




Bitcoin: an alternative to fiat money? A post-Keynesian perspective

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Abstract

Motivation: This paper addresses the ongoing debate surrounding Bitcoin's potential to function as an alternative to state-issued fiat currencies. With the advent of Bitcoin and its increasing global prominence, it is essential to explore its viability, particularly in light of its formal adoption in El Salvador as legal tender. The limited supply and decentralized nature of Bitcoin present a significant departure from traditional monetary systems, which raises questions regarding its capacity to fulfill the roles of money under Modern Monetary Theory (MMT).

Aim: The primary goal of this paper is to critically examine whether Bitcoin can serve as a functional replacement for fiat money. Using a post-Keynesian analytical framework, this study investigates Bitcoin's ability to meet the requirements of sovereign money, particularly within the theoretical framework of MMT. The analysis focuses on Bitcoin's decentralized issuance, limited supply, and its role in fiscal policy and credit creation.

Materials and methods: This research employs a critical literature review and a case study analysis, using the framework of MMT and post-Keynesian endogenous money theory to assess Bitcoin's economic implications and its real-world application in El Salvador's Bitcoin Law. The study analyzes Bitcoin's economic implications based on the endogenous money supply model and evaluates its impact on government fiscal policy, credit markets, and economic stability in both theoretical and practical contexts, with a special focus on El Salvador's Bitcoin Law.

Results: The analysis reveals significant limitations in Bitcoin's ability to function as a fiat currency. Its rigid supply and speculative nature hinder its capacity to serve as a medium of exchange, store of value, and unit of account, as envisaged by MMT. The study concludes that Bitcoin's decentralized nature and deflationary design pose challenges for its broader adoption as state money, particularly in managing aggregate demand and economic crises.

Keywords: *Bitcoin; fiat currency; MMT; endogenous money supply; El Salvador*

JEL: *E12; E51; F33*

1. Introduction

The global financial crisis of 2008 and the subsequent monetary policies — particularly quantitative easing and other unconventional expansionary measures — have raised questions about the long-term efficacy and stability of state-backed fiat currencies (Bernanke,

2013). As central banks sought to stabilize economies through these interventions, a parallel narrative emerged, suggesting that the increased control exerted by monetary authorities over the financial system contributed to a decline in public confidence (Friedman, 2009). This disillusionment spurred interest in decentralized alternatives, culminating

in the emergence of Bitcoin. Conceived as a response to the perceived failings of the traditional financial system, Bitcoin represents an effort to decentralize money and diminish the influence of central banks and established financial institutions (Nakamoto, 2008).

Sixteen years after its inception, Bitcoin — first introduced by the pseudonymous figure Satoshi Nakamoto in the 2008 white-paper *Bitcoin: A Peer-to-Peer Electronic Cash System* — continues to influence the discourse surrounding the future of money (Nakamoto, 2008). While Bitcoin has not entirely restructured the global financial system, it has introduced new paradigms in the conceptualization of digital currencies, with particular emphasis on decentralization, cryptographic security, and disintermediation. In this context, Bitcoin has evolved into a subject of both academic and practical significance, garnering the attention of economists, policymakers, and financial market participants (Narayanan et al., 2016).

The appeal of Bitcoin lies in its decentralized structure and the promise of operating beyond the control of central authorities. Though it was not the first attempt to create a digital currency — preceded by David Chaum’s development of blind signatures in 1982 (Chaum, 1983) — it was Nakamoto’s vision of a blockchain-based digital currency that captured global attention. Bitcoin’s design allows transactions to be recorded in an immutable, transparent ledger accessible to all participants, thus eliminating the need for a trusted intermediary such as a bank. On January 3, 2009, the Bitcoin network’s genesis block was mined, marking the official launch of what is now the world’s most recognized cryptocurrency.

Over the ensuing years, Bitcoin has achieved considerable adoption, despite facing significant scepticism and regulatory hurdles. As of February 2024, the Bitcoin network supports millions of active wallets, with the cryptocurrency achieving substantial market capitalization and a peak exchange rate of over \$69,000. This growth has fueled discussions regarding Bitcoin’s potential to serve as an al-

ternative to fiat money, its ability to operate as a hedge against inflation, and its role in the broader financial ecosystem (Yermack, 2015).

Given Bitcoin’s prominence and its perceived capacity to disrupt traditional financial models, it is essential to critically examine its characteristics and potential in the context of established monetary theories. Despite the optimism surrounding Bitcoin’s revolutionary potential, significant challenges remain, particularly in its ability to function as state-backed money (Krugman, 2018).

2. Purpose and methods

This paper employs a post-Keynesian analytical framework, utilizing a critical literature review and analysis as the primary research method, to examine Bitcoin’s viability as a functional alternative to state-issued fiat currencies, particularly in light of its formal adoption as legal tender in El Salvador. The theoretical foundation of the analysis is rooted in Modern Monetary Theory (MMT), as articulated by key figures such as Warren Mosler, Bill Mitchell, and L. Randall Wray. MMT, which reconceptualizes the nature of money as a state-driven phenomenon, offers a crucial lens for evaluating Bitcoin’s capacity to fulfill the roles traditionally attributed to sovereign money. Specifically, the distinction between the horizontal (credit money created by private banks) and vertical (net money injected by government spending minus taxes) components of the money supply, as emphasized in MMT, provides the primary theoretical toolset for this analysis.

Additionally, the endogenous theory of money, notably as developed by Marc Lavoie in *The Endogenous Flow of Credit and the Post-Keynesian Theory of Money* (1984), underpins the analysis of Bitcoin’s interaction with the banking system and broader economy. Lavoie’s model, which postulates that the money supply is determined endogenously by the demand for credit within the economy, is used to explore the potential disruptions that would arise in a hypothetical scenario of full “bitcoinisation” (hereafter, this term will be

used to refer to the state in which Bitcoin is effectively acting as the main state-sanctioned legal means of payment). This framework enables a comparative analysis of the implications of Bitcoin's rigid and predetermined supply mechanism, as opposed to the inherently flexible nature of credit-based money creation in fiat systems.

In this context, the Bitcoin Law of El Salvador is critically assessed in relation to the key assumptions of MMT, particularly the notion of state money, taxation, and unit of account. By employing a critical literature review methodology and evaluating Bitcoin against MMT's conceptualization of money as a public institution backed by state authority, this study investigates whether Bitcoin can truly fulfill the functions of sovereign money within a national economy. Moreover, the consequences of Bitcoin's fixed supply and decentralized issuance for monetary policy, fiscal stability, and the broader economic system are scrutinized, with particular focus on its potential to disrupt the endogenous money supply, credit markets, and investment dynamics.

3. Characteristics of bitcoin

To begin the analysis, it is necessary to distinguish the key characteristics of Bitcoin that constitute its essence in terms of its usefulness to the financial system. The first is its decentralized structure, resulting from its embedding on the aforementioned blockchain technology (Nakamoto, 2008). Unlike other payment systems, there is no central authority overseeing transactions and providing network capacity — the entire system relies on the computing power of individual miners, who lend it in exchange for transaction fees and new BTC units issued directly to their wallets with each new approved block of the register. However, as time passes, the amount of BTC foreseen to be issued procedurally decreases. This is a direct result of another feature of bitcoin — a limited quantity. The predetermined cap on the supply of 21 million tokens is written into the protocols of this system. According to Blockchain.com, more than

19 million units are in circulation (19,426,087 as of 13 February 2024), representing 92.5% of the total supply, making Bitcoin inherently deflationary due to its fixed cap of 21 million tokens. This limitation is intended to simulate the rarity of precious metals and alludes to the days of the gold standard, which was supposed to be characterized by greater stability in the value of money over time and austerity. This limited supply, additionally with the irreversibility of transactions and cryptographic security, is intended to give bitcoin the potential to act as a hedge against the effects of financial crises and inflation (Yermack, 2015).

4. El Salvador's experience with Bitcoin

Bitcoin has remained a problematic issue for financial market regulators, fiscal authorities, and even state law enforcement agencies since its inception. The link between cryptocurrencies and the black market activity is well documented (Saiedi et al., 2021), so the prevalence of efforts by various countries over the years to regulate the legal status of cryptocurrencies is understandable. However, the case is different when it comes to the adaptation as legal tender. From time to time, there have been reports in the media that efforts in this direction are being initiated in some part of the world, only to be immediately dismissed. A rather high-profile case in Europe was the situation surrounding the 2017 Catalan independence vote and the alleged promise of Russian financial support if this newly formed state adopted legislation very favorable to Bitcoin (Quotidiano, 2022). In practice, however, the actual interest in cryptocurrency adoption has so far been quite negligible. The real qualitative change did not come until 2021, when, on the initiative of Salvadoran President Nayib Bukele, the Bitcoin Law (*Ley Bitcoin*) came into effect (Nuthall, Magaa, & Nogueira, 2021). It was the largest experiment of its kind in the implementation of legislation aimed at "bitcoinising" the economy.

The essential content of this law boils down to the following points: Article 1: Bitcoin is given equal status to the US dollar as

a national means of payment, indicating that the state acknowledges its legitimacy as a unit of account. (However, this status is not fully substantiated by the mechanisms that underlie its role in the economy, as will be discussed further). Article 2: The exchange rate between BTC and the USD is floating, determined by supply and demand in the market. Article 3: Prices for goods and services may be expressed in BTC or USD (this dual pricing mechanism implies that bitcoin has not supplanted the dollar as the dominant unit of account, which raises questions about the actual extent of its planned integration). Article 4.: Tax obligations may be paid in BTC or USD. Article 5: Transactions in bitcoin are exempt from capital gains tax (a move likely intended to promote its adoption but also revealing an implicit recognition of its speculative nature, which further distances it from the typical characteristics of state-backed money (Swanson, 2015)). Article 7: The state obliges all economic actors to accept Bitcoin as a means of payment, attempting to institutionalize its role in the economy. Article 12 — an exception to Article 7: Individuals without access to the infrastructure and technology that enables bitcoin transactions are exempt from the requirement to accept it (which suggests that the adoption of BTC is contingent upon technological factors that are irrelevant to the acceptance of fiat currencies). Article 13: Debtors have the option to repay dollar-denominated obligations in Bitcoin. Article 14: In order to reduce currency risk, a trust fund will be created by the state to facilitate the conversion of Bitcoin into dollars (Alonso et al., 2024), a provision that indirectly acknowledges the inherent volatility and lack of control the state has over the cryptocurrency. The criteria proposed by Modern Monetary Theory (MMT), including the state's control over money supply, taxation, and fiscal obligations, will serve as a benchmark for evaluating whether Bitcoin meets the requirements of sovereign money.

5. Bitcoin through the prism of Modern Monetary Theory

When it comes to defining money, MMT theorists rely heavily on the optics of chartalism (Latin: *charta* — token, coupon), a theory created by Georg F. Knapp in 1905, according to which money is a product of law, established by the state, rather than a commodity (Knapp, 1924). This theory directly opposes the commodity-based view of money, emphasizing the central role of the state in assigning value to a medium of exchange, a notion critical to understanding why Bitcoin, despite its legal status, does not fully align with MMT's perspective on money (Wray, 2012). This view dates back to the dominance of the gold standard and the debate at the time over the origin of money. The metallists argued that money originated from the bottom up, by selecting a representative (and suitably convenient for these purposes and characterized by the “innate” quality of being rare in nature) commodity to facilitate barter. Chartalists pointed out the fundamental lack of backing in historical sources for this hypothesis, a criticism that continues to resonate in the context of Bitcoin, which proponents sometimes liken to digital gold, yet lacks the direct backing and legal institutionalization that MMT asserts is necessary for something to function as money (Swanson, 2015).

John Maynard Keynes also raised a similar argument in his work *A Treatise on Money* (1930), arguing that for at least the last 4,000 years, money has been a creation of the state, a principle which underscores the fundamental divergence between state-issued fiat money and decentralized currencies like Bitcoin. MMT theorists have adopted and extended this perspective, embracing it as the backbone of their own theory, which places the state at the center of money creation and fiscal policy, in stark contrast to the decentralized nature of Bitcoin. Wray (2012, p. 115) articulated its key assumptions as follows: “All modern money systems (...) are state money systems in which the incumbent chooses a unit of account and imposes fiscal obligations in that

unit. It also issues the currency used to pay taxes.” Returning to the example of El Salvador — if we take Wray’s characterization of modern monetary systems, cited here, as a list of requirements that a payment instrument must meet in order to be called full-fledged money, Bitcoin seems to meet only the first point. The authorities have adopted it as one of the valid (along with the US dollar), state units of account — Salvadorans have the right to regulate the tax obligations imposed on them by the state with it, which superficially fulfills the MMT requirement that the state accepts the currency for tax obligations (Nuthall, Magaa, & Nogueira, 2021). However, this is not a sufficient condition. Neither the State of El Salvador, nor any other institution, is an issuer of Bitcoin, making it not their IOU (I owe you) (Wray, 2012), a critical distinction that MMT makes between state-backed currencies and other forms of money.

As Wray (2012) further explains — fiat money in circulation is a liability to its issuer — it is on the liability side of the central bank’s balance sheet. However, it is not strictly a promise of repayment — as is usually the case with private IOUs. While a country may adopt the gold standard (or a fixed exchange rate) — then indeed the central bank makes a promise to exchange (“repay”) the money for a specific metal or currency, but in the majority of cases no such promise is made. The only promise that is made by the state in a floating exchange rate regime is a guarantee to accept money when settling obligations to the state (e.g. taxes). That is, the issuer of non-convertible money does not have to do anything more than accept its obligation back, thereby establishing a direct link between money and the state’s fiscal power. The value of fiat money is a direct consequence of taxation — the requirement to pay taxes means that there is a demand for money in society at least equal to the value of the obligations imposed, ensuring that the currency is broadly accepted (Mitchell, Wray, & Watts, 2019). In fact, this demand is much greater because people are willing to acquire more money than just enough to pay their taxes — they exchange goods and ser-

vices with it, making it a generally acceptable means of payment in the economy. This broad acceptability, rooted in the state’s legal and fiscal mandates, stands in contrast to Bitcoin’s market-driven evaluation, which does not rely on such institutional backing (Swanson, 2015).

In the case of bitcoin, there is no institution for which it is a liability and which could guarantee its nominal value. Although BTC has been adopted *de jure* as El Salvador’s state unit of account, the tax obligations imposed on Salvadorans are first calculated in relation to the dollar, the dominant unit of account in the country (Nuthall, Magaa, & Nogueira, 2021). Only then are they converted at a floating rate into BTC (Alonso et al., 2024). This reliance on the dollar as the primary unit of account highlights a crucial limitation in Bitcoin’s function as money under MMT’s framework. If there were a hypothetical collapse of the Bitcoin exchange rate against the dollar and its sharp depreciation, then the tax liabilities expressed in dollars would not change — only Bitcoin users would have to transfer more tokens into the treasury’s wallet. The only real difference between a Salvadoran paying taxes in BTC and, for example, a US citizen whose main asset is Bitcoins, is that the US resident has to pay additional transaction fees on currency conversion, while the Salvadoran can transact directly. However, the risks associated with exchange rate fluctuations are equally harsh for them. Therefore, it is impossible to speak of a nominal, declared value for Bitcoin. Its market evaluation is based solely on speculative demand and changes in beliefs about the hypothetical utility of this system in the indefinite future — its “fair” value understood as the discounted sum of future cash flows is zero. As Swanson (2015) put this: “It does not provide any income ($Y = 0$), it has no maturity given that it is not a financial instrument. For the sake of argument, we might assume that their maturity is infinite because we are stuck with them forever once they are created. So their fair value as a financial instrument is... ZERO?”

Is it then possible to *de facto* introduce BTC as a state unit of account, despite the

fact that it is nobody's IOU? This condition would be met if the state would establish BTC as its exclusive unit of account and impose tax liabilities nominated in it on its citizens. The state would thereby relinquish its ability to conduct any monetary policy, as it would have no control over the issuance of cryptocurrency. It is also necessary to assume that Bitcoin is the only generally acceptable means of payment in the described economy — the prices of goods and services would be universally expressed in this unit. The endogenous money supply theory will be used to analyse the economic consequences of such a scenario in detail.

6. Bitcoin and the theory of endogenous money supply

The analysis of the money supply in contemporary post-Keynesianism can be divided into two parts: the horizontal component (credit money created by private banks) and the vertical component (net money supply, resulting from government spending minus taxes) (Chart 1.). The horizontal supply, which refers to money created by commercial banks through credit expansion, operates endogenously, adjusting automatically to the economic demand for credit (Lavoie, 1992). In contrast, the vertical supply represents the injection of new money into the economy by the government through fiscal deficits or the withdrawal of money through surpluses (the word "government" does not refer here only to the executive branch of state power but to the consolidated construct of a state as money spender and issuer). This vertical supply is exogenous in nature, controlled directly by the government, and plays a key role in influencing overall economic activity. Thus, the two components of the money supply — horizontal and vertical — are distinct but interconnected elements that together form the basis for the post-Keynesian framework.

To begin the analysis, let us consider the vertical supply of money in the context of Bitcoin's adoption. In a traditional fiat system,

the government increases the vertical money supply by spending more than it taxes, injecting net financial assets into the economy (Mitchell, Wray, & Watts, 2019). This process increases aggregate demand and supports economic growth. However, in a system where Bitcoin is adopted as the primary or sole currency, the government loses the ability to manage the vertical money supply. Since bitcoin is not issued by any central authority, the government cannot spend more Bitcoins into the economy than it collects in taxes. As a result, the vertical money supply becomes fixed and constrained by the number of Bitcoins in circulation, determined by the mining process (Nakamoto, 2008). This would severely limit the government's ability to respond to economic crises, fund public services, or invest in infrastructure without first acquiring Bitcoins from the private sector, either through taxation or borrowing (Wray, 2012). Such a scenario would drastically reduce fiscal flexibility, leading to potential deflationary pressures, especially during economic downturns when the demand for money increases, but the government is unable to increase the money supply to stimulate the economy (Tymoigne & Wray, 2013).

Furthermore, the vertical supply of Bitcoin is not only predetermined but also entirely inelastic (word "inelastic" is used here in more broad and general sense) (Wray, 2012). The total supply is capped at 21 million coins, and the issuance schedule is governed by a fixed protocol that has no relation to the real economy's needs (Nakamoto, 2008). Consequently, the vertical supply of money in a Bitcoin-based economy would not respond to fluctuations in economic demand, effectively freezing the government's capacity to perform the traditional role of stabilizing the economy. This exogenous constraint is a stark contrast to the post-Keynesian view of a flexible vertical money supply, where the government can adjust its spending and taxation policies to manage inflation, unemployment, and economic growth (Mitchell, Wray, & Watts, 2019). With Bitcoin, this dynamic is lost, rendering the vertical money supply irrel-

evant to economic cycles and increasing the likelihood of destabilizing deflationary spirals.

Turning now to the horizontal supply, we observe that in the post-Keynesian model, the horizontal component of money supply is endogenous — created as a response to the credit needs of the economy (Chart 2.). Commercial banks issue loans to entrepreneurs and businesses, effectively creating money *ex nihilo* through the fractional reserve banking system (Lavoie, 1992). This credit creation allows the economy to expand and grow by enabling investments that are not constrained by existing savings. When banks provide loans, new deposits are created, which circulate in the economy as purchasing power, fueling production, consumption, and ultimately income (Kaldor, 1982). This relationship is fundamental to post-Keynesian thought, as it demonstrates the importance of demand-driven credit creation in fostering economic growth.

In a fully “bitcoinised” economy, however, the horizontal money supply would function very differently (Chart 2.). Bitcoin, by design, prevents the creation of new money through credit expansion (Nakamoto, 2008). Each Bitcoin has a transparent record of its transaction history and cannot be duplicated or multiplied through fractional reserve lending. In this context, commercial banks would no longer have the ability to create money by issuing loans that exceed their reserves. Instead, they would be limited to lending out only the Bitcoins they already hold, effectively turning them into narrow banks that can only lend against pre-existing deposits. This would severely restrict credit availability, as the supply of Bitcoin is fixed and cannot be expanded in response to increased demand for loans. Entrepreneurs seeking to finance investments would need to find lenders willing to part with their Bitcoins, making the availability of credit highly dependent on the existing distribution of savings within the economy (Dow, 1993).

This restriction on credit creation fundamentally alters the dynamics of the horizontal money supply (Lavoie, 1992). In a Bitcoin-based system, the priority of savings over investment would be enforced, as

banks and other financial institutions could not generate new purchasing power without corresponding deposits. This dynamic would likely lead to a credit crunch, as the availability of Bitcoins for lending would be limited, and interest rates would rise in response to increased competition for scarce funds. As a result, investment would be constrained by the willingness of savers to lend their bitcoins, creating a bottleneck in the flow of credit to productive enterprises (Kaldor, 1982). This prioritization of savings over investment is a reversal of the relationship advocated by Keynes and post-Keynesians, who argue that investment drives savings, not the other way around (Keynes, 1936).

In the traditional endogenous money model, investment leads to income, which then leads to savings, as income earners allocate portions of their earnings to future consumption (Lavoie, 1992). However, in a Bitcoin-based system, this causal sequence would be disrupted, as the lack of credit expansion would prevent investment from occurring in the first place unless sufficient savings already existed. This would stifle economic growth, as businesses would be unable to finance expansions or new projects without first accumulating or attracting Bitcoins from other holders.

The consequences of implementing Bitcoin as the primary currency extend beyond mere constraints on credit and fiscal policy. A Bitcoin-based system, due to its inherent deflationary nature, would likely exacerbate wealth inequality. As the value of Bitcoin appreciates over time due to its limited supply, those who hold significant quantities of Bitcoin would see their wealth increase, while those who rely on wages and have limited Bitcoin holdings would experience reduced purchasing power. This dynamic could lead to a further concentration of wealth, as access to credit becomes restricted to those who already possess significant amounts of the currency (Swanson, 2015). Moreover, the lack of government control over the money supply would remove an essential tool for mitigating inequality through progressive fiscal poli-

cies, further entrenching disparities in wealth and income distribution.

7. Conclusion

The analysis of Bitcoin through the lens of Modern Monetary Theory (MMT) and the endogenous money supply framework highlights significant limitations in its ability to serve as a functional alternative to sovereign fiat currencies. While Bitcoin's decentralized structure and fixed supply are often championed as advantages over traditional monetary systems, these features introduce substantial constraints on essential economic mechanisms, particularly in the realm of fiscal policy and credit creation. The rigidity of Bitcoin's supply — capped at 21 million units — prevents the kind of monetary flexibility necessary for governments to manage aggregate demand, respond to economic downturns, or fund public goods effectively.

El Salvador's experiment with Bitcoin as legal tender underscores the practical challenges of adopting a decentralized currency within a national economy. Although Bitcoin holds legal status as a unit of account, its speculative volatility undermines its utility as a stable medium of exchange and store of value. Additionally, Bitcoin's inability to serve as a basis for endogenous money creation limits the credit-creating capacity of financial institutions, which traditionally play a critical role in fueling investment and economic growth. Without the ability to expand the money supply through credit, Bitcoin-based economies would likely face higher interest rates, constrained access to capital, and deflationary pressures, all of which could hinder economic development.

Furthermore, the deflationary nature of Bitcoin's fixed supply poses risks for wealth concentration and economic inequality. As the value of Bitcoin appreciates over time due to its limited availability, wealth accumulation becomes skewed toward those who already hold significant amounts of the cryptocurrency, while wage earners and individuals with limited access to Bitcoin see their purchasing

power diminished. This dynamic exacerbates social inequality and limits the broader population's participation in economic gains, further distancing Bitcoin from the characteristics of a functional, state-backed monetary system.

In conclusion, despite its innovative technological underpinnings, Bitcoin's structural limitations prevent it from fulfilling the roles of money as envisaged by MMT. Its rigid supply, speculative nature, and lack of institutional backing make it ill-suited for the flexible fiscal and monetary policies required in modern economies. While it may continue to function as a speculative asset or a digital store of value for some, Bitcoin's prospects as a comprehensive alternative to sovereign fiat currencies remain highly constrained, particularly in terms of fostering economic stability, promoting equitable growth, and maintaining monetary sovereignty.

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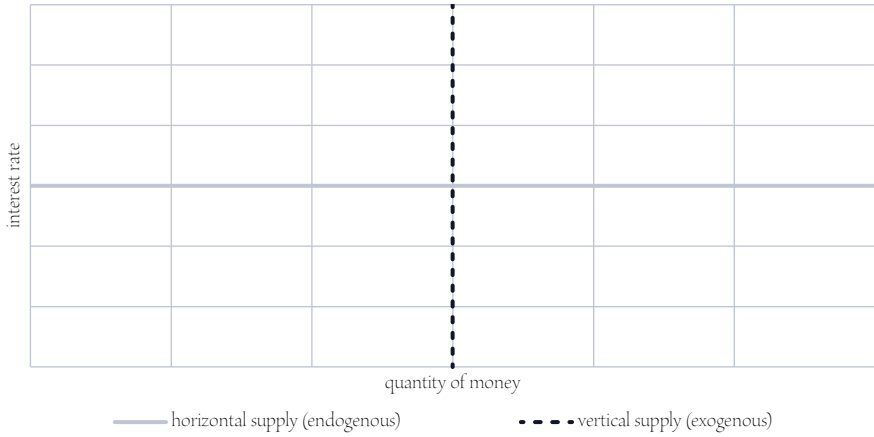
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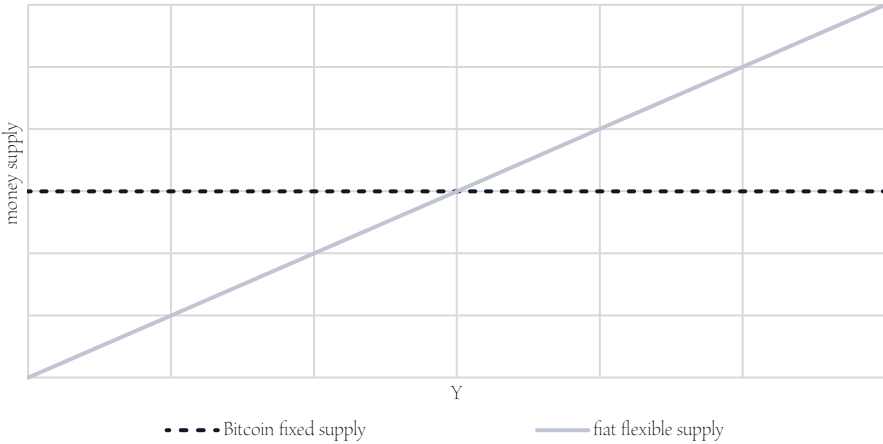
Appendix

Chart 1.
Vertical and horizontal money supply



Source: Own preparation based on Lavoie (1984).

Chart 2.
Bitcoin fixed supply vs fiat flexible money supply



Source: Own preparation based on Lavoie (1984).