soundness, depending on the technological capabilities of each era. From seashells to salt, cattle, silver, gold, and gold-backed government money, ending with the current almost universal use of government-provided legal tender, every step of technological advance has allowed us to utilize a new form of money with added benefits, but, as always, new pitfalls. By examining the history of the

tools and materials that have been employed in the role of money throughout history, we are able to discern the characteristics that make for good money and the ones that make for bad money. Only with this background in place can we then move on to understand how Bitcoin functions and what its role as a monetary medium is.

The next chapter examines the history of obscure artifacts and objects that have been used as money throughout history, from the Rai stones of Yap Island, to seashells in the Americas, glass beads in Africa, and cattle and salt in antiquity. Each of these media of exchange served the function of money for a period during which it had one of the best stock-to-flow ratios available to its population, but stopped when it lost that property. Understanding how and why is essential to understanding the future evolution of money and any likely role Bitcoin will play. [Chapter 3](#) moves to the analysis of monetary metals and how gold came to be the prime monetary metal in the world during the era of the gold standard at the end of the nineteenth century. [Chapter 4](#) analyzes the move to government money and its track record. After the economic and social implications of different kinds of money are discussed in [Chapters 5, 6, and 7](#), [Chapter 8](#) introduces the invention of Bitcoin and its monetary properties.

## Notes

- [1](#) See Ludwig von Mises' *Human Action*, p. 250, for a discussion of how uncertainty about the future is the key driver of demand for holding money. With no uncertainty of the future, humans could know all their incomes and expenditures ahead of time and plan them optimally so they never have to hold any cash. But as uncertainty is an inevitable part of life, people must continue to hold money so they have the ability to spend without having to know the future.
- [2](#) Carl Menger, "On the Origins of Money," *Economic Journal*, vol. 2 (1892): 239–255; translation by C. A. Foley.
- [3](#) Antal Fekete, *Whither Gold?* (1997). Winner of the 1996 International Currency Prize, sponsored by Bank Lips.

[4](#) Joseph Salerno, *Money: Sound and Unsound* (Ludwig von Mises Institute, 2010), pp. xiv–xv.

## Chapter 2

# Primitive Moneys

Of all the historical forms of money I have come across, the one that most resembles the operation of Bitcoin is the ancient system based on Rai stones on Yap Island, today a part of the Federated States of Micronesia.

Understanding how the large circular stones carved from limestone functioned as money will help us explain Bitcoin's operation in [Chapter 8](#). Understanding the remarkable tale of how the Rai stones lost their monetary role is an object lesson in how money loses its monetary status once it loses its hardness.

The Rai stones that constituted money were of various sizes, rising to large circular disks with a hole in the middle that weighed up to four metric tons. They were not native to Yap, which did not contain any limestone, and all of Yap's stones were brought in from neighboring Palau or Guam. The beauty and rarity of these stones made them desirable and venerable in Yap, but procuring them was very difficult as it involved a laborious process of quarrying and then shipping them with rafts and canoes. Some of these rocks required hundreds of people to transport them, and once they arrived on Yap, they were placed in a prominent location where everyone could see them. The owner of the stone could use it as a payment method without it having to move: all that would happen is that the owner would announce to all townsfolk that the stone's ownership has now moved to the recipient. The whole town would recognize the ownership of the stone and the recipient could then use it to make a payment whenever he so pleased. There was effectively no way of stealing the stone because its ownership was known by everybody.

For centuries, and possibly even millennia, this monetary system worked well for the Yapese. While the stones never moved, they had salability across space, as one could use them for payment anywhere on the island. The different sizes of the different stones provided some degree of salability across scales, as did the possibility of paying with fractions of a single stone. The stones' salability across time was assured for centuries by the difficulty and high cost of acquiring new stones, because they didn't exist in

Yap and quarrying and shipping them from Palau was not easy. The very high cost of procuring new stones to Yap meant that the existing supply of stones was always far larger than whatever new supply could be produced at a given period of time, making it prudent to accept them as a form of payment. In other words, Rai stones had a very high stock-to-flow ratio, and no matter how desirable they were, it was not easy for anyone to inflate the supply of stones by bringing in new rocks. Or, at least, that was the case until 1871, when an Irish-American captain by the name of David O'Keefe was shipwrecked on the shores of Yap and revived by the locals.<sup>1</sup>

O'Keefe saw a profit opportunity in taking coconuts from the island and selling them to producers of coconut oil, but he had no means to entice the locals to work for him, because they were very content with their lives as they were, in their tropical paradise, and had no use for whatever foreign forms of money he could offer them. But O'Keefe wouldn't take no for an answer; he sailed to Hong Kong, procured a large boat and explosives, took them to Palau, where he used the explosives and modern tools to quarry several large Rai stones, and set sail to Yap to present the stones to the locals as payment for coconuts. Contrary to what O'Keefe expected, the villagers were not keen on receiving his stones, and the village chief banned his townsfolk from working for the stones, decreeing that O'Keefe's stones were not of value, because they were gathered too easily. Only the stones quarried traditionally, with the sweat and blood of the Yapese, were to be accepted in Yap. Others on the island disagreed, and they did supply O'Keefe with the coconuts he sought. This resulted in conflict on the island, and in time the demise of Rai stones as money. Today, the stones serve a more ceremonial and cultural role on the island and modern government money is the most commonly used monetary medium.

While O'Keefe's story is highly symbolic, he was but the harbinger of the inevitable demise of Rai stones' monetary role with the encroachment of modern industrial civilization on Yap and its inhabitants. As modern tools and industrial capabilities reached the region, it was inevitable that the production of the stones would become far less costly than before. There would be many O'Keefes, local and foreign, able to supply Yap with an ever-larger flow of new stones. With modern technology, the stock-to-flow ratio for Rai stones decreased drastically: it was possible to produce far more of these stones every year, significantly devaluing the island's existing

stock. It became increasingly unwise for anyone to use these stones as a store of value, and thus they lost their salability across time, and with it, their function as a medium of exchange.

The details may differ, but the underlying dynamic of a drop in stock-to-flow ratio has been the same for every form of money that has lost its monetary role, up to the collapse of the Venezuelan bolivar taking place as these lines are being written.

A similar story happened with the aggrы beads used as money for centuries in western Africa. The history of these beads in western Africa is not entirely clear, with suggestions that they were made from meteorite stones, or passed on from Egyptian and Phoenician traders. What is known is that they were precious in an area where glassmaking technology was expensive and not very common, giving them a high stock-to-flow ratio, making them salable across time. Being small and valuable, these beads were salable across scale, because they could be combined into chains, necklaces, or bracelets; though this was far from ideal, because there were many different kinds of beads rather than one standard unit. They were also salable across space as they were easy to move around. In contrast, glass beads were not expensive and had no monetary role in Europe, because the proliferation of glassmaking technology meant that if they were to be utilized as a monetary unit, their producers could flood the market with them—in other words, they had a low stock-to-flow ratio.

When European explorers and traders visited West Africa in the sixteenth century, they noticed the high value given to these beads and so started importing them in mass quantities from Europe. What followed was similar to the story of O'Keefe, but given the tiny size of the beads and the much larger size of the population, it was a slower, more covert process with bigger and more tragic consequences. Slowly but surely, Europeans were able to purchase a lot of the precious resources of Africa for the beads they acquired back home for very little.<sup>2</sup> European incursion into Africa slowly turned beads from hard money to easy money, destroying their salability and causing the erosion of the purchasing power of these beads over time in the hands of the Africans who owned them, impoverishing them by transferring their wealth to the Europeans, who could acquire the beads easily. The aggrы beads later came to be known as slave beads for the role they played in fueling the slave trade of Africans to Europeans and North

Americans. A one-time collapse in the value of a monetary medium is tragic, but at least it is over quickly and its holders can begin trading, saving, and calculating with a new one. But a slow drain of its monetary value over time will slowly transfer the wealth of its holders to those who can produce the medium at a low cost. This is a lesson worth remembering when we turn to the discussion of the soundness of government money in the later parts of the book.

Seashells are another monetary medium that was widely used in many places around the world, from North America to Africa and Asia. Historical accounts show that the most salable seashells were usually the ones that were scarcer and harder to find, because these would hold value more than the ones that can be found easily.<sup>3</sup> Native Americans and early European settlers used wampum shells extensively, for the same reasons as aggrary beads: they were hard to find, giving them a high stock-to-flow ratio, possibly the highest among durable goods available at the time. Seashells also shared with aggrary beads the disadvantage of not being uniform units, which meant prices and ratios could not be easily measured and expressed in them uniformly, which creates large obstacles to the growth of the economy and the degree of specialization. European settlers adopted seashells as legal tender from 1636, but as more and more British gold and silver coins started flowing to North America, these were preferred as a medium of exchange due to their uniformity, allowing for better and more uniform price denomination and giving them higher salability. Further, as more advanced boats and technologies were employed to harvest seashells from the sea, their supply was very highly inflated, leading to a drop in their value and a loss of salability across time. By 1661, seashells stopped being legal tender and eventually lost all monetary role.<sup>4</sup>

This was not just the fate of seashell money in North America; whenever societies employing seashells had access to uniform metal coins, they adopted them and benefited from the switch. Also, the arrival of industrial civilization, with fossil-fuel-powered boats, made scouring the sea for seashells easier, increasing the flow of their production and dropping the stock-to-flow ratio quickly.

Other ancient forms of money include cattle, cherished for their nutritional value, as they were one of the most prized possessions anyone could own and were also salable across space due to their mobility. Cattle continue to

play a monetary role today, with many societies using them for payments, especially for dowries. Being bulky and not easily divisible, however, meant cattle were not very useful to solve the problems of divisibility across scales, and so another form of money coexisted along with cattle, and that was salt. Salt was easy to keep for long durations and could be easily divided and grouped into whatever weight was necessary. These historical facts are still apparent in the English language, as the word *pecuniary* is derived from *pecus*, the Latin word for cattle, while the word *salary* is derived from *sal*, the Latin word for salt.<sup>5</sup>

As technology advanced, particularly with metallurgy, humans developed superior forms of money to these artifacts, which began to quickly replace them. These metals proved a better medium of exchange than seashells, stones, beads, cattle, and salt because they could be made into uniform, highly valuable small units that could be moved around far more easily. Another nail in the coffin of artifact money came with the mass utilization of hydrocarbon fuel energy, which increased our productive capacity significantly, allowing for a quick increase in the new supply (flow) of these artifacts, meaning that the forms of money that relied on difficulty of production to protect their high stock-to-flow ratio lost it. With modern hydrocarbon fuels, Rai stones could be quarried easily, aggrary beads could be made for very little cost, and seashells could be collected en masse by large boats. As soon as these monies lost their hardness, their holders suffered significant wealth expropriation and the entire fabric of their society fell apart as a result. The Yap Island chiefs who refused O'Keefe's cheap Rai stones understood what most modern economists fail to grasp: a money that is easy to produce is no money at all, and easy money does not make a society richer; on the contrary, it makes it poorer by placing all its hard-earned wealth for sale in exchange for something easy to produce.

## Notes

- <sup>1</sup> The story of O'Keefe inspired the writing of a novel named *His Majesty O'Keefe* by Laurence Klingman and Gerald Green in 1952, which was made into a Hollywood blockbuster by the same name starring Burt Lancaster in 1954.

2 To maximize their profits, Europeans used to fill the hulls of their boats with large quantities of these beads, which also served to stabilize the boat on its trip.

3 Nick Szabo, *Shelling Out: The Origins of Money*. (2002) Available at <http://nakamotoinstitute.org/shelling-out/>

4 Ibid.

5 Antal Fekete, *Whither Gold?* (1997). Winner of the 1996 International Currency Prize, sponsored by Bank Lips.

## Chapter 3

# Monetary Metals

As human technical capacity for the production of goods became more sophisticated, and our utilization of metals and commodities grew, many metals started getting produced at large enough quantities and were in large enough demand to make them highly salable and suited for being used as monetary media. These metals' density and relatively high value made moving them around easy, easier than salt or cattle, making them highly salable across space. The production of metals was initially not easy, making it hard to increase their supply quickly and giving them good salability across time.

Due to their durability and physical properties, as well as their relative abundance in earth, some metals were more valuable than others. Iron and copper, because of their relatively high abundance and their susceptibility to corrosion, could be produced in increasing quantities. Existing stockpiles would be dwarfed by new production, destroying the value in them. These metals developed a relatively low market value and would be used for smaller transactions. Rarer metals such as silver and gold, on the other hand, were more durable and less likely to corrode or ruin, making them more salable across time and useful as a store of value into the future. Gold's virtual indestructibility, in particular, allowed humans to store value across generations, thus allowing us to develop a longer time horizon orientation.

Initially, metals were bought and sold in terms of their weight,<sup>1</sup> but over time, as metallurgy advanced, it became possible to mint them into uniform coins and brand them with their weight, making them far more salable by saving people from having to weigh and assess the metals every time. The three metals most widely used for this role were gold, silver, and copper, and their use as coins was the prime form of money for around 2,500 years, from the time of the Greek king Croesus, who was the first recorded to have minted gold coins, to the early twentieth century. Gold coins were the goods most salable across time, because they could hold their value over time and resist decay and ruin. They were also the goods most salable across space,

because they carried a lot of value in small weights, allowing for easy transportation. Silver coins, on the other hand, had the advantage of being the most salable good across scales, because their lower value per weight unit compared to gold allowed for them to conveniently serve as a medium of exchange for small transactions, while bronze coins would be useful for the least valuable transactions. By standardizing values into easily identifiable units, coins allowed for the creation of large markets, increasing the scope of specialization and trade worldwide. While the best monetary system technologically possible at the time, it still had two major drawbacks: the first was that the existence of two or three metals as the monetary standard created economic problems from the fluctuation of their values over time due to the ebbs of supply and demand, and created problems for owners of these coins, particularly silver, which experienced declines in value due to increases in production and drops in demand. The second, more serious flaw was that governments and counterfeiters could, and frequently did, reduce the precious metal content in these coins, causing their value to decline by transferring a fraction of their purchasing power to the counterfeiters or the government. The reduction in the metal content of the coins compromised the purity and soundness of the money.

By the nineteenth century, however, with the development of modern banking and the improvement in methods of communication, individuals could transact with paper money and checks backed by gold in the treasuries of their banks and central banks. This made gold-backed transactions possible at any scale, thus obviating the need for silver's monetary role, and gathering all essential monetary salability properties in the gold standard. The gold standard allowed for unprecedented global capital accumulation and trade by uniting the majority of the planet's economy on one sound market-based choice of money. Its tragic flaw, however, was that by centralizing the gold in the vaults of banks, and later central banks, it made it possible for banks and governments to increase the supply of money beyond the quantity of gold they held, devaluing the money and transferring part of its value from the money's legitimate holders to the governments and banks.

## **Why Gold?**

To understand how commodity money emerges, we return in more detail to the easy money trap we first introduced in [Chapter 1](#), and begin by differentiating between a good's *market demand* (demand for consuming or holding the good for its own sake) and its *monetary demand* (demand for a good as a medium of exchange and store of value). Any time a person chooses a good as a store of value, she is effectively increasing the demand for it beyond the regular market demand, which will cause its price to rise. For example, market demand for copper in its various industrial uses is around 20 million tons per year, at a price of around \$5,000 per ton, and a total market valued around \$100 billion. Imagine a billionaire deciding he would like to store \$10 billion of his wealth in copper. As his bankers run around trying to buy 10% of annual global copper production, they would inevitably cause the price of copper to increase. Initially, this sounds like a vindication of the billionaire's monetary strategy: the asset he decided to buy has already appreciated before he has even completed his purchase. Surely, he reasons, this appreciation will cause more people to buy more copper as a store of value, bringing the price up even more.

But even if more people join him in monetizing copper, our hypothetical copper-obsessed billionaire is in trouble. The rising price makes copper a lucrative business for workers and capital across the world. The quantity of copper under the earth is beyond our ability to even measure, let alone extract through mining, so practically speaking, the only binding restraint on how much copper can be produced is how much labor and capital is dedicated to the job. More copper can always be made with a higher price, and the price and quantity will continue to rise until they satisfy the monetary investors' demand; let's assume that happens at 10 million extra tons and \$10,000 per ton. At some point, monetary demand must subside, and some holders of copper will want to offload some of their stockpiles to purchase other goods, because, after all, that was the point of buying copper.

After the monetary demand subsides, all else being equal, the copper market would go back to its original supply-and-demand conditions, with 20 million annual tons selling for \$5,000 each. But as the holders begin to sell their accumulated stocks of copper, the price will drop significantly below that. The billionaire will have lost money in this process; as he was driving the price up, he bought most of his stock for more than \$5,000 a

ton, but now his entire stock is valued below \$5,000 a ton. The others who joined him later bought at even higher prices and will have lost even more money than the billionaire himself.

This model is applicable for all consumable commodities such as copper, zinc, nickel, brass, or oil, which are primarily consumed and destroyed, not stockpiled. Global stockpiles of these commodities at any moment in time are around the same order of magnitude as new annual production. New supply is constantly being generated to be consumed. Should savers decide to store their wealth in one of these commodities, their wealth will only buy a fraction of global supply before bidding the price up enough to absorb all their investment, because they are competing with the consumers of this commodity who use it productively in industry. As the revenue to the producers of the good increases, they can then invest in increasing their production, bringing the price crashing down again, robbing the savers of their wealth. The net effect of this entire episode is the transfer of the wealth of the misguided savers to the producers of the commodity they purchased.

This is the anatomy of a market bubble: increased demand causes a sharp rise in prices, which drives further demand, raising prices further, incentivizing increased production and increased supply, which inevitably brings prices down, punishing everyone who bought at a price higher than the usual market price. Investors in the bubble are fleeced while producers of the asset benefit. For copper and almost every other commodity in the world, this dynamic has held true for most of recorded history, consistently punishing those who choose these commodities as money by devaluing their wealth and impoverishing them in the long run, and returning the commodity to its natural role as a market good, and not a medium of exchange.

For anything to function as a good store of value, it has to beat this trap: it has to appreciate when people demand it as a store of value, but its producers have to be constrained from inflating the supply significantly enough to bring the price down. Such an asset will reward those who choose it as their store of value, increasing their wealth in the long run as it becomes the prime store of value, because those who chose other commodities will either reverse course by copying the choice of their more successful peers, or will simply lose their wealth.