
THE MAIN ASPECTS OF THE COSTS AND BENEFITS OF DIGITALIZATION OF MONEY

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Abstract

There are a number of concerns about taking transactions out of cash and this can only be done through digitization of money. This is a trend towards reducing the use of cash.

A study by the International Monetary Fund shows that the share of cash in peer-to-peer transactions, as measured by the sum of cash withdrawals plus the sum of transactions using two of the closest substitutes, card and e-money, has declined significantly or nearly so in all countries covered in this analysis.

On average, the share of cash in the economy has declined at an average annual rate of about 6%, from 49% in 2006 to 26% in 2016 and 21% in 2022.

In this article the authors aim to determine what are the costs of a society based on digitization and what is the efficiency or benefit of such an activity.

As we have shown, Southeast Asian economies appear to be experiencing a particular decline in market cash. The decline in cash is driven by the convenience and efficiency gains offered by electronic payment methods in combination with mobile devices.

The authors propose in this article to highlight precisely this perspective of increasing the efficiency of the use of digital money.

The decline in the importance of cash is driven by convenience gains. Other arguments in favor of a cashless society include the reduction of fraud and aspects leading to defrauding the monetary system. In addition, financing illegal activities, money laundering and tax evasion are more difficult without cash and almost impossible when using digital money.

In dealing with these aspects, we used the logical, comparative study of the two situations, the existence of cash on the market and the reduction of this cash, to ensure control and avoidance of the negative aspects faced by the

financial market. We also used a series of statistical data that, by comparison, led to some conclusions that show that there must be a balance between the cost of digitizing money and the benefits that this digitized system brings.

Keywords: *cash transactions, digitization, inflation, costs, efficiency.*

JEL classification: *E50, E60*

Introduction

In this article the authors started from the advantages and concerns of a cashless society, showing the aspects faced by a society in which cash is too widely used in the market, compared to the situation of the digitization of money, the introduction of digital money that allows transactions quasi-anonymous such as cryptocurrencies such as Bitcoin, which shows that the crypto market is strong implemented in a number of countries precisely to replace the monetary situation and bring a state of control over the correlation of the money supply needed in the market and the existing money supply.

In terms of monetary policy, eliminating cash would increase the scope of monetary policy to introduce negative interest rates as an effective lower bound on nominal interest rates, which depend on being able to switch to cash as an interest-free alternative to deposits.

The potential for digital crime, especially fraud, unauthorized access and breach of data privacy, may increase with the weight of digital usage.

Next, we focused on the advantages and concerns of digital currencies. In traditional currency areas are usually a number of theoretical aspects that impose according to their capacity, the mitigation of shocks and the improvement and protection of the financial market against risks.

The introduction of private digital currencies, independent in the case of stablecoins, can also serve as additional insurance against monetary policy against the official currency.

There are a number of concerns about the introduction of stablecoins on a global scale and with a fairly well-defined scope. However, the introduction of digital money will require very precise regulation against money laundering, which may differ from one time period to another, from one state to another.

There is a data security issue considering the large number of data privacy breaches that have become public in recent years make the use of cash in the markets sensitive.

Next, we focused on central bank digital currencies. In today's banking system, money issued by the central bank is available as either cash or reserves. The difference in cash is accessible, but it must be borne in mind that it is the banks that must have control over it.

Digitization is the method of the future that banks must consider in order to produce well-controlled currencies, to ensure electronic control over transactions and to determine at any time the need and the way to balance the ratio between the existing digitalized money supply and the one that is to be is practiced on the market.

Therefore, simply an additional option for money users, without any of the radical changes to banks' balance sheets, would lead to the emergence of reserve deposits, without forcing banks to change practices towards old business and then financial crime may be on the rise.

In the analysis carried out in this article, we have also focused on the possible consequences for the system of functional reserves. Currently, non-banks hold liquidity mostly in the form of demand deposits. The share of deposits in the monetary aggregate M1 was, and still is, approximately 80% in the euro area.

For commercial banks, deposits are a cheap way of refinancing. Indeed, the amount of deposits in the euro area represents approximately half of the amount of loans that are granted on the market.

Commercial banks issue money, for the most part, by drawing money from the market and using it by paying a very low interest rate.

In other words, the amount of money M1, which is actually used for retail payments, being created in a public-private partnership where private banks contribute most of it.

Commercial banks can still retain the deposit account activity to a greater or lesser extent only if they are able to bundle the deposit account with essential financial services or if they offer interest rates higher than the rate imposed on central banking system accounts.

The impact on banks' balance sheets is identical to a bank run with liquidity, which must respect a certain balance. In this context, banks must replace withdrawn liquidity with new funding resources.

All the bankruptcies that occurred in Romania in the banking system were determined by the withdrawal of existing cash in demand deposits. The only one that endured and was able to overcome this scourge of massive withdrawals by depositors was the then Commercial Bank, which was a state bank and in which the National Bank immediately provided, at the time of massive demands, additional sums that calmed the things.

Cash continues to play an important role in the lifetime experience and payment methods, and many businesses still rely on cash as their primary or only accepted means of payment.

We must bear in mind that this is a practice when it comes to a sensitive and difficult to control financial market.

At the same time, in this article we also inventoried and analyzed why central banks should produce money. And I thought that, at least in theory, there is a considerable list of reasons why the Central Bank needs to have a reserve payment system.

Only by digitizing money can banks control this relationship that exists between the digitized money produced and existing in the market and the money that should exist in the market.

Maintaining the public monopoly of money is an element of every national economy where the Central Bank achieves its goal by controlling the money used in the digital system.

Of course, this article is at an early stage, but it is likely that a digital money system will be reached in the future that ensures the efficient use, the precise correlation of the ratio of these monetary values, whether they are cryptocurrencies or a currency used in digitized by the Central Bank.

Literature review

The question of the costs and benefits of digitalization of money is a current topic addressed by a significant number of researchers. Thus, Bjerg (2017) analyzes the evolution of all three subsets of electronic systems, issued by the central bank and types of accessible money. Brainard (2019) analyzes the issue of introducing stable currencies on a global scale and scope such as Libra, highlighting the need for legal and regulatory provisions adopted in advance. Bech and Garratt (2017) discuss the differences between account-based and token-based payment systems. Brunnermaier et al (2019) highlights certain payment systems based on both account and tokens. Khianonarang and Humphrey (2019) show that the share of cash in cash-like transactions has fallen significantly in almost all countries Riksbank (2017) shows that banks have to replace the withdrawn liquidity with new sources of refinancing, thus easing the burden of the lending Central Bank.

Methodology, data, results and discussion

One manifestation of the digitization of money is the tendency to reduce the use of cash in transactions. This trend is indeed almost universal, although it differs substantially from country to country.

According to a recent IMF study, the share of cash in cash-like transactions, measured by the sum of cash withdrawals plus the sum of transactions using two of the closest substitutes (card and e-money) has fallen significantly in almost all countries under analysis.

On average, the share of cash in the economy declined at an average annual rate of change of 6% between 2006 and 2016, from 49% to 29% and 2.1% in 2020.

The lowest level of cash usage in 2016 is found in Norway at 10% (down from an already low level of 22% in 2006), the highest level remains prevalent in Germany at 70% (2006 at 84%).

East Asian economies appear to be declining particularly rapidly (-10% annual change in cash use in China and -9% in Japan). The South Korean government is actively pushing the population to further reduce the use of cash and plans to phase out cash, but the separation from notes and coins is likely to be gradual. Sweden is studying the possibility of supplementing cash with an electronic crown, a digital central bank.

The decline in the relative importance of cash is partly driven by the convenience and efficiency gains offered by electronic payment methods in combination with mobile devices.

Other arguments in favor of a cashless society include an expected reduction in financial crime following the absence of physical money, involving the elimination of cash theft and robbery, as well as counterfeiting. In addition, financing illegal activities, money laundering and tax evasion are more difficult without cash, especially in electronic payment systems that rely on a central counterparty that records all transactions.

Clearly, the use of digital money that allows quasi-anonymous peer-to-peer transactions, such as cryptocurrencies like Bitcoin, reduces this advantage, which is why the crypto market is heavily regulated in a number of countries.

In terms of monetary policy, eliminating cash would increase the scope of monetary policy to introduce negative interest rates as an effective lower bound on nominal interest rates that depend on the ability to switch to cash as an interest-free alternative to deposits.

Going cashless altogether comes with a number of issues and concerns. These include privacy issues. To the extent that payments made are traceable, private companies as well as governments are able to track individual transactions (and actions) to compile an individual's profile or engage in large-scale surveillance.

The potential for digital crime, including fraud, unauthorized access and data breaches, may increase with a growing share of electronic payments.

A serious risk is the complete dependence on a functioning electronic infrastructure in a cashless society, which makes the economy even more vulnerable to cyber-attacks.

Another challenging issue is to ensure that they currently rely on cash as a means of payment. They tend to be concentrated in the poorer segments of the population and the elderly population, who are generally less accustomed to using electronic payment systems.

There is concern that electronic payment systems make it difficult for people to control their budgets.

Traditional currency areas are usually defined along national borders and evaluated according to the theory of optimal currency areas according to their ability to mitigate economic shocks and ensure risk sharing.

This situation remains virtually unchanged with the potential introduction of central bank digital currency.

By contrast, the network of digital currency areas based on a digital (national or international) aims to exploit the links and exchanges in the ecosystem of a network by providing users with the possibility of direct peer-to-peer money transfers. This could lead to economic growth.

The introduction of independent private digital currencies, especially if they provide the functions of traditional money, as in the case of stable coins, can also serve as an additional insurance against irresponsible monetary policy vis-à-vis the official currency.

The downside could be the appearance of a reduced sphere of monetary policy response in the event of an adverse macroeconomic shock situation.

There are a number of additional concerns with the introduction of stable coins on a global scale and scope like Libra. There will need to be a number of legal and regulatory provisions adopted beforehand. These include compliance with rules and regulations introduced to counter the use of digital currencies for illegal activities, illegal financing, and compliance with national regulations and anti-money laundering laws as national jurisdictions differ from country to country.

In the case of transnational networks, it must be determined which jurisdiction is applicable and for which financial activity carried out by the various players in the system and whether the environment is appropriate for that regulation.

Consumer protection is also an important issue. It is not clear to what extent consumer protections for Libra users are comparable to those provided by existing regulations in many countries. At the very least, the differences in the risks of digital currencies compared to traditional deposits should be sufficiently transparent.

There is the issue of data security, given the large number of data breaches that have become public in recent years.

A serious concern is the possibility that the association of a widely used electronic currency with a coin from a large social or commercial electronic platform will lead to an unprecedented aggregation of personal data, which may strengthen the competitive advantage of the provider of that platform and currency over potential competitors, thus reinforcing the monopolistic

tendencies that are already inherent in the network industries, in their pursuit to enable an evolution of the financial system and at the same time to guard against the aforementioned risks.

It is expected that national governments will use different regulatory regimes, for example to take into account different priorities regarding the prevention of illegal transactions or privacy issues.

As a result, it may become impossible to easily use a single digital currency on a global scale. Despite the potential of digitization to facilitate the transnationality of transactions, the result could ultimately be an increasingly fragmented international finance system.

In today's banking system, money issued by the central bank is available as either cash or reserves. Holding cash is accessible to anyone, but holding reserves is accessible only to banks.

If non-banking entities intend to hold intangible money, they must rely on deposits with commercial banks. Essentially, these deposits represent claims held by commercial banks and claims held by Central Banks.

With a central bank of digital currency (CBDC), households and businesses can actually choose to hold intangible money at a central bank, i.e. direct claims held by central banks (digital cash).

Base money is extended beyond cash and reserves to a third aggregate, unless reserves are simply merged with CBDC units by granting unrestricted access to reserve accounts.

The central bank guarantees equal convertibility between all kinds of central bank money.

Another way to think of CBDCs is that they are simple versions of a full backup system. In June 2018, a referendum was held in Switzerland, which radically transformed the banking system of the Swiss into a full reserve system.

Banks were prohibited from creating money out of thin air in a credit agreement and offering fractional reserve deposit accounts.

The referendum stimulated a lively debate on the fundamentals of the monetary system in Switzerland and abroad.

International commentary followed the Swiss campaign closely. In the end, the initiative was voted down by a large margin. It is no coincidence, however, that many proponents of a full-reserve system are attracted to the concept of a CBDC, as it effectively offers the option of keeping the liquidity of a full-reserve account (100% money). At the same time, banks can still offer accounts as a reserve basis.

Therefore, a CBDC introduces an additional option for money users, without any of the radical changes to bank balance sheets on the day

of introduction, without prohibiting fractionalization, reserve deposits, and without forcing banks to change their business practices from a day to day.

A further distinction is required if payment systems are account-based (such as bank deposits) or token-based (such as cash). In an account-based payment system, authenticating a transaction requires the payer to prove their identity. In a token-based system, the payer does not have to reveal his identity, but authentication requires proof that the amount of money transferred is feasible. A token-based CBDC therefore enables peer-to-peer anonymous payments between users.

The economic interpretation of a CBDC is not affected, and the distinction is more a matter of technology, of the feasibility of anonymous peer-to-peer transactions, of cryptography.

The simplest way to introduce a CBDC is an account-based version, managed by the central bank as a trusted counterparty. This involves a permissioned blockchain instead of a permission less blockchain, whereby the need for computer-intensive algorithms to prove the authenticity of transactions across a distributed network of users largely disappears.

Currently, non-banks hold liquidity mostly in the form of demand deposits. Recently, the share of deposits in the monetary aggregate M1 was over 80% in the euro area.

For commercial banks, deposits are a cheap way of refinancing. In fact, an integral part of the banks' business model consists of collecting short-term deposits and granting long-term loans (maturity transformation). Indeed, the amount of deposits in the euro area is about half of the entire amount of loans granted to non-bank institutions.

In an equilibrium representation of the monetary system, the central bank issues cash and a small amount of reserves, which add up to the monetary base M0.

Commercial banks, on the other hand, mostly issue money that is actually used for payments (ie demand deposits) and are required to hold only a small fraction of it as minimum reserves. Thus, the amount of M1 money that is actually used for retail payments is created under a public-private partnership, with private banks contributing most of it.

A digital currency issued by the central bank is in direct competition with bank deposits and may replace them as the main form of holding money.

CBDC is legal tender, so there is no counterparty risk and no banking risk involved, thus making this option superior to bank deposits.

In the balance sheet representation, CBDC is both part of the base currency M0 and part of the monetary aggregate M1. As intangible money, CBDC will replace some of the demand deposits. The lost deposits would

cease to contribute to the bank's funding, and the bank credit currently refinanced with deposits would require a new source of funding.

Commercial banks can still retain the attractiveness of deposit accounts to some extent if the infrastructure fee is more convenient or superior, if they are able to bundle the deposit account with essential financial services, or if they offer interest rates higher than the rate imposed CBDC accounts.

The third argument implies that the policy rate imposed on CBDC accounts is lower than for the mandatory interest rate on bank deposits.

To compensate for the counterparty risk associated with fractional reserve accounts, banks will have to offer a risk premium dependent on their own credit rating. In normal times, this premium is likely to be close to zero, and in times of financial stress it could rise sharply to high levels.

A procyclical flow of liquidity in and out of the banking system is a possible outcome.

Sudden transfers of bank deposits to CBDC accounts also affect the financial sector much like a bank run. To withdraw cash from a bank, people don't even have to line up in front of ATMs, they simply use online banking tools to transfer it to their CBDC accounts.

The impact on banks' balance sheets is identical to a bank run, with liquidity flowing at an accelerated rate. In this situation, banks must replace the withdrawn liquidity with new sources of refinancing. Finally, the central bank, in its role as lender of last resort, will flexibly provide sufficient liquidity.

CBDCs are still disrupting the traditional business model of commercial banks, even as they manage to retain appeal for some money users. The mere option of a full backup account clearly means losing some of today's depositors.

Banks will have to offer additional benefits and services to remaining customers and will be even more vulnerable to financial stress if they continue to rely on deposits when refinancing credit. Therefore, a digital currency issued by the central bank may disrupt the fractional reserve system, as deposits will become a less reliable source of funding.

To date, central banks are subject to a zero effective lower bound on nominal interest rates because of the option to withdraw cash and still receive a zero percent nominal return.

In response to inflation and low potential growth, this restriction on monetary policy sometimes becomes mandatory, so central banks tend to resort to extraordinary measures as they themselves become increasingly inefficient and have unwanted side effects.

With a digital currency, the central bank could impose both positive and negative interest on CBDC units. However, only if cash is abolished

simultaneously, there will be no outflow from the banking system and people will be forced to accept even negative interest rates on overnight deposits for holding reserves at the bank.

Without cash, the effective lower bound is indeed relaxed, and the central bank will improve its capacity not to hurt economic activity in low-interest environments. With substantially negative interest rates in place, a CBDC is a viable implementation of previous suggestions to add carrying costs to money or prevent cyclical hoarding.

In this framework, substantially negative interest rates induce economic actors to either spend the money immediately or put it in a bank savings account. Even with perfectly stable prices, such money loses some of its functionality as a store of value. Therefore, this CBDC coin would likely be vulnerable to direct competition from coins that are stores of value.

In most countries a CBDC will likely be introduced as a complement to cash rather than a replacement for it. Cash plays an important role in many people's lifetimes experience and payment habits, and many commercial transactions still rely on cash as the main or only accepted means of payment.

Cash payments leave no digital footprint. Therefore, the availability of cash is not only desirable for criminals, but also constitutes institutionalized freedom from government control and personalized and data collection.

Moreover, official support is needed for the legal abolition of cash, which currently appears well out of reach in most countries, although any attempt to do so is sure to face strong political resistance.

Therefore, a more likely path to a cashless society would start with the introduction of a CBDC as a simple add-on. Once people are used to the new and more convenient means of payment, and once the digital currency is accepted everywhere, the government may consider eliminating cash. Only then will the zero lower bound be effectively relaxed.

The question is what is the reason for central banks to issue CBDCs, independently or jointly. In general, central bankers tend to be hesitant and cautious when it comes to launching a potentially disruptive innovation in the monetary system.

At least in theory, there is a considerable list of reasons to launch a CBDC (reserve payment system) in times of financial stress, the fractional reserve system is vulnerable to systemic crises, even if there are mechanisms to manage this problem, regulation financial, deposit insurance, last resort loan function.

However, if big banks have problems, governments tend to fix them to prevent bank runs and to protect the payments system, which is at the heart of economic activity in societies based on the division of labor.

With a CBDC, a different payment system would be available that is not at all vulnerable to systemic crises. Financial crises can be resolved more easily if economic actors are able to switch to a different payment system.

The central bank can partially replace bank deposits with CBDC, so that the amount of interest-bearing assets on its balance sheet increases and thus its ability to generate public revenue.

However, profit generation is probably not a primary motive for most central banks today. Also, CBDC issued by a national central bank will not increase the efficiency of cross-border payments.

Cash phase-out, if people rely more and more on digital means of payment, while businesses start refusing cash payments due to the relatively high cost of maintaining a retail cash infrastructure, legal tender will lose its relevance for money users.

Issuing a CBDC allows money issued by the central bank, which defines the unit of account, to continue to play an important role in retail payments.

In less developed countries, a considerable part of the population does not have access or rather it is limited to financial services. With digital money, the barriers to entry to payment systems were much lower, as a physical retail bank was not necessarily required.

However, financial exclusion is an issue with the growing importance of digital payments, the financial exclusion of some people could instead become an issue as their payment habits are more affected by a potential cash phase-out.

Digital payments always leave traces, while cash allows anonymous access to peer-to-peer transactions. A CBDC would improve options for preventing and tracking illegal transactions, money laundering, financial crime, tax evasion, and so on, and expand market surveillance capabilities. Privacy and civil liberties are key elements of Western democracies, so the possibility of increased surveillance may raise doubts and resistance there. In other countries, the existence of more possibilities for close supervision may be an argument in favor of a CBDC.

Private cryptocurrency issuers are definitely trying to provide a currency that really fulfills the money users' needs. However, money is currently provided by public authorities (the public monopoly of money) and it is debatable whether this core competence of nation states should allow a shift to private issuers beyond centralized control. Being in charge of the money supply brings power and revenue, and private issuers of money may have other goals (notably profit maximization) that do not necessarily align in all potential situations with providing an indispensable public good. Therefore,

a central bank-backed digital currency can be a credible alternative to meet some of the needs of potential private e-money users. At the same time, the government will continue to regulate emerging Cryptocurrencies, especially if they have the potential to achieve macroeconomic relevance.

Countering competition from foreign CBDCs is another important issue. If a major foreign central bank introduces a universally accessible CBDC, this innovation will raise the interest and possibly the appeal of this currency as a reserve medium or even as an international currency.

If this sets the international relevance of the currently leading currencies on a downward trend, policymakers in these countries must consider launching their own CBDC to maintain their position.

Combating competitive devaluations needs to be ensured. A foreign central bank could not only introduce a CBDC, but also abolish cash. In this case, the monetary policy authorities in that currency area can drive interest rates deep into negative territory. In the recent past, many countries have entered a near-zero interest rate environment where traditional monetary policy transmission channels such as the bank lending channel have lost relevance while the exchange rate channel has gained importance. As a result, some of the monetary policy decisions of major central banks have been interpreted as competitive devaluations or even currency wars by many commentators. In this context, a currency that replaces cash with a CBDC would allow that central bank to penetrate the exchange rate channel much further, so that the rest of the central banks, which are restricted by the zero floor, would not be able to counter. It is anticipated that such a competitive devaluation should replace cash with a CBDC.

Privately issued electronic money such as Libra, which is not limited to a specific territory and is therefore truly international, can lead to national currencies becoming global reserve media. This would shift power and dominance from national central banks to private, possibly multinational, institutions. If Libra is successfully introduced, it will, by design, make it immediately as stable as the major currencies on which it is based. Due to its large network, it immediately expands widely and beyond national borders. This makes a perfectly stable currency suddenly available to people in developing countries, whose home currencies often fail to provide a similar degree of stability. People would start holding money in that currency (digital dollarization or release). In developed areas, on the other hand, Libra will start as a simple internet currency accepted in online shops and for services offered over the internet. Over time, people will start keeping money partially in Libra accounts for online purchases.

On a global scale, the newly established unit of account, Libra, would gain relevance and a capital market of intermediaries between Libra savers

(in developed countries) and Libra borrowers (in developing countries) could even emerge at a rate of risk-free common interest.

Once users continuously hold large sums of money in Libra accounts, the Libra network can reduce its support to 100% pegged currencies and still maintain full convertibility. The Libra would evolve into a single currency that can, temporarily, maintain a currency link with a certain basket of traditional currencies.

To prevent the associated loss of relevance for national currencies, authorities could impose strict regulations and measures to prevent Libra from gaining any relevance.

Another approach, to counter private international electronic money from gaining increased relevance, is to issue a CBDC together with a number of major central banks (with regulatory support to ensure their dominance) to provide a global digital currency as an alternative.

The concept of CBDC is widely debated among central bankers, practitioners and academics. Numerous central banks around the world are currently exploring the prospects of a CBDC, not only theoretically, some of them are already developing technical solutions to implement this system.

Sometimes the investigation takes place behind closed doors, while other central banks communicate quite openly their investigation into the possibility of an e-krona. In 2018, the bank engaged in a deeper analysis of the prospects and challenges that led to two additional reports.

The following years are dedicated to the development of technical solutions with external experts for this purpose. It is generally unclear if and when a major central bank actually introduces a CBDC that has global relevance. Intuition suggests that CBDCs will become a reality at some point and today's major currencies will not be the leaders of such a movement.

Conclusions

From the study of this article, the conclusion can be drawn that the future for the money supply will be that of the introduction of digital money.

The introduction of digital money eliminates the use of cash and at the same time ensures the possibility of eradicating financial crime.

Cryptocurrencies make their way primarily in developed economies that have a well-ordered and easy-to-control banking system.

The quality of money is, in the process of digitization of the entire economy, a priority and forward-looking element, which will be given attention.

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