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The Performance of Monetary Policy Amid the Spread of Virtual Currency Transactions

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Abstract:

This research paper explores the conceptual framework of virtual currencies, detailing their definition, distinctions from other currencies, acquisition mechanisms, and key characteristics. The study examines the rise of virtual currencies as a new form of electronic payment, highlighting their differences from electronic money and traditional currencies. Focusing on Algeria, it discusses the legal stance on virtual currency transactions and their potential impact on monetary policy. Virtual currencies, such as Bitcoin, are decentralized and exist solely online, offering unique benefits and challenges. The results of this research emphasize the differences between virtual and electronic currencies, the various types of virtual currencies, and their advantages and disadvantages. As virtual currencies continue to gain global recognition, central banks will need to innovate new tools to adapt to this evolving financial technology. The paper concludes by suggesting that central banks should regulate virtual currencies through dedicated legal frameworks, especially in light of the disruptions caused by the COVID-19 pandemic.

Keywords: virtual currency, e-commerce, monetary policy, Bitcoin, cryptocurrency, Algeria, financial systems, digital economy, regulation, central banks.

Introduction

The information revolution that has occurred in recent years has had a significant impact on transforming various aspects of life. This transformation has shifted traditional material-based methods to electronic processes across all sectors, relying on technology and its tools, which have become indispensable. One of the outcomes of this continuous technological advancement is the emergence of virtual currencies as a new and distinct form of electronic payment in e-commerce. These currencies have rapidly gained popularity due to their numerous advantages, such as ease of payment and time-saving in completing transactions, all without the involvement of a central bank or specific regulations governing their issuance or control.

Reasons for the Study

The rationale behind studying this topic stems from its novelty and the numerous challenges it presents, particularly in understanding the origins and precise definition of virtual currencies. These currencies are closely tied to modern communication technologies, which are continuously evolving, leading to a fundamental shift in the global financial system and affecting national monetary policies.

Study Objectives

This study aims to achieve several objectives, including:

1. Clarifying the nature of virtual currencies in terms of their origins, definition, acquisition mechanisms, and types.
2. Examining the stance of Algerian lawmakers on the use of virtual currencies.
3. Investigating the most significant effects of using virtual currencies on monetary policy.

Research Question

As this study addresses one of the financial challenges brought about by information technology—namely, virtual currencies—it aims to explore the following main question: How do virtual currencies affect the performance of monetary policy?

Origins of Virtual Currencies

Bitcoin is recognized as the first virtual currency, and most current virtual currencies are derived from its concept. Bitcoin emerged in 2008 when an entity under the pseudonym "Satoshi Nakamoto" (1) published a research paper describing it. The first Bitcoin units were issued in 2009, although initially they had no value. The first recorded transaction using Bitcoin occurred in 2010, when an enthusiast purchased pizza for 10,000 units. By 2016, Bitcoin's economy had grown to over $16 billion, with a single unit valued at $1,000. The value of the pizza transaction by early 2018 was estimated to be over $87 million.

The motivation behind creating virtual currencies was to eliminate intermediaries in commercial exchanges, reduce transaction fees, and offer absolute freedom in choosing the size and method of payment. This bypasses the greed of banks and brokers and mitigates the uncertainties associated with traditional cash transactions. Socially, virtual currencies help reduce the fear of investment risks that cause financial hoarding, while economically, they prevent the wastage of business opportunities and stimulate global economies by providing more freedom in financial dealings, free from the constraints imposed by government monetary policies. This provides an economic boost to local economies that might otherwise suffer from poor financial management.

Therefore, the innovator of virtual currency sees it as a way to break free from dependency and control, moving towards a more just and free financial environment for transactions (2).

Virtual currency first emerged in 2009 with the aim of replacing traditional currencies with a new form of money that preserves the privacy of both buyers and sellers, without being controlled by banks or governments. It operates through a peer-to-peer protocol, using modern encryption techniques to enhance security and reduce electronic transaction fees. As such, virtual currency exists solely on the internet and can only be used through digital wallets (3).

Given the novelty of the term, it has garnered significant attention from both banking institutions and economic and legal experts, leading to various definitions, such as the following:

- The European Central Bank defines virtual currency as: "A type of unregulated (decentralized) digital money, usually issued by developers, controlled by them, and used and accepted among members of a specific virtual community."(4)
- It has also been described as: "An abstract unit that has no physical presence or tangible material form, is not issued by a central bank or any specific monetary authority, and is not tied to any local or global currency. It can be transferred and stored electronically, issued through advanced computers, and traded in electronic environments and specialized platforms without government oversight." (5)
- Another definition states that virtual currencies are: "Cryptocurrencies aimed at allowing users to send funds to each other over the internet via a peer-to-peer network without the need for a central authority to monitor payments and transfers, while maintaining user anonymity." (6)

In the Algerian Finance Law of 2018, the legislature defines virtual currency in Article 117 as: "Currency used by internet users through the internet, characterized by the absence of physical support such as coins, banknotes, or payment via checks or bank cards."(7)

It is worth noting that this law prohibits the sale, use, and possession of virtual currencies, imposing penalties for any violations of this prohibition. The law explicitly states: "The purchase, sale, use, and possession of virtual currencies are prohibited. Virtual currency is the currency used by internet users through the internet, distinguished by the absence of physical forms such as coins, banknotes, checks, or bank card payments. Any violation of this provision will be penalized in accordance with applicable laws and regulations."

Commenting on Algeria's current stance of prohibiting virtual currency, which remains firmly in place, one might argue that this position is not entirely sound, especially when considering the shift in stance by some countries. These nations have moved from banning virtual currencies to allowing their issuance due to their positive economic and financial impacts, which outweigh the negative aspects. Algeria should reconsider its position and look into issuing its own virtual currency, much like Nigeria, which recently launched its own virtual currency called eNaira, following the example of other countries.

Based on the various definitions of virtual currency discussed, it can be concluded that virtual currency is one that has no physical, tangible form and is not issued by any central bank. It is traded and used over the internet, making it different from similar terms such as electronic money, encrypted virtual currency, and digital currency. These differences are clarified as follows:

- **Electronic Money**: It refers to pre-paid electronic monetary value held by consumers, used to fulfill contractual obligations. This means it does not differ from traditional money (paper or coins) except in the medium on which it is stored. The former has no physical form, while the latter has a tangible presence (8).
- **Encrypted Virtual Currency**: This term refers to a system that uses encryption to allow the decentralized and distributed creation, transfer, and exchange of digital payment units. These units can be traded at market prices against fiat currencies. Encrypted virtual currency is a type of digital virtual currency secured by encryption and utilizes decentralized networks based on blockchain technology (9).
- **Stable Virtual Currency**: A blockchain-based encrypted digital currency that holds a reliable value and can be used by anyone. This currency employs a specific form of automated monetary policy to keep its price stable by reducing supply when prices drop and increasing supply when prices rise. This process uses a secondary cryptocurrency that acts as a tool to implement monetary policy and earns revenue through transaction fees. Terra is a famous example of stable digital currencies (10).
- **Digital Currency**: This term generally refers to the process of converting information from a physical form into a digital one. Regarding money, it refers to creating or digitizing money or transferring it from a physical form to a digital one. Digital currency can be defined as a form of currency that exists only in digital form, accessible and usable through computers or mobile devices, as it does not exist physically (11).

Thus, it is clear that the term "digital currency" is the broadest and most comprehensive concept, serving as an umbrella under which all types of digital currencies (electronic money, encrypted and non-encrypted virtual currency, stable currency) fall, regardless of their type or purpose. This term refers to any currency that is traded and used over the internet.

1. Characteristics of Virtual Currency

Virtual currency has several characteristics, which can be summarized as follows (12):

1. It is a digital, imaginary currency with no physical (tangible) existence and no intrinsic value.
2. It is a non-regulated currency, meaning it is not backed by any official entity, institution, or international organization.
3. It is available for all users to mine, depending on their technical and technological capabilities.

4. It is used exclusively over the internet, within institutions, companies, and websites that accept it.
5. Commercial exchanges through it are conducted directly from person to person without needing a bank intermediary (peer-to-peer).
6. There is no set limit or ceiling for spending or purchases, unlike credit cards.
7. Regulatory authorities cannot track or monitor the commercial transactions conducted through it.
8. Monetary authorities in any country cannot control its supply or value.
9. Due to its decentralized nature and reliance on technology, which evolves with new advancements, it is a convenient mechanism for quick and smooth buying and selling.

2. Virtual Currency: Advantages and Disadvantages

Virtual currency has both advantages and disadvantages, detailed as follows:

A. Advantages of Virtual Currency: they as following (13)

- **Ease of Payment**: One of the key features of virtual currency is the ability to send or receive any amount of money instantly, to or from anywhere in the world, at any time. There are no bank holidays, no borders, and no restrictions. This currency allows users to have full control over their money.
- **Low Fees**: Fees are virtually nonexistent. Users can include transaction fees with their payments to receive priority processing, resulting in quicker confirmation of transactions by the network. This is due to the absence of intermediaries, as transactions operate on a peer-to-peer basis. Additionally, merchants have units to help process transactions, convert virtual currency into official currencies, and deposit funds directly into their bank accounts daily. All of this occurs at much lower costs compared to other banking services and credit cards.
- **Reduced Risks:**
  Virtual currency transactions are secure and irreversible, protecting merchants from fraud-related losses and enabling them to expand into new markets where credit cards may not be supported or where fraud is unexpectedly high.
- **High Security:**
  Bitcoin technology, for instance, is one of the largest distributed computing projects globally, making it difficult to counterfeit or replicate. Users can employ security practices to protect their funds or use service providers that offer high levels of security against theft or loss, as it has a very strong security record. Additionally, merchants cannot force unwanted or hidden charges, as sometimes happens with other payment methods. Transactions are also fully private, as they do not link personal information with the transaction details.
- **Transparency and Neutrality:**
  All information about the supply of virtual currencies is publicly available, allowing anyone to verify and monitor it in real-time. It is possible to see how many units a wallet owner has, the number of transactions made, and track the flow of the currency between wallets, but without revealing the owner's identity. No entity can manipulate or control the rules of the currency, as it is protected by encryption, making it both neutral and transparent.
- **B. Disadvantages of Virtual Currency**
  Currency Anonymity and Encryption:
  While anonymity is an advantage, it also has drawbacks. It facilitates illicit and illegal activities on the internet, making virtual currencies a safe haven for money laundering, smuggling, and illegal trades, such as drug trafficking and stolen goods.
- **Difficulty in Obtaining It:**
  One of the major downsides is the difficulty for ordinary users to mine virtual currencies. This is due to the complex programs and computational processes required for mining, though in theory, it is available to everyone.

- **Hacking:**
  Virtual wallets can be vulnerable to theft and manipulation if not well-protected. Several hacking incidents have occurred in poorly secured wallets, and once a user's account is compromised, their money cannot be recovered due to the network's anonymity. Legal action against hackers is often impossible.
- **Significant Price Fluctuations:**
  These fluctuations may encourage scammers to exploit users through fake currency exchange sites. Scammers simulate cyberattacks to create panic, causing the currency's value to drop. They then buy the currency at low prices and sell it once its value rebounds, resulting in users losing their money without the ability to file complaints or objections.

C. Mechanism for Acquiring Virtual Currency

Virtual currencies can be obtained through two mechanisms (14):

First Mechanism:

The first way to obtain virtual currency is by purchasing it from websites or electronic platforms specializing in selling these currencies online. This is an easy method available to anyone; all one needs to do is create an electronic account and a digital wallet on their computer or even on their mobile phone using available apps, and then buy the desired currencies.

Second Mechanism:

The second method is known as mining. This is a very difficult and complex process that not everyone can undertake. It is termed mining because it is analogous to the process of extracting gold from the earth. The concept of mining relies on a program installed on users' computers, which provides a high level of security due to the exchanges that can be described as secretive in some countries. The value of the currency is transferred directly from one computer to another without a middleman or transfer fees. Once a user downloads and activates the "Bitcoin" program or app, this program starts producing non-reproducible coins through specialized algorithms called mining operations, which are run on dedicated servers designed to issue a specific amount annually. This amount is halved every four years.

In simple terms, the program virtually mines for currencies according to a specific programming algorithm, but the quality and strength of this mining process depend on the power of the computer's processor. The stronger the processor, the better the mining process, resulting in greater currency generation. However, mining is not that easy; it requires the user to solve many puzzles and equations to reveal a long string of numbers and letters to issue Bitcoin and transfer it to a digital wallet. As mining becomes more extensive, the puzzles become harder, requiring specialized computer programs to solve them. Therefore, users in the system tend to equip themselves with powerful computers and advanced specialized software to obtain it.

Fourth: Types of Virtual Currency

There are various types of virtual currencies that have emerged at different stages. Here are some details about these types:

1. **Bitcoin (BTC)**: This cryptocurrency was invented in 2008 and began to be used in 2009. It is the first decentralized digital currency without a central bank. It can be sent from one person to another over the Bitcoin network through a peer-to-peer method without the need for a third party (like banks). Research estimates from the University of Cambridge indicate that in 2017, there were between 2.9 to 5.8 million users utilizing a digital currency wallet. Since 2009, Bitcoin has been operational, and due to its consensus system, no one has been able to hack the Bitcoin blockchain. Most breaches occur due to human errors in wallet management rather than design flaws. Bitcoin is fully managed by its users and has received substantial support from many websites and online stores, characterized by rapid spread and ease of mining using computers, as well as fast transfers and low fees (15).
2. **Ethereum (ETH)**: Founded by Vitalik Buterin, Ethereum was introduced through a research paper in 2013 and launched in 2015. It serves as a platform for smart contracts using blockchain technology and enjoys a high level of security. What distinguishes it from other currencies is that it was created specifically for executing smart

contracts that closely mimic traditional contracts. This platform is built on the same blockchain technology used by Bitcoin. It's worth noting that the creators of this currency are known to monetary organizations, unlike Bitcoin, whose founders remain unknown (16).

3. **Litecoin (LTC)**: This currency appeared in October 2011 and is considered one of the first alternative cryptocurrencies. It differs from Bitcoin in its mining process, as it is easier and cheaper. Litecoin is based on completely different encryption algorithms than those used in Bitcoin, and it allows for faster exchanges compared to Bitcoin, leading to increased acceptance. It has been said that if Bitcoin is the gold of virtual currency, then Litecoin is the silver (17).

4. **Ripple (XRP)**: Ripple is a low-cost global network that enables banks to settle cross-border payments instantly, transparently, and at a lower cost. It is one of the most famous and important current digital currencies, ranking third globally in terms of liquidity. It was created by a company called OpenCoin in 2013 (18).

Fourth: The Impact of Virtual Currency on Monetary Policy Performance

1. **Concept of Monetary Policy:** Definitions of monetary policy vary from one school of thought to another, but they all converge on the elements that constitute policy: the measures taken by the issuing authority and the ultimate goals to be achieved. The various definitions of monetary policy are as follows (19):

Monetary policy refers to a set of means applied by monetary authorities responsible for managing monetary and credit affairs. This control can involve making changes to the quantity of money or the amount of payment instruments in accordance with the surrounding economic conditions.

It is also defined as a set of procedures and measures related to organizing the currency issuance process and controlling credit in such a way that it becomes impossible to separate money from credit in terms of the influence that these measures exert on price movements (20).

2. **Objectives of Monetary Policy:** It is important to note that monetary policy alone cannot achieve all economic and social objectives unless there is harmony and coordination with other government policies, including economic, financial, social, and cultural policies. The objectives of monetary policy can be summarized in the following elements (21):

2.1 **Operational Objectives:** The strategy of monetary policy begins with determining the monetary tools to be used to influence the primary objectives chosen by the monetary authorities. These are variables through which the central bank tries to influence intermediate objectives, represented by aggregate monetary reserves and the conditions of the money market.

2.2 **Intermediate Objectives:** These refer to variables that are expected to be controlled and regulated to achieve the ultimate objectives. They can be considered as indicators whose changes reflect variations in the final goal. Intermediate objectives are considered monetary variables, which the central bank can influence.

2.3 **Final Objectives:** The strategy of monetary policy begins with identifying the monetary tools to be used in influencing the operational objectives chosen by the monetary authorities and then affecting the intermediate objectives in order to reach the final goals outlined in light of the overall economic policy. Generally, there is broad agreement that the main objectives of economic policy in general, and monetary policy in particular, are mentioned in the square goals as follows:

A. **Stability of the General Price Level:**

B. Maintaining price stability is one of the most important factors influencing economic activity and key economic indicators.

C. **Stability of Exchange Rates:**

This objective is closely linked to the first goal, which is to achieve stability in domestic prices. If we assume that domestic prices in a certain country decrease, this will lead to an increase in exports, which in turn raises the demand for the currency of that country. An increase in demand for the currency results in a rise in its exchange

rate against other currencies. Conversely, if prices in a country increase, this means that its exports will decrease, leading to a decline in demand for that country's currency, and consequently, a decrease in its exchange rate against other currencies.

D. **Full Employment:**
High employment is a primary goal of any economic policy, and all opinions support this policy. Economists define employment as the level of employment achieved through the efficient use of the civilian labor force while allowing for a low unemployment rate that primarily results from dynamic changes and structural conditions within the economic framework. Monetary policy can help achieve this goal by strengthening effective demand. When monetary authorities increase the money supply, interest rates decrease, investment rises, unemployment falls, and consequently, consumption increases, leading to higher income (22).

E. **Participation in Achieving a High Economic Growth Rate:**
The goal of economic growth is linked to achieving full employment. Economic growth is the only means capable of absorbing the increase or surplus in labor. The role of monetary policy here is to influence the credit rate through credit expansion in the money supply, so as to reach a growth phase that places the economy on a path of rapid growth. In all cases, it is important to remove or address any conflicts between monetary policy objectives. The relationship between price stability and full employment is one of the instances that illustrates this, as achieving both objectives simultaneously is challenging (23).

3. Analysis of the Effects of Virtual Currency on the Performance of Monetary Policy:

Considering the volume of virtual currencies in circulation and the amount of legal currency circulating in any country worldwide, there is no basis for comparison between the two, making virtual currencies effectively non-influential on monetary policy.

However, with the increasing importance of virtual currency, the expanding scope of its acceptance, and its spread across different levels, along with the growth of e-commerce and individuals' desire to exchange goods and services online—which are often difficult to control or direct—central banks face challenges in tracking electronic transaction balances. This weakens the central bank's role in directing credit, leading to a decline in the effectiveness of monetary policy tools in various aspects. This situation arises from the central banks' limited ability to control the money supply within their jurisdictions.

Consequently, the expected impact of these virtual currencies, with their growing prevalence and recognition by countries, will result in significant changes in monetary policy and its tools. This will diminish the role of central banks in managing monetary policy, forcing them to seek innovative tools and methods that align with the new monetary technology—virtual currency (24).

4. How Central Banks Deal with Virtual Currencies (25):

First Scenario: In this case, the central bank treats virtual currencies as part of the broad money supply, which includes the following:

- Broad money supply (M2) = currency in circulation + current deposits + fixed and savings deposits + money market funds + money market deposits + repurchase agreements.

In this scenario, the central bank must work on obtaining sufficient statistics on the amount of virtual currencies in circulation and how they are used, subsequently adding them to the money supply and taking necessary monetary measures based on that information.

However, the central bank's actions in this case will not affect the virtual currency itself, as it does not fall under its jurisdiction or control. Additionally, some transactions involving virtual currencies may involve external parties. Therefore, the central bank's ability to modify monetary policy and exercise its monetary authority will occur only through the influence it can exert on the other components of the money supply, excluding virtual currencies, while still considering the latter. In other words, the bank will only recognize the impact of those currencies.

And the available measures will apply only to the other components of the money supply, excluding virtual currencies.

Second Scenario:

This scenario is more realistic and requires legal, economic, and regulatory actions by the state, the central bank, and other authorities. Additionally, international cooperation is necessary to accomplish this difficult and complex task of controlling and regulating virtual currencies so that they become part of the national monetary system and the international monetary system as well. In this case, the situation would be favorable for the central bank to implement its monetary policy according to its visions, goals, and policies. We now see efforts focused on trying to achieve this situation, as seen in Table (1) above.

Third Scenario:

This scenario is the most challenging and presents a pessimistic outlook, involving the proliferation of virtual currencies without any means of control. It also entails their dominance without regulations or sufficient mechanisms to manage transactions. Furthermore, these currencies would not be subject to the mechanisms of central banks. In this case, central banks would lose their ability to control the national economy and the monetary and credit systems, as control would shift to the major institutions issuing these currencies. This scenario complicates the modeling of a reality that may also lead to countries losing their control over markets and monetary and credit systems, implying the emergence of a new monetary system that will not have clear characteristics at this time.

Resorting to virtual currencies can also be an option for countries facing issues in their monetary systems or experiencing the dominance of strong currencies in their markets and their impact on local currencies. There are some indications of such a situation, as Venezuela resorted to issuing a virtual currency under pressure from rampant inflation, the sanctions it faces, and the decline in oil prices, which represent the main source of its resources. Similarly, Iran recently hinted at issuing a virtual currency to circumvent international sanctions that negatively affect its economy.

Sixth: The Impact of Dealing in Virtual Currencies on the Algerian Economy

According to Article 117 of the 2018 Finance Law, it states: "The purchase, sale, use, and possession of virtual currency is prohibited. Virtual currency is that which is used by Internet users over the Internet, characterized by the absence of physical backing such as coins and banknotes or payments by check or bank card. Anyone violating this provision shall be punished in accordance with the applicable laws and regulations."(26)

This can be attributed to geopolitical security reasons rather than purely economic ones, considering that the risks associated with these currencies allow them to easily fund suspicious or illegal activities without revealing the source of funding. They may also serve as tools for money laundering abroad. In light of the absence of a developed e-commerce framework in Algeria, coupled with the weakness of the stock market, such transactions would have little benefit for the national economy compared to their risks.

The Algerian government’s inability to regulate virtual currencies at this time is justifiable, as it cannot identify the parties involved in transactions. Since it lacks this capability, virtual currencies cannot become legal tender. However, this does not negate their status in international trade, especially since they have provided additional means of exchange at the international level, which may contribute to rising inflation rates.

Moreover, the volume of currencies traded outside the banking system may increase with their circulation, as these virtual currencies would not fall under the central bank's measures for the money supply. This would lead to an increase in the total money supply within the economy, especially since they are not considered when formulating monetary policies. On the other hand, the completion of many online transactions using these digital currencies may reduce the demand for legal (traditional) money, which could directly impact the central bank's ability to implement appropriate monetary policies.

The impact of using virtual currencies can be observed in two aspects. The first manifests in shocks to aggregate demand, similar to large-scale financial transfers, leading to positive trade shocks, which may result in inflation and a misestimation of the real exchange rate. The second aspect pertains to the effectiveness of monetary policy, which may become increasingly affected by globalization. If authorities declare a non-intervention policy and, for example, the velocity of

money circulation collapses, this would lead to price volatility in exchange rates. Consequently, changes in the money supply and its circulation are likely to be affected.

The trading of virtual currencies and their inherent volatility (exemplified by Bitcoin's fluctuations) raises another issue related to consumer and investor protection, particularly for smaller investors who may not conduct thorough analyses. This places an additional burden on regulatory authorities to ensure protection against losses. Thus, it becomes essential for these authorities to provide clear guidance regarding the risks associated with dealing in cryptocurrencies (26).

Conclusion

This research paper aims to explore and highlight the conceptual framework of virtual currencies by revealing their definitions, differences from other currencies, methods of acquisition, and key characteristics. It will also address the Algerian legislator's stance on dealing with this type of currency. Ultimately, it summarizes the main findings of the research while providing several suggestions deemed important to mention:

Findings

1. Virtual currency is defined as currency that lacks a tangible physical presence and is not issued by any central bank; it is traded and used over the Internet.
2. Virtual currency is distinct from electronic money, which is originally paper money issued by the central bank and can only be traded and used electronically.
3. There are multiple types of virtual currencies that have emerged at different stages, each with its own advantages and disadvantages.
4. The spread of virtual currency and its recognition by states will lead to fundamental changes in the roles of central banks, prompting these banks to seek to innovate new tools and methods compatible with the new monetary technology of virtual currency.

Suggestions

- Given that virtual currency is an inevitable reality, especially due to the circumstances created by the COVID-19 pandemic and its negative repercussions, central banks must find mechanisms to grant them the authority to recognize this type of currency similarly to official currencies in their countries. They should intensify efforts to regulate them through specific laws instead of working to prohibit their use.
- Stricter oversight should be enforced on the issuance and trading of virtual currencies to control illegal exploitation activities.

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