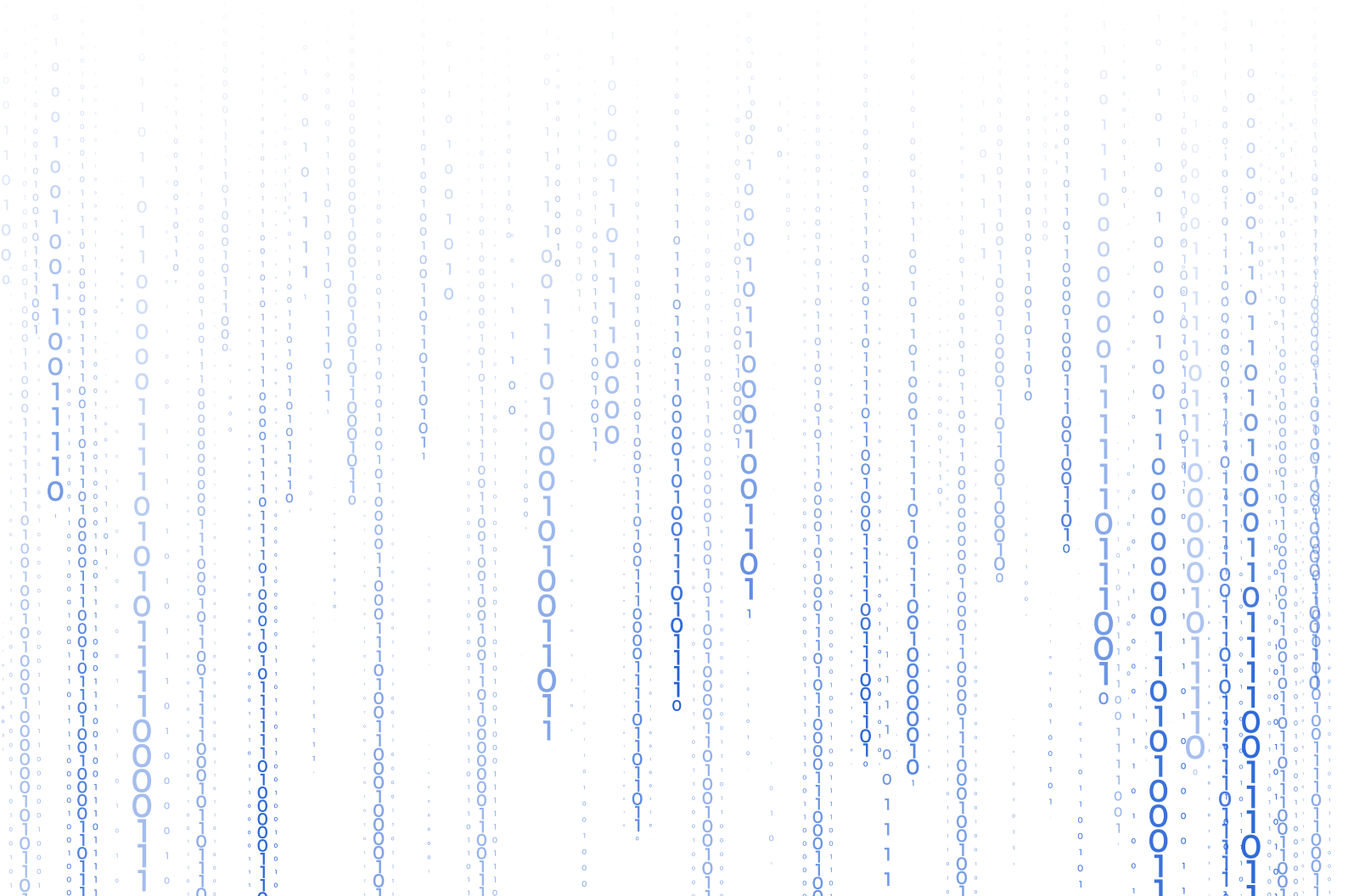


# House Of Chimera Research: A fundamental insight on fiat and Commodity money

This paper aims to provide insights into the differences between fiat and commodity money by providing a fundamental framework.

**December, 2022**



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# Introduction

Reserve Protocol is evolving; Rtokens can significantly impact the traditional and decentralised finance industry. This research aims to provide an outlook on the fundamental differences between fiat and commodity money.

## **Diederick Jacobs**

Founder

*House of Chimera*





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# A Comprehensive Overview Of Fiat Money And Its impact

Fiat money has existed for centuries, but it only became widespread in the 20th century in the United States. However, its integration has been a difficult journey.

The global macroeconomic perspective is grim, with a high inflation rate<sup>1</sup> and declining consumer and business confidence.<sup>2</sup> Supply chain disruptions are causing significant shortages in key manufacturing processes, which are strengthened by extreme energy prices, contributing to the current abnormal inflation rates. Even when excluding volatile energy prices, the core inflation rate is expected to remain well above the central bank's target for the coming year.<sup>3</sup> This is a cause for concern, as it suggests that traditional monetary policies may not effectively combat the rise in prices. According to the International Monetary Fund (IMF), the definition of inflation is the following:

"Inflation is the rate of increase in prices over a given period, often measured by an index of consumer prices. The inflation rate is the percentage change in the price level in a given period."<sup>4</sup>

Central banks consider the stable 2% inflation rate economically healthy.<sup>5</sup> It provides enough margin for central banks to

react in case inflation is too low, and thus deflation lurks. Additionally, having a stable inflation rate provides certainty to consumers and investors. If the probability of an event is uncertain, it could lead to unexpected individual behaviour resulting in market imperfections.<sup>6</sup> Thus, having no, or a low degree, of uncertainty (i.e., steady inflation) means the probability of risky events is relatively known. Therefore, enabling efficient markets to accurately price contracts contingent on risk events.<sup>7</sup>

This raises the question of whether the current fiat policy is an appropriate system and if there are better available currency mechanisms. This paper aims to identify and analyse the benefits and drawbacks of fiat and its counterpart commodity money by providing a fundamental framework. Additionally, the paper intends to offer a guideline to determine the perfect commodity for asset-backed money. In the first section of the paper, we discuss the implications of fiat money to analyse commodity money in the second chapter.

## The vicious circle of uncertainty

Alice has a car repair shop. The engine of Bob's Toyota Corolla is on the verge of breaking down and, therefore, needs repairs. Bob utilises his car daily for work; hence, it is vital for his livelihood. However, due to a global supply chain crisis, many of the necessary parts to repair the engine are

increasing in price. Furthermore, the delivery of these parts will take days up to weeks. To account for the uncertainty, Alice has to raise their prices to remain profitable. Bob cannot afford the repairs, which significantly hinders Bob from performing his job. Therefore, Bob's livelihood is

at risk. Alice loses potential revenue leading to operational uncertainty, which could result in a potential employee layoff. Thus, a potentially vicious circle has developed, possibly resulting in a domino effect.

<sup>1</sup>International Monetary Fund. Retrieved November 29, 2022, from:

<https://www.imf.org/en/Publications/WEO#~:text=Global%20inflation%20is%20forecast%20to,to%204.1%20percent%20by%202024.>

<sup>2</sup>Organisation for Economic Co-operation and Development. Retrieved November 29, 2022, from:

<https://data.oecd.org/leadind/consumer-confidence-index-cci.htm>.

<sup>3</sup>Trading Economics. Retrieved November 29, 2022, from: <https://tradingeconomics.com/united-states/core-inflation-rate>.

<sup>4</sup>International Monetary Fund. Retrieved November 29, 2022, from: <https://www.imf.org/en/About/Glossary>.

<sup>5</sup>The Federal Reserve. Retrieved November 29, 2022, from: [https://www.federalreserve.gov/faqs/economy\\_14400.htm](https://www.federalreserve.gov/faqs/economy_14400.htm).

<sup>6</sup>Rigotti, L., & Shannon, C. (2005). Uncertainty and risk in financial markets. *Econometrica*, 73(1), p. 203-243.

<sup>7</sup>Okun, A. M. (1971). The mirage of steady inflation. *Brookings papers on economic activity*, 1971(2), p. 485-498.

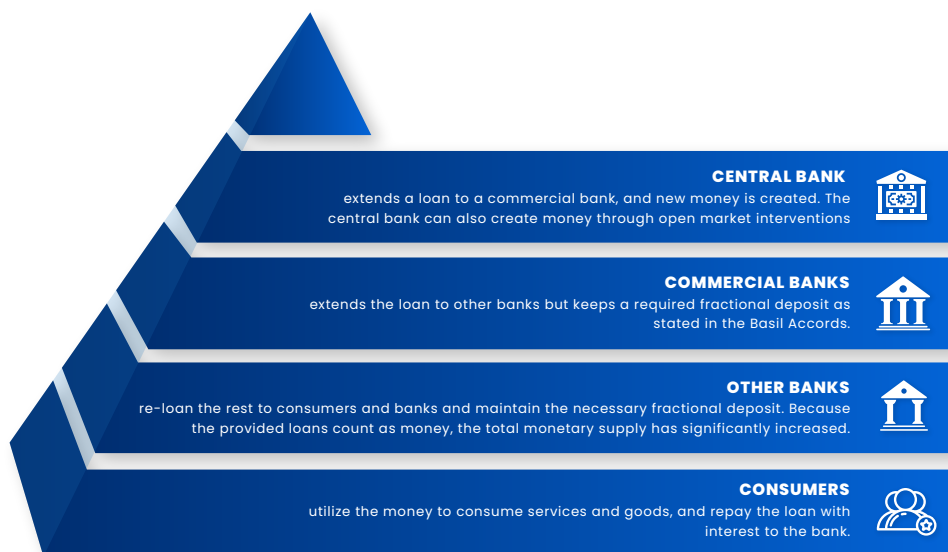
## What Is fiat money, and how is it created?

Fiat money is a medium of exchange that is not a commercial commodity, produced good, or provides a right to any commodity. In 1971, the former international gold (i.e. commodity) standard was abolished in the United States.<sup>8</sup> Consequently, all fiat used today is an irredeemable piece of paper with no intrinsic value. The value of fiat money is based on perception, and individuals who use it as a unit of account agree on its value. Therefore, fiat money works solely if enough individuals trust their governments and central banks.

The amount of circulating fiat money is controlled by a central bank (i.e. Federal Reserve, FED). A common misconception is that most of the money is printed, but in the modern economy, most money is created and loaned out to banks (Figure 1). Therefore, the 'digital' money is essentially destroyed if the loan is paid back.<sup>9</sup> Banks can lend out that money to consumers, but there are restrictions (i.e. Basel Accords). These limitations obligate banks to have specific capital and liquidity requirements and leverage ratios to decrease capital, market and operational risks.<sup>10</sup>

One of the primary benefits of fiat money is that the central bank can perform its monetary policy with relative ease. Central banks use tools such as interest rates and open market operations to adjust the overall money supply to keep the economy as stable as possible (i.e. prevent uncertainty). Open market operations can be defined as purchasing and selling securities in the open market by a central bank. To widen the overall money supply, the central bank buys government bonds from commercial banks (i.e. Quantitative Easing). Additionally, the central bank can lower interest rates, lowering the costs of debt (i.e. borrowing). In that case, debt financing can be more attractive for investments and, consequently, increase the overall money supply. The purpose of open market operations is to guide short-term interest rates, which in turn influence longer-term rates and, thus, the overall economic activity (i.e. consumption, investing). Generally, quantitative easing is used when the overall economy is stalling, and interest rates are near zero.

**Figure 1** Money Creation Process



<sup>8</sup> Federal Reserve History. Retrieved November 30, 2022, from: <https://www.federalreservehistory.org/essays/gold-convertibility-ends>.

<sup>9</sup> Bank of England. Retrieved November 31, 2022, from: <https://www.bankofengland.co.uk/knowledgebank/how-is-money-created>.

<sup>10</sup> Bank for International Settlements. Retrieved November 31, 2022, from: [https://www.bis.org/basel\\_framework/index.htm](https://www.bis.org/basel_framework/index.htm).

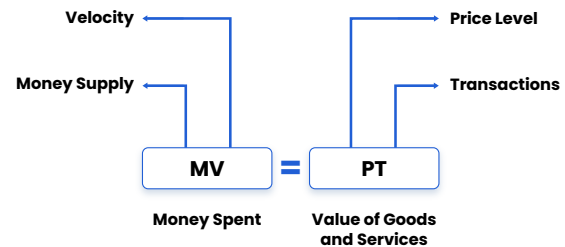
## The ever-changing money supply

The Fisher Quantity Theory of Money will be utilised to put changing the money supply further in perspective (Figure 2). M is the total nominal amount of money in circulation, V is the velocity of money, P is the price level, and T is the total number of transactions involving money payments.<sup>11</sup> Commonly, the left side of the equation is summarised as the total money spent in an economy, often referred to as the money supply. The right side can be shortened to the total value of all transactions during a period, often referred to as the demand side of money. The right and left sides of the equation should always be equal; thus, if one increases the money supply, the price level (i.e. P) or the number of transactions (i.e. T) should increase to balance the equation.

Irving Fisher, the originator of the equation, used the equation to illustrate a causal relationship between the money supply and the price level. Under the assumption that the overall velocity of money remains stable, and the number of transactions (i.e. output) does not change either. The velocity of money is only influenced by exogenous

factors (i.e. population change, interest rates). These factors, on average, can be

**Figure 2** The Fisher Quantity Theory of Money Equation



considered relatively stable and change only slowly over time. According to Fisher, the number of transactions depends on changes in external factors, such as demographic, technological developments or natural resources, which change slowly over time. Thus, both of these variables are quite stable. Therefore, solely the M and P are variables of influence due to the causal relationship between these variables. As highlighted earlier in this paper, an increase in prices over a given period is considered inflation. As a consequence, increasing the money supply will increase the price levels; *Ceteris Paribus*.

## The COVID-19 pandemic and the money supply

During the COVID-19 pandemic, the FED has increased its balance sheet from 3.7 trillion in 2019 to over 8.9 trillion in 2022.<sup>12</sup> The FED significantly increased the amplitude of its repurchase agreement operations (Repo) to increase liquidity. The Repo market is where businesses

can lend cash and securities for the short term. Additionally, the FED resumed its quantitative easing program and purchased enormous debt securities. Furthermore, the FED used other tools to broaden the money supply to stimulate economic activity.<sup>13</sup> The widening of

the money supply was deemed required to enhance the economy's liquidity and increase overall expenditure and investments. The European Central Bank (ECB) and The Bank of Japan have performed a similar monetary policy to widen the money supply.

<sup>11</sup> Gardiner, G.W. (2006). Irving Fisher's Equation. In *The Evolution of Creditary Structures and Controls*. Palgrave Macmillan, London, p. 142-158.

<sup>12</sup> Federal Reserve. Retrieved December 4, 2022, from: [https://www.federalreserve.gov/monetarypolicy/bst\\_recenttrends.htm](https://www.federalreserve.gov/monetarypolicy/bst_recenttrends.htm).

<sup>13</sup> Brookings. Retrieved December 4, 2022, from: <https://www.brookings.edu/research/fed-response-to-covid19/>.

## When it rains, it pours

The significant increase in the money supply comes with a few notable drawbacks. Before these drawbacks are explained, light should be shed on the economic behaviour of individuals. The Law of Unintended Consequences refers to how decisions may have unexpected effects, which often lead to distortions.<sup>14</sup> The Law of Unintended Consequences is frequently observable in economics, especially during economic stagnation or financial distress. As highlighted earlier in this paper, humans tend to behave unexpectedly during times of uncertainty. To put this in perspective, a simple analogy is used. Inflation expectations are the beliefs households and businesses have about future price increases. The expectation is essential, considering humans act upon them. Hence, if one expects inflation to rise, firms may raise the prices of goods and services, and employees might demand higher wages to counteract the price increases. Essentially,

creating a vicious cycle whereby inflation keeps increasing. This could contribute to a higher rate of actual inflation and create a self-fulfilling prophecy.

The central bank has limited tools to counteract inflation, such as changing interest rates. However, there is an effect lag between the realised effect and the execution. Thus, it is hard to anticipate if a particular tool will have the desired impact or if even more extreme measures need to be taken. Therefore, battling inflation can be challenging, considering taking too many extreme measures (i.e. hiking interest aggressively) can significantly damage the economy. Changing the interest rates can have a major impact on the economy, including but not limited to liquidity, net exports and imports, investments and much more. However, if the central bank is not proactively tempering inflation, it could lead to uncontrollable inflation.

## Building roads, for whom?

Induced demand is when one produces more of a good or service or provides it for a lower price; consequently, more people are willing to use it. Economist Anthony Downs made a famous example of induced demand in 1962.<sup>15</sup> According to Downs; roads

will be congested before and after a new investment in road capacity because fewer people are taking public transport. His reasoning is simple, as soon as the word spreads that a certain highway is not as congested anymore, more people will use the road and

abandon other transport methods (i.e. public transport). This is an unintended consequence of increasing road capacity, which according to Downs, eventually leads to the previous status quo.

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<sup>14</sup> Merton, R. K. (1936). The unanticipated consequences of purposive social action. *American sociological review*, 1(6), p. 894-904.

<sup>15</sup> Downs, A. (1962). The law of peak-hour expressway congestion. *Traffic Quarterly*, 16(3), p. 393-409.





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# The Advantages And Limitations Of Commodity Money

Unlike fiat money, which is issued by a government and backed by its authority, commodity money derives its value from the rarity and usefulness of the commodity it is based on.

**The alternative** to fiat money is money backed by either a commodity (i.e. copper, gold) or another asset. As highlighted earlier in this paper, before 1971, the international gold standard was the basis of the monetary system, and nearly all countries used it. The primary difference between commodity and fiat money is that the value of commodity money is based on the underlying commodity, and individuals can freely convert the paper into that commodity. Thus, commodity money is not solely based on perception, like fiat money, but instead derives its value from the rarity and usefulness of the commodity it is based on. Unlike fiat money, trust is generated through the underlying commodity and does not rely on individuals trusting the government.<sup>16</sup> Additionally, A commodity-based currency is theoretically more resistant to currency inflation, assuming a central bank is legally restricted and cannot break the commodity peg.

### **The perfect commodity**

Gold has been used for centuries for the backing of money; however, is it reasonable to claim that gold is money? In other words, why can't we utilise stones or any other asset rather than gold? The characteristics of being durable, storable, non-consumable and relatively finite are insufficient. Thus, there is a distinction between monetary and non-monetary commodities, commonly depicted by characteristics defining the superior commodity in terms of durability, scarcity, portability, and divisibility.<sup>18</sup> Considering there are usually costs to storing a commodity; thus, individuals will be incentivised to hold the paper instead of the commodity.

A notable side effect of the ability to convert money to a commodity is that the central bank is limited in expanding the money supply due to the involved costs of producing commodity money.<sup>17</sup> The reason is simple; if one increases the circulating money supply without linearly increasing the collateral (i.e. commodity), it will lead to the devaluation of money. Thus, the central bank cannot print as much money as they can with traditional fiat money, making the possibility of inflation caused by increasing the money supply less of an issue.

However, this is a potential drawback of a commodity-based fiat currency. A central bank's monetary policy has arguably less impact due to an even more restrictive set of monetary tools. Consequently, a competent central bank has fewer options to dictate economic stability and growth, potentially leading to hyperinflation or other macroeconomic imperfections.

It could be the case that there are several types of commodity money. According to Gresham Law, assuming the face value of the commodity money is equal and laissez-faire, the one with the most valuable commodity will disappear due to arbitrage.<sup>19</sup> Additionally, the perfect commodity must resist demand or supply shocks. If non-monetary demand for the commodity significantly increases, this has to be offset. The ability to offset demand or supply shocks depends on the elasticity of the commodity supply and integrated offset mechanisms.

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<sup>16</sup> Taub, B. (1985). Equilibrium traits of durable commodity money. *Journal of Banking & Finance*, 9(1), p. 5-34.

<sup>17</sup> Sargent, T. J., & Wallace, M. (1983). A model of commodity money. *Journal of Monetary Economics*, 12(1), p. 163-187.

<sup>18</sup> Taub, B. (1985). Equilibrium traits of durable commodity money. *Journal of Banking & Finance*, 9(1), p. 5-34.

<sup>19</sup> Economic History Association. Retrieved December 9, 2022, from: <https://eh.net/encyclopedia/greshams-law/>.

### Would a copper standard have worked?

Let's assume that England had been on a copper standard, in the 18th century, instead of a gold standard.<sup>20</sup> In the early 19th century, the copper price significantly increased due to the British Navy's discovery of copper's

benefits as a material for sheathing the bottoms of boats.<sup>21</sup> This would have plunged England into a potential deflationary crisis due to the sharp increase in the non-monetary demand for the metal and, thus, in its relative price. This could

have been potentially offset if copper's overall circulating supply increased and, thus, a price equilibrium was found. However, this is solely possible if production is not at its maximum.

### Conclusion

What distinguishes money from other goods is the reliance of trust in its future value. The previous sections have demonstrated that both fiat and commodity money have unique benefits and drawbacks. Fiat money relies on the perception of the individual, whereby the individual has to trust the central bank and agree on its unit of account. Commodity money relies on the characteristics of the underlying commodity,

whereby a change in a characteristic (i.e. scarcity) can have profound effects. As highlighted in this paper, both systems are vulnerable to certain situations. There are existing models of Sargent and Wallace that provide theoretical models and possible solutions for the highlighted issues. These should be highlighted in future research regarding this topic, considering it is outside of the current research scope.

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<sup>20</sup> Selgin, G. (2015). Synthetic commodity money. *Journal of Financial Stability*, 17, p. 92-99.

<sup>21</sup> Winton. Retrieved December 10, 2022, from: <https://www.winton.com/longer-view/copper-bottomed-booms-and-busts>.



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