

How a Bitcoin System is Like and Unlike a Gold Standard

Lawrence H. White

January 12, 2018

Many commentators have compared Bitcoin to gold as an investment asset. “Can Bitcoin Be Gold 2.0,” asks a [portfolio analyst](#). “Bitcoin is increasingly set to replace gold as a hedge against uncertainty,” suggests a [Cointelegraph reporter](#).

Economists, by contrast, are more interested in considering how a monetary system based on Bitcoin compares to a gold-standard monetary system. In a noteworthy [journal article](#) published in 2015, George Selgin characterized Bitcoin as a “synthetic commodity money.” Monetary historian Warren Weber in 2016 released an interesting Bank of Canada [working paper](#) entitled “A Bitcoin Standard: Lessons from the Gold Standard,” which analyzes a hypothetical international Bitcoin-based monetary system on the supposition that “the Bitcoin standard would closely resemble the gold standard” of the pre-WWI era. More recently, University of Chicago economist John Cochrane in a [blog post](#) has characterized Bitcoin as “an electronic version of gold.”

In what important respects are the Bitcoin system and a gold standard similar? In what other important respects are they different?

Similarities and Differences

Bitcoin is similar to a gold standard in at least two ways. (1) Both Bitcoin and gold are stateless, so either can provide an international base money that is not the creature of any national central bank or finance ministry. (2) Both provide a base money that is reliably limited in quantity (this is the grounding for Selgin’s characterization), unlike a fiat money that a central bank can create in any quantity it likes, “out of thin air.”

Gold is a tangible physical commodity; bitcoin is a purely digital asset.

Bitcoin and the gold standard are obviously different in other ways. Gold is a tangible physical commodity; bitcoin is a purely digital asset. This difference is not important for the customer’s experience in paying them out, as ownership of (or a claim to) either asset can be transferred online, or in person by phone app or card.

The “front ends” of payments are basically the same nowadays. The “back ends” can be different. Gold payments can go peer-to-peer without third-party involvement only when a physical coin or bar is handed over. Electronic gold payments require a trusted vault-keeping intermediary. Bitcoin payments operate on a distributed ledger and can go peer-to-peer electronically without the help of a financial institution. In practice, however, many Bitcoin transactions use the services of commercial storage and exchange providers like Coinbase.

The most important difference between Bitcoin and gold lies in their contrasting supply and demand mechanisms, which give them very different degrees of purchasing power stability. The stock of gold above ground is slowly augmented each year by gold mines around the world, at a rate that responds to, and stabilizes, the purchasing power of gold. Commodity (non-monetary) demands also respond to the price of gold and dampen movements in its value. The rate of Bitcoin creation, by contrast, is entirely programmed. It does not respond to its purchasing power, and there are no commodity demands.

Difference in Supply Mechanisms

Let's consider supply in more detail. Secularly, annual production of gold has been a small percentage (typically 1% to 4%) of the existing stock, but not zero. Because the absorption of gold by non-monetary uses from which it is not recoverable (like tooth fillings that will go into graves and stay there, but unlike jewelry) is small, the total stock of gold grows over time. Historically this has produced a near-zero secular rate of inflation in gold standard countries.

The supply curve for BTC is always vertical.

The number of BTC in circulation was programmed to expand at 4.0 percent in 2017, but the expansion rate is programmed to fall progressively in the future and to reach zero in 2140. At that point, assuming that real demand to hold BTC grows merely at the same rate as real GDP, Bitcoin would exhibit mild secular growth in its purchasing power, or equivalently we would see mild deflation in BTC-denominated prices of goods and services. (Warren Weber's paper similarly derives this result.) This kind of growth-driven deflation is benign, but the difference is small in real economic welfare consequences between a money stock that steadily grows 3% per year and one that grows 0%.

The key difference in the supply mechanisms is in the induced variation in the rate of production of monetary gold in response to its purchasing power, by contrast to the non-variation in BTC. A rise in the purchasing power of BTC does not provoke any change in the quantity of BTC in the short run or in the long run. In Econ 101 language, the supply curve for BTC is always vertical. (The supply curve is, however, programmed to shift to the right over time, ever more slowly, until it stops at 21 million units).

By contrast, a non-transitory rise in the purchasing power of gold brings about some small increase in the quantity of monetary gold in the short run by incentivizing owners of non-monetary gold items (jewelry and candlesticks) to melt some of them down and monetize them (assuming open mints) in response to the rising opportunity cost of holding them and to the owners' increased wealth. The short-run supply curve is not vertical. Still more importantly, this rise will bring about a much larger increase in the longer run by incentivizing owners of gold mines to increase their output. The "long-run stock supply curve" for monetary gold is fairly flat. (I walk through the stock-flow supply dynamics in greater detail in chapter 2 of my monetary theory text.) The purchasing power of gold is mean-reverting over the long run, a pattern seen clearly in the historical record.

The stock of BTC is free from supply shocks, unlike that of monetary gold.

Because its quantity is pre-programmed, the stock of BTC is free from supply shocks, unlike that of monetary gold. Supply shocks from gold discoveries under the gold standard were historically small, however. The largest on record was the joint impact of the Californian and Australian gold

rushes, which (according to Hugh Rockoff) together created only 6.39 percent annual growth in the world stock of gold during the decade 1849-59, resulting in less than 1.5 percent annual inflation in gold-standard countries over that decade. For reference, the average of decade-averaged annual growth rates over 1839-1919 was about 2.9 percent.

Predicting Supply

As a result of the long-run price-elasticity of gold supply combined with the smallness and infrequency of supply shocks, the purchasing power of gold under the classical gold standard was more predictable, especially over 10+ year horizons, than the purchasing power of the post-WWII fiat dollar has been under the Federal Reserve.

As I have written previously: “Under a gold standard, the price level can be trusted not to wander far over the next 30 years because it is constrained by impersonal market forces. Any sizable price level increase (fall in the purchasing power of gold) caused by a reduced demand to hold gold would reduce the quantity of gold mined, thereby reversing the price level movement. Conversely, any sizable price level decrease (rise in the purchasing power of gold) caused by an increased demand to hold gold would increase the quantity mined, thereby reversing that price level movement.”

Bitcoin's purchasing power is much harder to predict at any horizon.

Bitcoin lacks any such supply response. There is no mean-reversion to be expected in the purchasing power of BTC, and thus its purchasing power is much harder to predict at any horizon.

Describing gold supply, Warren Weber writes: “Changes in the world stock of gold were determined by gold discoveries and the invention of new techniques for extracting gold from gold-bearing ores.” This is not well put. Changes in the world stock of monetary gold come about every year from normal mining. Gold strikes and technical improvements in extraction brought about changes in the growth rate (not the level) of the stock.

Historically, the changes in the growth rate were not dramatic by comparison to changes in the postwar growth rates of fiat monies. As often as not, the changes in gold stock growth rates were equilibrating, speeding the return of the purchasing power of gold to trend from above trend. As Rockoff noted, some important gold strikes (like the Klondike in the 1890s) and some important technical breakthroughs (like the cyanide process of 1887) were induced by the high purchasing power of gold at the time, which gave added incentive for prospecting and research.

The phrase from John Cochrane quoted above is part of a sentence that reads in its entirety: “It's an electronic version of gold, and the price variation should be a warning to economists who long for a return to gold.” From the consideration of the mean reverting character of the purchasing power of gold, by contrast to Bitcoin's lack of such a character, we can see that the second half of Cochrane's statement is incorrect.

The inelastic supply mechanism that produces price variation in Bitcoin should give pause to those who predict that Bitcoin will become a commonly accepted medium of exchange. It says nothing about the purchasing power of gold under a gold standard.

*Lawrence H. White is a senior fellow at the Cato Institute, and professor of economics at George Mason University since 2009. An expert on banking and monetary policy, he is the author of *The Clash of Economic Ideas* (Cambridge University Press, 2012), *The Theory of Monetary Institutions* (Basil Blackwell, 1999), *Free Banking in Britain* (2nd ed., Institute of Economic Affairs, 1995), and *Competition and Currency* (NYU Press, 1989).*