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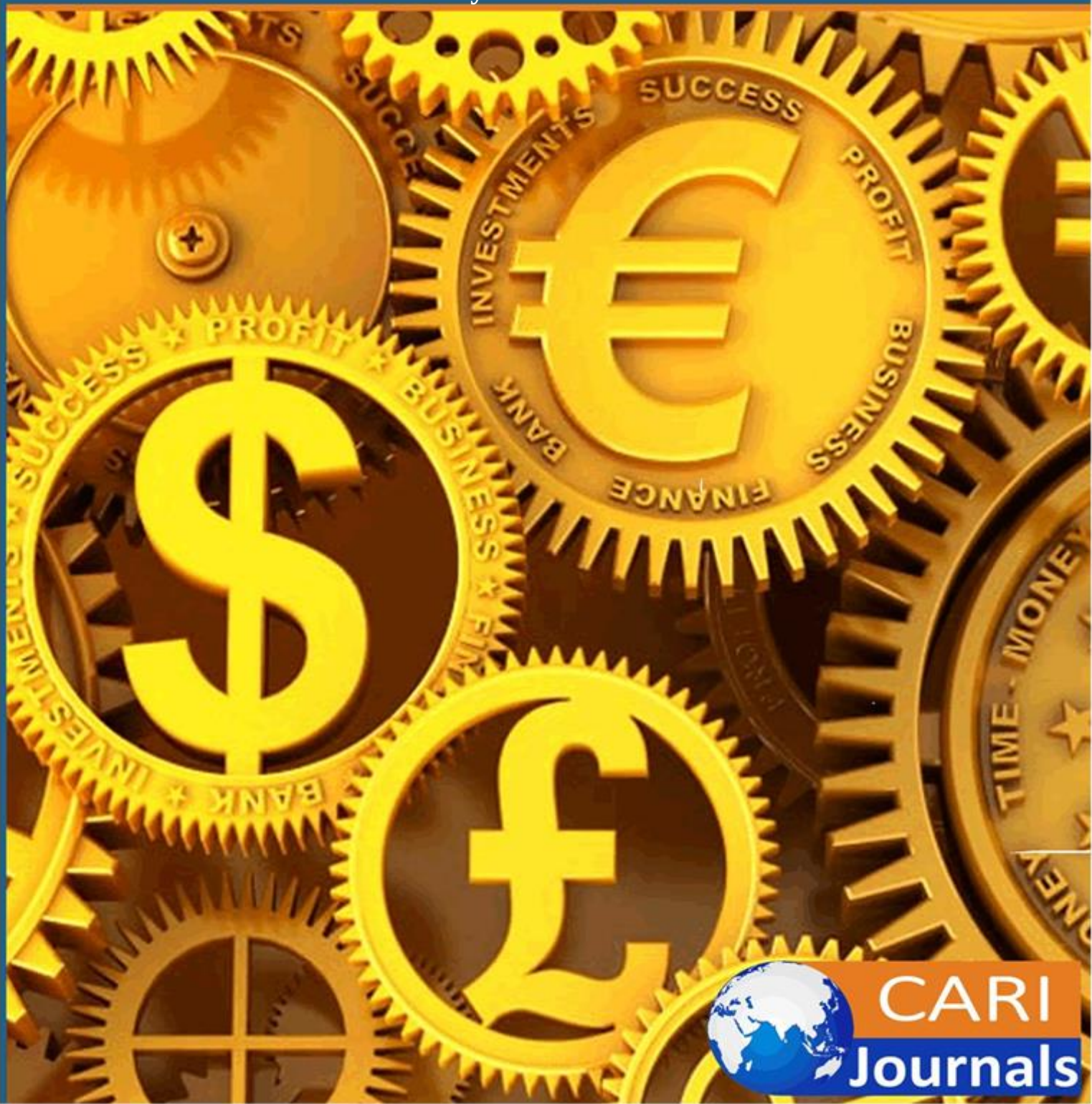

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Gold, Bitcoin, and Central Banks in the 21st Century: The New Dynamic

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Abstract

This paper examines how gold and Bitcoin have changed in terms of value and function in the context of the central banking system in the 21st century. Over the past decades, central banks have held gold as one of their primary reserve assets, given its stability, relative rarity, and traditional status as an inflation hedge and financial crisis buffer. However, with the advent of Bitcoin, central banks now have the opportunity to hold a new asset, one that has been compared to "digital gold". On one hand, Bitcoin revolutionizes the monetary system because it is decentralized, has built in scarcity, and serves as a store of value. However, on the other hand, Bitcoin has traditionally been highly volatile, suffered from regulatory issues, and possesses a relatively short history; all of which hinder Bitcoin from becoming more accepted among central banks. Factors are discussed that affect central bank reserve management: the enduring role of gold, Bitcoin as an additional reserve, and the growing significance of central bank digital currencies. It is argued that while it remains unclear whether central banks will fully integrate Bitcoin into current reserves, its acceptance thus far may impact the decision of global monetary systems regarding incorporating digital technologies alongside more conventional assets, such as gold.

Keywords: *Central Banking, Gold, Bitcoin, Monetary Policy*

1. Introduction

The world's financial framework is rapidly evolving, driven by technology, economic shifts, and volatility. Traditionally, gold has been a cornerstone of central bank reserves, providing an anchor by which to diversify portfolios and perhaps mitigate currency depreciation or hyperinflation. The stabilizing work of a central bank became apparent during the period of the gold standard in which currency values were anchored to gold. In the early 20th century, central banks gave up on the gold standard (only to be resumed post-WWII until the early 1970s). A significant reason for central banks to retain gold was its perceived intrinsic worth in the event of an international crisis (Bernholz, 2002). However, the 21st century has presented yet a new feature that has disrupted the established financial systems with the debut of Bitcoin, which has recently been dubbed by Federal Reserve Chairman as "a rival to Gold". Bitcoin has long been deemed "Digital Gold" and is increasingly recognized as a store of value. Due to its finite amount (only 21 million will ever be mined), ability to be divided into extremely small units (called Satoshis), and capability to transcend borders and time, it increasingly serves as a form of financial security for individuals, companies, and central banks. It has been a primary interest of both retail and institutional players (Belke and Beretta, 2020). As central banks around the world grapple with these implications, the question arises of whether Bitcoin can take a similar position as gold has historically held in terms of the reserves of a central bank. This paper aims to further investigate the relationship between gold, Bitcoin, and central banks, focusing on the role of gold in the 21st century and whether Bitcoin can be considered an adequate replacement. More importantly, can such a highly volatile but popular and commonly traded commodity, such as Bitcoin, be included in the list of assets a central bank may employ in the future? Based on the evolution of central bank gold reserves, Bitcoin, and Central Bank Digital Currencies (CBDCs), this paper seeks to identify the new dynamics that shape central banking in the 21st century.

Research Questions:

Given the dynamic of the last decade or more of the new century, what is the relationship between some of the largest central banks of the world and gold? Is there a correlation between the health of an economy and/or a central bank's balance sheet and their amount of gold holdings? Lastly, could Bitcoin be considered "digital gold" and will central banks ever hold reserves in Bitcoin?

2. Central Banks and Gold: A Historical Context

The Role of Gold in Global Monetary Systems

Gold has been an integral form of money worldwide for centuries since it is rare, does not decompose or disintegrate, and can serve as a means of accumulating wealth across generations. Traditionally, it has been used not only as a means of payment but also as a sign of wealth (as in the case of gold jewelry). The most famous of these systems was the gold standard, first established in England in the 1700s, but then re-established for a time in the United States in the 19th and early 20th centuries, whereby the value (or perceived worth) of a nation's currency depended upon its gold stock (Belke and Beretta, 2020). This system brought order and restraint to the monetary

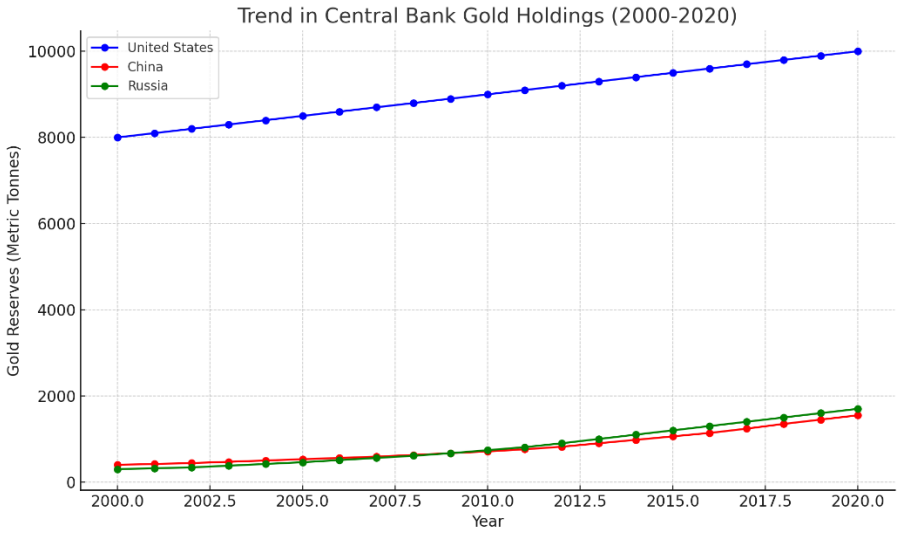
system, in the sense that a country could only issue as much currency as it had gold and that there was a strong, reliable monetary structure which supported monetary policy. The most well-known of these standards was the Bretton Woods Gold Arrangement, which began post-WWII and tied the US Dollar to gold and the rest of the major currencies of the world to the dollar. However, the gold standard imposed certain constraints as the global economy developed. Gold was a finite resource and could not keep up with the demand for liquidity, especially as nations faced challenges regarding the need to finance wars, manage inflation, and cope with economic downturns. The Bretton Woods system ended in 1971 when the United States suspended the dollar's convertibility to gold and ushered in an era of fiat money – currencies not backed by physical commodities but by government regulation (Prates, 2021).

Nevertheless, gold remains an essential commodity for central banks today. While no longer the cornerstone of monetary policy in most developed countries, gold remains an insurance against inflation, currency devaluations, and political risks. Central banks hold gold in their reserves in large part to bolster confidence in their national currencies and provide some degree of protection against adverse external conditions. As it stands now, central banks around the globe have been on a recent sprint to accumulate more gold, with some countries' central banks (such as those of Russia and China) now accumulating thousands of tons of gold per year. Consequently, gold has assumed a different role in the last decades, serving predominantly as insurance instead of as currency.

Central Bank Gold Reserves

Interestingly, even as countries ceased using the gold standard as their monetary reference, central banks still continued to maintain a significant stock of gold over the years (and as stated above, continue to acquire it). Today, even as the fiat system dominates the global economy, gold still acts as a type of hedge (or insurance) in the financial system. Gold also serves as a buffer against external economic shocks and offers protection during economic crises or cases of hyperinflation. The global economic crises thus far of the 21st century have cemented this view of gold as an asset predominantly used for safe-haven purposes. When there is extreme volatility in the market, people inherently turn towards investing in gold (Taskinsoy, 2021). For instance, certain emerging market economies, including Russia, China, and India, have ramped up their purchase of gold over the last few decades. This change is partly due to the wish to decrease reliance on the US dollar, especially during economic difficulties or diplomatic strife (Gilder, 2016). For instance, the increase in Russia's gold holdings shows that the country is tactfully positioned, especially regarding measures such as sanctions (Bernholz, 2002). Other countries, such as China, have also used gold accumulation to diversify away from the US dollar and exert more control within the international monetary system. Moreover, these nations want to expand their foreign reserves and promote the use of their own currencies in global markets (especially the Chinese Yuan).

Figure 1: Trend in Central Bank Gold Holdings (2000-2020)



Given the above figure, it is essential to understand that the gold reserves strategies of central banks are not equal; this process depends on numerous factors, such as the economic policies of different countries, geopolitical activity, and markets. Some central banks, particularly those of the developed countries, have chosen to simply retain their gold reserves and not add much to their stockpile. At the same time, many others, especially those of emerging economies, have striven to augment their gold reserves. For instance, China has emerged as one of the largest holders of gold in the world and has gradually been increasing its gold reserves in large part to challenge the dominance of the US dollar in the global economy.

The Correlation Between Economic Health and Gold Holdings

A certain dynamic tends to exists between the overall health of a nation's economy and its physical gold inventory. Generally, countries experiencing economic uncertainty or inflation risks will seek to build more gold reserves (Prates, 2021). For instance, after the global financial crisis of 2008, many countries, especially those with emerging economies, sought a safe haven in gold due to the risks of holding USD and other major foreign currencies. Moreover, when possible, countries facing economic constraints or geopolitical conflicts have striven to enhance their gold stock. For example, Russia has been amassing gold to protect its economy from fluctuations in oil prices and Western sanctions (Taskinsoy, 2021). Likewise, the gradual increase in gold ownership is congruent with China's long-term strategy of challenging the dollar's dominance and replacing it with the renminbi. In contrast, developed economies may not necessarily focus on increasing their gold reserves because they tend to have more faith in their fiat money systems. For example, although the US has had significant gold reserves in the past, it is now heavily invested in other assets (such as Treasury bonds and foreign currencies) in addition to gold, at least in part because it trusts the dollar to remain the world’s international reserve currency.

3. Bitcoin: The Emergence of Digital Gold

Bitcoin as a Digital Asset

Bitcoin was launched in late 2008 by a person or a group of persons under the pseudonym of Satoshi Nakamoto. It has shown to be a revolutionary approach to the concepts of what money actually is. Unlike the conventional fiat currency system, Bitcoin is a virtual currency not governed by any authority such as a central bank. Instead, it is controlled and managed through a peer-to-peer network using technology known as blockchain. This decentralization is one characteristic that makes Bitcoin different from other types of money and has encouraged its adoption, especially by individuals who do not trust political or financial institutions. Bitcoin has been designed in such a way that the overall supply of the currency is capped at 21 million units. This scarcity is a significant attribute that has led to its comparison to physical gold (Bernholz, 2002). Gold has always been valued in large part due to its scarcity, and Bitcoin also has a scarcity factor, in the sense that the number of bitcoins that can ever be created (or "*mined*") is mathematically fixed by an algorithm. For thousands of years, gold has been considered a way to store value, protect against inflation and economic instability, and guard against the depreciation of traditional fiat money (Belke and Beretta, 2020). This characteristic of scarcity, combined with the fact that Bitcoin is fully digital, has led to it be described as "digital gold". Moreover, similar to physical gold, Bitcoin is to a great degree unregulated since it is a decentralized currency (i.e. no centralized authority has the exclusive right to issue it). Due to its increasing adoption and the possibility of disrupting centralized financial systems, governments and commercial financial institutions have been compelled to learn more about Bitcoin (even to the extent of some governments, such as that of El Salvador, even adopting it as legal tender at the encouragement of its President). However, over its short history (15 years as of this writing), Bitcoin has been an incredibly volatile asset, which has led many central banks along with both institutional and retail investors to be wary of it. Furthermore, it is considered to still be in the "early adoption phase" of its trajectory.

The following table compares the characteristics of gold vs. Bitcoin:

Table 1: Comparison of Properties of Gold vs. Bitcoin

Property	Bitcoin	Gold
Scarcity	Fixed supply of 21 million coins	Limited supply, finite resource
Divisibility	Highly divisible (up to 100 million satoshis per bitcoin)	Divisible into smaller units (e.g., grams, ounces)
Portability	Easily transferable electronically across borders	Difficult to transport physically, especially in large quantities
Storage	Digital storage on wallets, exchanges	Physical storage in vaults or safes
Security	High security via cryptographic techniques and blockchain	Vulnerable to theft but secured through physical protection (e.g., vaults)

As can be seen, both gold and Bitcoin have unique characteristics that make distinguish each. Perhaps there is no easy answer to the question of which is better and the role that each could play in the future of international monetary policy.

Bitcoin's Role in Financial Markets

Bitcoin has continued to evolve since the time of its launch. In its first years of existence, it was used primarily by technology pioneers and innovators (many of whom referred to themselves as "*cypherpunks*"). However, over the years of its existence, it has slowly begun to garner interest from institutional investors, hedge funds, and corporations who now hold Bitcoin as not only a speculative asset but as a form of value storage, a role which has usually been attributed to gold (Thorarinsson et al., 2013).

One of the significant recent trends in Bitcoin's market growth is the investment from institutional players. Various large investment firms, corporations, and hedge funds have now invested in Bitcoin, including Blackrock, Grayscale, Fidelity, Tesla, and MicroStrategy. This institutional interest has enhanced Bitcoin's credibility and placed it among other more traditional forms of investment (such as equity funds). In this regard, it is considered a high-risk/high-reward investment instrument and has become a more important element in the concept of portfolio diversification (Prates, 2021), which is particularly appealing in volatile economic environments.

Furthermore, it has become an ideal medium of exchange and store of value, especially in countries with volatile fiat currencies. In countries such as Venezuela and Zimbabwe, in recent years, the government has followed economic policies leading to the destruction of the local currencies through hyperinflation, making Bitcoin a viable instrument for savings and transactions (Thorarinsson et al., 2013). This usage highlights the ability of Bitcoin to act like gold, which can be used as a store of value during very unstable economic periods (Bordo, 2021). However, Bitcoin also has inherent drawbacks, including high volatility. Although the price of Bitcoin has risen exponentially over the years, this growth has been anything but linear. Prices of Bitcoin could rise or fall by as much as 20 percent or more within a day in the past. This level of instability has been problematic for the institutional adoption of Bitcoin and still needs to be considered by central banks as a reserve asset. Gold, on the other hand, has traditionally risen in a much more controlled fashion (although its price growth has been much less than that of Bitcoin).

Is Bitcoin the New Gold?

Bitcoin has come to be known as "digital gold," because Bitcoin is considered to be an inflation-resistant, digital currency offering some of the qualities of gold. In addition, both assets are scarce and offer protection against currency devaluation and inflation. However, gold has been a form of saving for millennia. The fact that it has existed for centuries across different civilizations and cultures has gradually determined its inherent value as a store of value and/or medium of exchange (Danker, 2012).

On the other hand, Bitcoin is significantly newer as an asset, as it was created only in 2009, so it remains to be seen whether it will also serve as a good store of value (Hernandez, 2022). While

Bitcoin has demonstrated remarkable strength and immense potential for appreciation (in fact, it has been the best performing asset of any type since its inception), some challenges are unique to this asset class, such as substantial volatility. Using Bitcoin as a currency may present some initial challenges not only due to its price swings, but also due to factors such as regulatory status, technological advancements, and sentiment (Bordo, 2021). The price of gold, on the other hand, is relatively stable and depends on supply and demand, geopolitical events, and inflation expectations. This consistency has made gold more secure for central banks and institutional investors seeking a long-term investment rather than just short-term returns.

However, key differences remain regarding the limited supply of Bitcoin (fixed at only 21 million units), which many investors consider a unique feature not present in any other asset, and the rapidly advancing embrace of blockchain technology. Another factor that supports the adoption of Bitcoin over gold is that digital capital is more portable than physical capital; it is easier to store and transfer across time, space, and borders since it is in a digital format (Gilder, 2016). Moreover, since the use of Bitcoin is transparent and it is not stored in physical form like gold, it is more resistant to theft. However, the massive price swings of Bitcoin still remain an issue. Therefore, for qualify Bitcoin as a more likely candidate for a central bank reserve, the volatility most likely will need to diminish somewhat. However, it is probable that as Bitcoin continues to evolve and mature as an asset class, that its volatility will diminish.

4. Central Banks' Interaction with Bitcoin

Central Banks and Bitcoin

Since the emergence of Bitcoin, central banks across the globe have weighed its potential in the established financial framework. Traditionally, central banks have been cautious or even opposed to the idea of digital currencies being held in their reserves. Some of the most renowned central banks that have been opposed to the idea of Bitcoin include the US Federal Reserve, the European Central Bank (ECB), and the People's Bank of China (PBOC). These institutions focus on what they consider to be the negatives of Bitcoin: price volatility, usage in criminal activities, and the fact that it has no legal backing. They also have posited that Bitcoin is too risky and unstable to serve as a reliable means of value storage or transactions (Sadewa and Huruta, 2024).

Similarly, the European Central Bank has also been skeptical, especially regarding Bitcoin being used to facilitate money laundering and tax evasion (Meling et al., 2024). The ECB has also expressed concerns regarding the volatility associated with Bitcoin; thereby, its capacity as a stable unit of account needs to be improved. Nevertheless, the ECB has recognized the potential of blockchain technology and its ability to enhance the transparency and effectiveness of operations in the financial sphere. However, the People's Bank of China (PBOC) has taken a more active approach over the years (Gilder, 2016). Although the Chinese government has prohibited the trading and mining of Bitcoin due to the potential instability caused in the financial sector as well as excessive energy consumption, China has been leading the way in implementing a digital yuan, which is already in the trial phase. This suggests that while the PBOC deems Bitcoin as a

technology that may challenge its policymaking authority, it also recognizes the value of the blockchain and other cryptocurrency technology in modernizing its financial system.

Risks and Opportunities for Central Banks

Bitcoin represent both risks and opportunities for central banks. One danger would be that it, being a decentralized digital asset (with a fixed number of tokens), threatens to displace traditional fiat currency. It could potentially undermine the authority of state-issued money as a store of value or a medium of exchange, which may impact the implementation of monetary policy measures, such as interest rates or Quantitative Easing (Georgiou, 2020). Although over the longer term, Bitcoin's value has risen dramatically, its values have been extremely unpredictable over the shorter term. While central banks depend on fiat money to control economies, the unpredictable nature of Bitcoin may lead to the disruption of more vulnerable financial systems, especially those of developing nations (Danker, 2012). Additionally, higher inflation rates in certain countries may also lead to the outflow of capital to Bitcoin, thus aggravating the situation with national currencies and even causing their collapse (Taskinsoy, 2021).

Despite any potential challenges and risks, cryptocurrencies allow central banks to advance the financial systems globally. Bitcoin, the dominant digital currency, is built on an advanced form of record-keeping known as the blockchain, which has the potential to enhance the accountability, transparency, and effectiveness of financial transactions. For instance, emerging economies with relatively immature banking industries could leverage blockchain to provide more financial services to those lacking them. Furthermore, blockchain may eliminate some intermediaries, decrease the cost of transactions, and promote financial access. Bitcoin's lack of centralization could also spur innovation in monetary policy. Moreover, supporters have stated it may place pressure on central banks to implement better approaches to stabilize their respective fiat currencies. Lastly, it could result in more competition and enhanced rules of operation in the financial sector and payment systems.

Central Bank Digital Currencies (CBDCs)

Due to the rise of cryptocurrencies, more central banks are considering implementing central bank digital currencies (CBDCs). While Bitcoin is a decentralized electronic currency, CBDCs are centralized digital currencies under national governments' supervision, designated as electronic money that is legal tender and backed by government credit (Belke et al., 2020). Countries involved in exploring the possibility of developing CBDCs include China (with the digital yuan mentioned above), the European Union, and the United States. CBDCs may (arguably) be potentially advantageous over Bitcoin in a few aspects, such as stability and regulation. Being recognized as state-backed digital currencies, it is touted that CBDCs would offer the same advantages as digital currencies while being free from the instabilities of cryptocurrencies. It could be one way of revolutionizing the payment systems for central banks while providing a secure, efficient digital fiat currency (Bordo, 2021). However, CBDCs may also assist central banks in retaining authority over their monetary systems, particularly given the increasing popularity of

private cryptocurrencies. For instance, the Central digital yuan seeks to fortify the sovereignty and independence of China's financial system and reduce dependence on international money. CBDCs imply a centralized, government-issued currency that counteracts decentralized cryptocurrencies (Belke and Beretta, 2020). However, essential privacy implications arise from the implementation of CBDCs. Compared to Bitcoin, which allows users to perform anonymous transactions, CBDCs would be fully trackable by central banks. This could create issues related to government surveillance and the continued diminishing of financial privacy. This question remains open as central banks strive to find the right balance between efficiency and control.

5. The Future of Gold, Bitcoin, and Central Banks

Will Central Banks Ever Hold Bitcoin Reserves?

As Bitcoin evolves from a niche digital asset to a mainstream investment, the question then becomes: will central banks ever hold Bitcoin reserves? Although the current trends remain largely positive and growth in the usage of Bitcoin and other cryptocurrencies remain robust, there exist several challenges that must be overcome before this phenomenon can fully occur. The first challenge with Bitcoin is its instability, which makes it highly volatile. Its price can fluctuate by thousands of dollars (or several percentage points) within a matter of a few hours and even more over a period of days or weeks, making it highly risky for central banks that require stable assets to regulate an economy (Hernandez, 2022). Moreover, Bitcoin fails to provide the kind of regulation that central banks need for their operations. However, as a decentralized asset, Bitcoin exists separately from the traditional financial system, raising questions about its openness and management (Prates, 2021). Due to the historical lack of comprehensive global standards regulating cryptocurrencies, central banks have typically felt the need for clarification regarding adding Bitcoin to their portfolios. This is in large part because Bitcoin has a much shorter history (only dating back to 2009) than most reserve assets, such as gold. Gold has been used as a currency for centuries; on the other hand, Bitcoin has only existed for only a matter of years, making it hard for central banks to determine its durability moving forward (Raskin and Yermack, 2018). However, some central banks are now considering adding a small amount of Bitcoin to their reserves in the near future. Since Bitcoin is now considered a much more mature asset, central banks may “test the waters” by employing a limited volume as a hedge against financial threats and the continued debasement of national fiat currencies. See Table 2 below.

Table 2: Potential Scenarios for Bitcoin in Central Bank Reserves

Scenario	Description	Percentage of Total Reserves	Likelihood (2024)
Minimal Adoption	Central banks hold no Bitcoin reserves or only a negligible amount. Bitcoin is seen as too volatile and risky for inclusion.	0-1%	Low
Limited Experimentation	Some central banks experiment with small Bitcoin allocations, testing its value as a hedge or portfolio diversification tool.	1-5%	Moderate
Moderate Adoption	A few central banks include Bitcoin in their reserves, driven by the desire to diversify and hedge against traditional risks.	5-10%	Moderate
Widespread Acceptance	Central banks widely accept Bitcoin as a reserve asset, either alongside or in place of traditional assets like gold.	10%+	Low

The Future of Gold in the Central Bank Portfolio

Although Bitcoin and other digital assets will likely continue to grow in popularity, gold should remain a dominant component of central bank portfolios for the foreseeable future. Again, interest and demand for gold are anchored in its attributes – it is scarce, difficult to mine, has high aesthetic appeal, and considered a stable asset, which acts as a defense against risk in the financial world (White, 2008). Traditionally, gold is used as an "flight to safety" type instrument in extreme

situations, such as economic downturns, conflicts, or high inflation, just as it is today. Its inherent physical characteristics, which include durability and the capacity to maintain value, are suitable for storing the world's monetary value and helping to ensure a nation's economic stability. With centuries of usage in international trade and finance, this reliability makes it possible for gold to sustain its position as an anchor of central bank holdings despite the emergence of new digital currencies (Grynberg et al., 2019). The trust in gold as a store of value further cements its position as a reserve with central banks. While Bitcoin is a relatively new entrant in financial markets, slowly and gradually gaining acceptance as "digital gold", the concept of gold has already been accepted within global financial systems for several centuries. While the prospects of Bitcoin are clear, the frequent fluctuations in the price have traditionally been difficult to ignore. As for central banks, some may consider diversifying into digital assets as an option, but gold will likely retain its priority as an economic hedge, especially during volatile times.

The Impact on Global Financial Systems

The increasing presence of gold, Bitcoin, and CBDCs in global central bank reserves may be harbingers of significant transformations to come over the next few years within international financial systems. Thus, this new paradigm may change the power dynamic between fiat money, gold, and Bitcoin (as well as potentially other cryptocurrencies). Global fiat currencies have reigned supreme since the end of the gold standard in 1971 (when floating exchange rates became the norm). However, Bitcoin (and to a lesser degree, CBDCs) are challenging this established system (Weber, 2016). With countries continuing to experiment with digital currencies, the global financial system at some point in the future may include physical gold alongside Bitcoin and state-backed digital money (Raskin and Yermack, 2018). In this context, gold remains a store of value and an inflation hedge. At the same time, Bitcoin has the potential for financial inclusion, portfolio diversification, and a store of value as a decentralized digital currency. CBDCs could potentially be used as an equivalent of both fiat money and cryptocurrencies, thus giving central banks the power to regulate monetary systems within the context of constantly emerging digitalization (Bordo, 2021). With Bitcoin and other CBDCs coming into play as viable options for conducting transactions, it can be expected that the structure of the global financial markets will split into different approaches depending on the economic goals of the countries (Grynberg et al., 2019). The adoption of CBDCs can also pressure central banks to reassess how monetary policy is managed in the presence of Bitcoin. As more people adopt digital assets, physical currency might become less effective, and as a possible result, it may become increasingly challenging to influence inflation and interest rates. This could result in profound changes in central banks' policy regarding stabilizing economic growth and financial regulation.

6. Conclusion

This paper has sought to conceptualize central banks, gold, and Bitcoin in the context of the current financial system and the symbiotic relationship that has been witnessed between these three. With the emergence of Bitcoin as an innovative digital form of gold as a store of value, central banks are experiencing new opportunities and threats that they experienced to some degree when reserve

assets were backed by gold. That is to say, gold was pivotal in monetary policy. However, Bitcoin (along with its inherent scarcity), it could be seen as complementary to gold. Although Bitcoin has always been known for its high volatility, uncertain legal status, and "young age", it has gradually integrated itself into financial markets. It is quite likely that it becomes a reserve currency for central banks in the future.

Moreover, governments are considering the strategic use of central bank digital currencies (CBDCs), which allow the state to gain significant control over the monetary system and influence power distribution in the world economy. With digital assets likely to change over time, central banks may use a small amount of Bitcoin in their reserves while relying on gold for stability. The direction of central banking moving forward will require the application of traditional and modern elements, thereby redesigning the monetary system and reserve base.

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