German Advisory Group Ukraine

German Advisory Group

Policy Paper Series [PP/01/2019]

Central Bank Digital Currencies: A Survey of the Key Issues

Cyrus de la Rubia, Robert Kirchner

Berlin/Kyiv, March 2019

About the German Advisory Group

The German Advisory Group on Economic Reforms, which has been active in Ukraine since 1994, advises the Ukrainian Government and other state authorities such as the National Bank of Ukraine on a wide range of economic policy issues and on financial sector development. Our analytical work is presented and discussed during regular meetings with high-level decision makers. The group is financed by the German Federal Ministry for Economic Affairs and Energy.

German Advisory Group
c/o BE Berlin Economics GmbH
Schillerstr. 59
D-10627 Berlin
Tel: +49 30 / 20 61 34 64 0
Fax: +49 30 / 20 61 34 64 9
info@beratergruppe-ukraine.de
www.beratergruppe-ukraine.de

About the Authors

Dr Cyrus de la Rubia is chief economist of Hamburg Commercial Bank with a focus on monetary policy and global economics. Before joining the Hamburg Commercial Bank, Dr de la Rubia headed the Economics Department of the Dresdner Bank Latin America in Hamburg, analyzing Emerging Markets. He is also a lecturer at the Frankfurt School of Finance and Management and works as an economic policy consultant for Berlin Economics. Dr Cyrus de la Rubia wrote his PhD thesis at the University of Potsdam (Germany) about the maturity structure of bond markets, after studying Economics at the University of Kiel (Germany) and Córdoba (Argentina). Dr de la Rubia is the author of the book “Unser Geld in der Krise” (“Our money in trouble”), which was published in spring 2017.

Robert Kirchner is the Deputy Team Leader of the German Advisory Group and an authorized representative of Berlin Economics, the consulting firm which implements the project. His consulting and research activities focus on macroeconomic and financial sector issues, particularly in the context of transitioning countries.

After studying economics and finance at the University of Potsdam and the Warwick Business School (UK), he worked as a research fellow at the University of Potsdam for several years.

Central Bank Digital Currencies: A Survey of the Key Issues

Executive Summary

Central bank digital currency (CBDC) is currently a hot topic, discussed in a significant number of central banks as well as in academic circles. As can be expected, there is no clear-cut definition of CBDC. Rather, there are different variants of CBDC being in discussion with mainly one feature in common: It is digital money issued by the central bank. For the purpose of this paper, we focus on CBDC on an account basis that is available for the general public. Thus, in this paper, CBDC is synonym for digital money deposited at the central bank, with every adult being entitled to hold such an account, without any limit to swap deposits against CBDC.

Some 70% of central banks surveyed by the Bank of International Settlement (BIS) are currently engaged in doing research about CBDC, a majority of them from emerging markets. Reasons behind this strong interest are manifold. CBDC might work here as an accelerator towards a cashless society, as the use of cash in economic transactions in many countries is already decreasing in relative terms. Other reasons relate to combatting tax evasion and money laundering, creating more efficient payment systems and addressing the zero lower bound in the monetary transmission mechanism. Among emerging economies, the main motivation to think about the issuance of general-purpose CBDC is payment-efficiency, followed by financial inclusion and payment safety. Monetary policy implementation ranks on the lower end of importance.

The introduction of CBDC (in whatever concrete form) has implications for the stability and the profitability of the banking sector. Proponents of CBDC argue that by creating such “safe money”, a more stable financial system can be achieved by decoupling the payment system from the banking sector, which also reduces the necessity to regulate the banking system in its current form. Banks would become like normal “service” companies in this view. As such a shift would also affect their funding structure (banks in most countries fund themselves mainly through public deposits) and their lending capacity, their profitability would probably suffer.

For central banks, the introduction of CBDC would also affect monetary policy. This relates to likely increased volatility in traditional broad monetary aggregates, the role of the standard policy rate channel, possible elimination of lower bounds on rates (probably not very relevant for emerging markets like Ukraine) and credibility aspects. The latter might be negatively affected by more frequent liquidity interventions, and increased political interference in the activities of the central bank. Possible losses of seigniorage (related to money demand due to illegal activities) might also increase political dependency.

To conclude, over the last few years, a fascinating new topic has emerged in monetary economics. While the majority of this work is theoretical so far, it would be a mistake not to follow the discussion closely, as it might have far-reaching practical implications for the conduct of monetary policy.

Authors

Dr Cyrus de la Rubia	cyrus.delarubia@yahoo.de	
Robert Kirchner	kirchner@berlin-economics.com	+49 30 / 20 61 34 64 0

Contents

1. Introduction

Central bank digital currency (CBDC) is currently a hot topic, discussed in a significant number of central banks as well as in academic circles. The rise of cryptocurrencies like bitcoin may have served as a watershed moment to central banks as they had to realize that, in principle, there is the possibility to create private money which could circulate in peer to peer payments. While the fear of competition by cryptocurrencies has subsided somewhat, the research about CBDC is moving on, with some 70% of central banks surveyed by the Bank of International Settlement (BIS) engaged in doing research. In the same survey[1], 42 monetary authorities out of the 63 participating central banks were from emerging economies, amongst them Russia, Georgia, Azerbaijan, Kazakhstan and China. The impression that emerging economies are especially interested in CBDC is supported by the Indian economist Eswar Prasad: "I think in emerging markets there is more of a need [for digital currencies] given the fact that there is less financial inclusion (…)"[2]

Out of all 63 central banks surveyed by BIS, around 10% consider it very or somewhat likely to introduce general-purpose CBDC in the medium term. A further 25% consider it possible.

While the central banks of emerging economies hope to reap benefits from the introduction of CBDC by creating a more efficient payment system and to foster financial inclusion, among other motivations, there are important questions surrounding CBDC. There are for example different design possibilities for CBDC, ranging from token-based to account-based digital money on the one hand, and from general-purpose to wholesale digital money. Apart from this technical discussion, there is an emerging debate about the impact the introduction of CBDC would have on the banking sector, monetary policy and the whole economy. This, obviously, depends on the specific design of CBDC, among other things. Finally, introducing CBDC in emerging economies is connected to different challenges in comparison to the introduction of CBDC in advanced economies. Among emerging economies, the main motivation to think about the issuance of general-purpose CBDC is payment-efficiency, followed by financial inclusion and payment safety. Monetary policy implementation ranks on the lower end of importance.

This survey paper is structured as follows. In chapter 2 we will focus on the definition of CBDC and introduce a systematic approach to differentiate between different sorts of CBDC. Chapter 3 deals with the underlying motivations to think about the introduction of CBDC, which varies between emerging and advanced economies significantly. Chapter 4 is concerned with the impact of CBDC on the banking sector and especially its stability. In chapter 5 it is analyzed in how far monetary policy would have to change if CBDC were introduced. As this paper deals with a relatively new and quickly evolving topic, open issues are summarized in the final chapter 6.

2. Definition of Central bank digital currency (CBDC)

As can be expected, there is no clear-cut definition of CBDC. Rather, there are different variants of CBDC being in discussion with mainly one feature in common: It is **digital money** issued by the **central bank**. Or, to put it in the words of the International Monetary Fund (IMF): "CBDC is a digital form of existing fiat money, issued by the central bank and intended as legal tender. It would

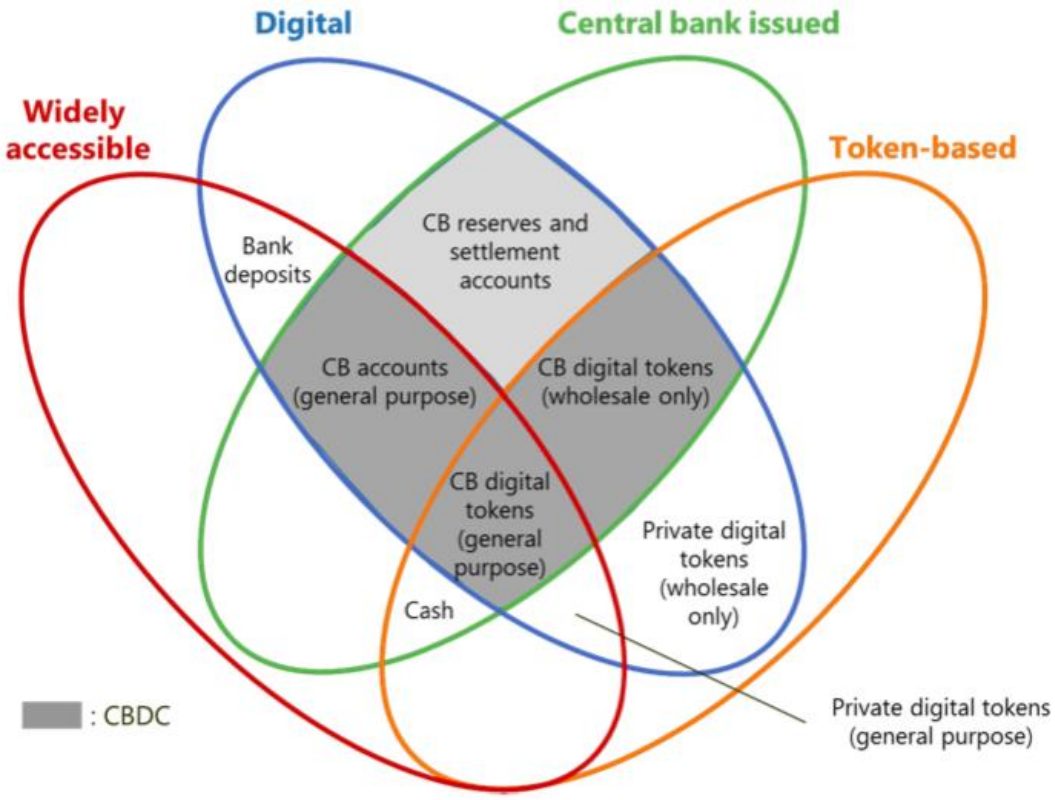
[1] *BIS (2018): Central bank digital currencies. Committee on Payments and Market Infrastructures. https://www.bis.org/cpmi/publ/d174.pdf.*

[2] *Prasad (2018): Digital currencies: Implications for central banks. Brookings Institute. https://www.brookings.edu/events/digital-currencies-implications-for-central-banks/.*

potentially be available for all types of payments and could be implemented with a variety of technologies." (IMF, 2019)[3]

However, before diving deeper into CBDC design choices, it is useful to put CBDC in the general context of money (public and private), which can be done via the so-called money flower.

Figure 1: The money flower



Source: BIS (2018)

The basic idea of the money flower is that there are **four properties,** which can be attributed to money:

1. **Who is the issuer?** Money which is issued by the central bank is included in the green ellipse. All privately-issued money is outside the green ellipse.
2. **What form?** All digital forms of money forms are included in the blue ellipse; all physical forms of money are outside the blue ellipse.
3. **How is the degree of accessibility?** All widely accessible money forms are included in the red ellipse. Restricted forms of money are outside the red ellipse.
4. **Which technology is used?** Token-based (or interchangeable value based) money is included in the orange ellipse; account-based money is outside the orange ellipse.

---

[3] *IMF (2018): Casting Light on Central Bank Digital Currency, Tommaso Mancini-Griffoli er al. https://www.imf.org/~/media/Files/Publications/SDN/2018/SDN1808.ashx.*

Alternatively, there is a definition by the Bank of International Settlement: "A central bank liability, denominated in an existing unit of account, which serves both as a medium of exchange and a store of value." (BIS, 2018): https://www.bis.org/cpmi/publ/d174.pdf.

With this taxonomy of money, **four kinds of CBDC** can be defined:

1. **CB accounts (general purpose)**: Central bank accounts with general access to the public.
2. **CB reserves and settlement accounts**: Central bank accounts with restricted access. Central bank reserves and settlement accounts would fit into this definition, with banks being the only institutions with access to central bank money. This is obviously the common model we have today. However, the access could be widened to other institutions, for example big corporates.
3. **CB digital tokens (general purpose)**: Central bank digital tokens with general access for the public. These digital tokens are linked to a physical technology. Thus, payments are only possible if the item where the tokens are stored gets in contact with the item where the tokens are to be transferred. This could be a card reader.
4. **CB digital tokens (wholesale only)**: Finally, a central bank digital token with restricted access is also possible.

Unfortunately, this rather broad differentiation is not enough to get a clear picture about the properties of CBDC. The additional design features are shown in the following table.

Table 1: Design features of ordinary and of digital central bank money

	Existing central bank money		Central bank digital currencies		Description
	Cash	Reserves	General purpose token	General purpose accounts	
24/7 availability	✓	×	✓	(✓)	Tokens would be available 24/7 hours, accounts could be available 24/7, which is up to the decision of the central bank
Anonymity	✓	×	(✓)	×	Tokens could take the same form of anonymity like cash. However, it would also be possible to introduce traceability of transactions.
Peer-to-peer	✓	×	(✓)	×	While it would be the most natural thing to have peer-to-peer transfers when using tokens, in the case of central bank accounts, the central bank is the intermediary (rather than a private bank)
Interest bearing	×	(✓)	(✓)	(✓)	It is technically feasible to pay interest rates on both forms of CBDC, on tokens and on accounts. This feature is important with respect to its implication for financial stability and monetary policy.
Limits or caps	×	×	(✓)	(✓)	Limits or caps to CBDC are discussed for example in the context of the risk to increase to possibility of bank runs (which is debatable).

✓ = existing or likely feature; (✓) = possible feature; × = not typical or possible feature

Source: BIS (2018), modified by the authors
Note: Wholesale-only token is not considered here, as this kind of CBDC is not very relevant in our view

While CBDC could be designed in different forms, it is another question in how far there should be exclusivity or parallelism. Thus, should cash be abolished with the introduction of general purpose CBDC, or should it be still available, letting the public to decide which form of money will dominate? Should account-based CBDC coexist with token-based CBDC? The answers to these questions have

significant implications for the acceptance of newly introduced CBDC, the stability of the financial sector and the monetary policy transmission process.

In the rest of this paper, we will focus on CBDC on an account basis for the general public. Thus, in the following, CBDC is synonym for digital money deposited at the central bank, with every adult being entitled to hold such an account, without any limit to swap deposits against CBDC.[4]

3. Reasons for thinking about the introduction of CBDC

There are a number of reasons why policy circles and the academic community has shifted its focus on CBDC. We would like to highlight seven reasons below in more detail:

1. **Dwindling use of cash** in relation to total cash and cash-like payments: Assuming that in not too far future cash will not be accepted anymore by the private sector (due to the costs which are involved in using cash) any access to central bank money would become impossible for private households. Instead they would be fully dependent on the money created by the banking sector. This may or may not be desirable, which is above all a political question. Sweden is an example for dwindling use of cash in relative and absolute terms.

Figure 2: Share of people in Sweden who paid for their most recent purchases in cash (%)

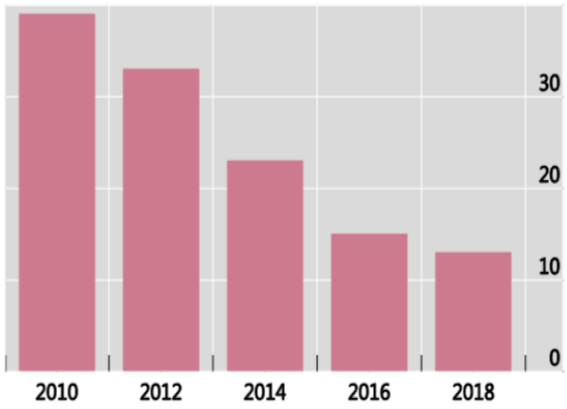
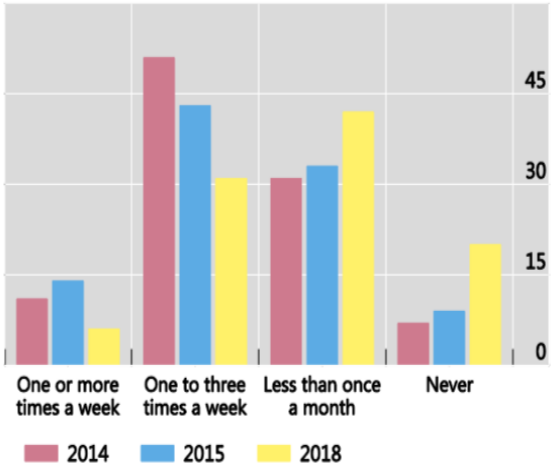


Figure 3: Share of people in Sweden who withdrew cash from an ATM/cash desk (%)

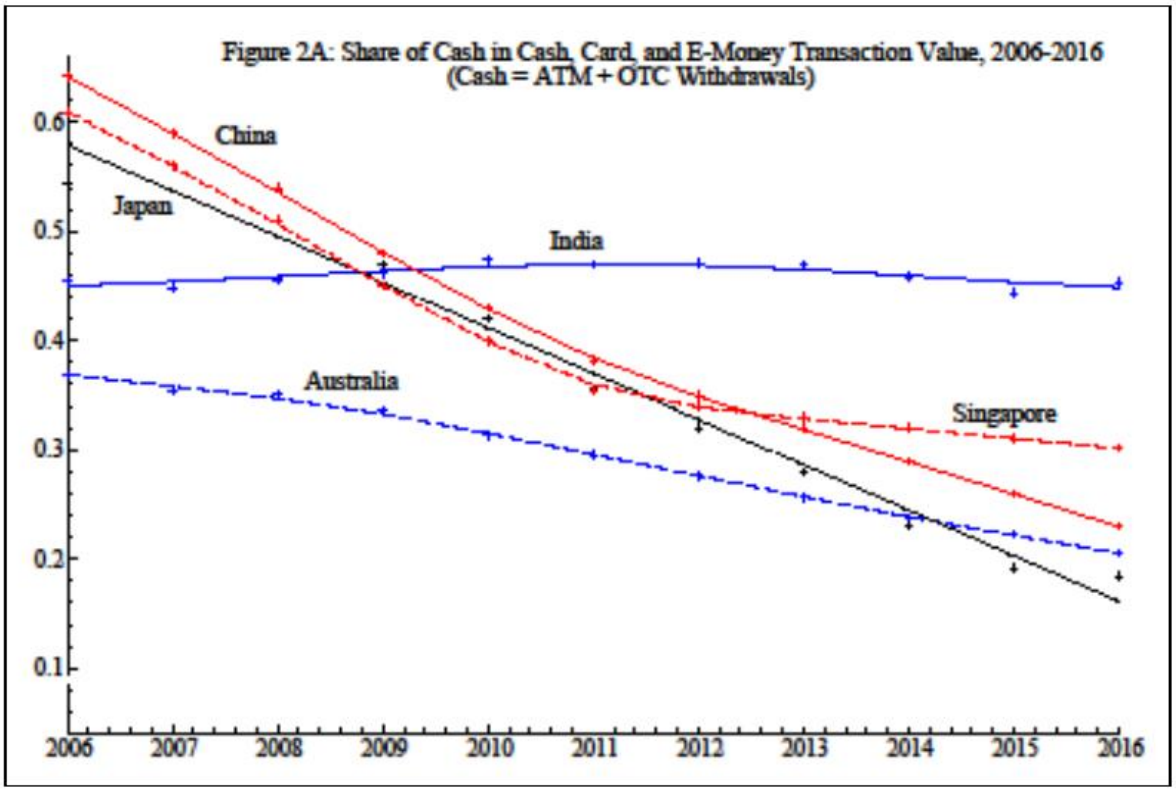


Source: BIS (2019): Proceeding with caution – a survey on central bank digital currency: https://www.bis.org/publ/bppdf/bispap101.pdf

[4] *In contrast, the Bank of England has presented a model where the central bank sells CBDC only against government bonds. Therefore, a direct swap of bank deposits against CBDC is not possible. Thus, even in a bank run, it is not possible that all deposits are changed against CBDC. As people can freely trade deposits against CBDC on a private market, deposits from weaker banks may be valued less than deposits from stronger banks. The total amount of CBDC which is in the market is determined by the central bank. The amount of deposits is determined by banking sector activity (each new loan generating a corresponding deposit). The reserve systems works as before. If an individual wants to have CBDC instead of his deposits, he could sell his deposits to someone who wants to have these deposits. The overall deposits in the whole banking system would remain unchanged. A bank run on single banks can still happen, e.g. if all clients of bank A transfer their deposits to bank B, where they have a second account. In this case, bank A has to transfer reserve money to bank B's central bank account and will run out of liquidity, unless the central bank is willing to act as the lender of last resort for this bank. Thus, we have two payment systems running parallel to each other.*

In a global context, the use of cash is still increasing in absolute terms in most countries, but decreasing in relative terms (share of cash in (cash + card + E-Money) transaction volume).

Figure 4: Share of cash in relation to cash, card, and e-money transaction volume



Source: IMF (2019): Cash Use Across Countries and the Demand for Central Bank Digital Currency: https://www.imf.org/~/media/Files/Publications/WP/2019/WPIEA2019046.ashx.

2. **Combatting tax evasion and/or money laundering:** CBDC would give the possibility, if designed accordingly, to trace transactions and hamper thereby the evasion of tax payments and social security contributions as well as money laundering, thereby reducing the informal sector. Obviously, this is a highly political question, involving the question in how far it is desirable to eliminate anonymity and in how far the people are willing to accept such a forced transparency. Such policy might be even counterproductive, giving rise to higher dollarization, capital flight and use of alternative means of payments including cryptocurrencies.
3. **CBDC as an accelerator towards a cashless society:** The use of cash involves high costs, including the transport and handling of cash and security issues. The latter could become a serious issue depending on the crime rate. In Brazil, a country with a rather high crime rate, ATMs cost 60% more than the global average due to the need for additional security requirements. However, it is far from clear if the introduction of CBDC on a voluntary basis would help to eliminate cash. A more radical approach would be to introduce CBDC while abolishing the acceptance of cash as legal tender. This could be connected to various side effects, including exclusion of people from economic life. The example of India, which tried to demonetize the society in a rather brute way, is worth to be analyzed in this respect.
4. **Competition with cryptocurrencies:** Cryptocurrencies allow for peer to peer money transfer. In the traditional monetary system this is only possible with cash, but not with deposit currency. Instead, in every non-cash transaction, banks and the central bank are involved as intermediaries. CBDC instead would cut out banks as intermediaries and allow for peer to peer transfers, or for transfers with the central bank as the only intermediary, depending on the CBDC design. This would enable central banks to compete in a much better way with the rise of cryptocurrencies. It is quite striking that just a few years after the appearance of bitcoin, a

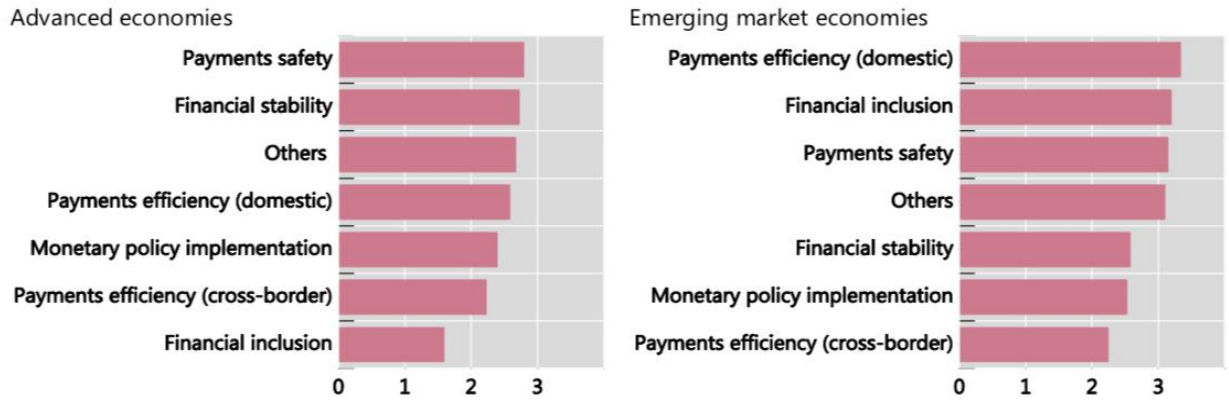
growing number of central banks are engaging in research activities with respect to CBDC. Obviously, they feel some pressure to do so.

5. **Zero lower bound/monetary transmission process:** If CBDC were introduced with the objective of fully substituting cash, this could eliminate the zero lower bound which proved to be a problem for developed economies during the financial market crisis over the last ten years. In addition, some analysts express their hope that the monetary transmission process would work more directly (under the assumption that every citizen had an interest-bearing central bank account). For most emerging economies, however, the lower zero bound is not an issue for now.
6. **More efficiency/higher welfare:** Given that a growing part of economic life happens in and through internet transactions, it seems to be a logical step to have internet-compatible money. While platforms like eBay and Amazon provide a platform for buyers and sellers to get into direct contact (without any intermediary like wholesale dealers and retailers), the step of disintermediation is still missing in the sector of money transfer. This gap could be closed through CBDC.
7. **Technological feasibility:** Payment systems are highly complex. This is one reason why until now, only banks have usually access to central bank accounts[5], while the broad public is excluded. Given the progress in digitization and the massive increase in storage capacity, a decentralized system of central bank accounts (e.g. with every citizen older than 15 being considered) seems to be conceivable if not today, then tomorrow.

In the above-mentioned BIS survey, 63 central banks were asked about their motivation to think about the introduction of CBDC. Interestingly, emerging economies have different priorities with respect to the motivation to issue CBDC. Emerging economies most important priorities are to improve payment efficiency, to enhance financial inclusion and to provide for more payment safety. In contrast, payment efficiency and financial inclusion rank quite low in advanced economies' central banks. Only payment efficiency is similar important among central banks of advanced and emerging economies. Cross-border payment efficiency ranks rather low in the case of emerging economies' central banks and the same is true for monetary policy implementation.

The survey does not provide information in how far combatting tax evasion and money laundering may be a motivation for the issuance of CBDC.

Figure 5: Motivation for issuing general-purpose CBCSs, ranked in order of importance



[1] The score is calculated as an average of the options: "Not so important" (1), "Somewhat important" (2), "Important" (3) and "Very important" (4).

Source: BIS (2019): Proceeding with caution – a survey on central bank digital currency: https://www.bis.org/publ/bppdf/bispap101.pdf

[5] There are some jurisdictions where public sector entities have access to central bank accounts. For example, this is the case for German finance ministries on the central and the federal level.

The reasons to think about the introduction of CBDC are summarized in the following table.

Table 2: Reasons to think about the introduction of CBDC

Dwindling use of cash (absolute and/or relative)	The decreasing significance of cash for transactions means that there is a conceivable scenario of having a society without general access to central bank money. This might be not desirable for political reasons (as e.g. banks are given too much power).
Combatting tax evasion/money laundering	Increasing the effectiveness of the tax and social security system. Risk of evasive actions like dollarization.
CBDC as an accelerator towards a cashless society	Costs involving the handling of cash would be cut. Risk: Unclear if CBDC is attractive for people or if the forced introduction of CBDC and elimination of cash would lead to harmful side effects.
Competition with cryptocurrencies	CBDC would cut out banks as intermediaries, making it more competitive with respect to cryptocurrencies which enable peer-to-peer transfers (albeit at a low scale).
Zero lower bound/monetary transmission process	The elimination of the zero lower bound happens only when cash would be completely eliminated. In the case of Ukraine this point is less relevant at the moment due to rather high inflation and interest rates.
More efficiency/higher welfare	Cutting out banks as middlemen would correspond to the evolution of the internet economy, whose role has increased significantly over the last years.
Technological feasibility	While certain designs of CBDC are rather complex, the progress of the last decades means that the technological borders have been expanded.

Source: Own compilation

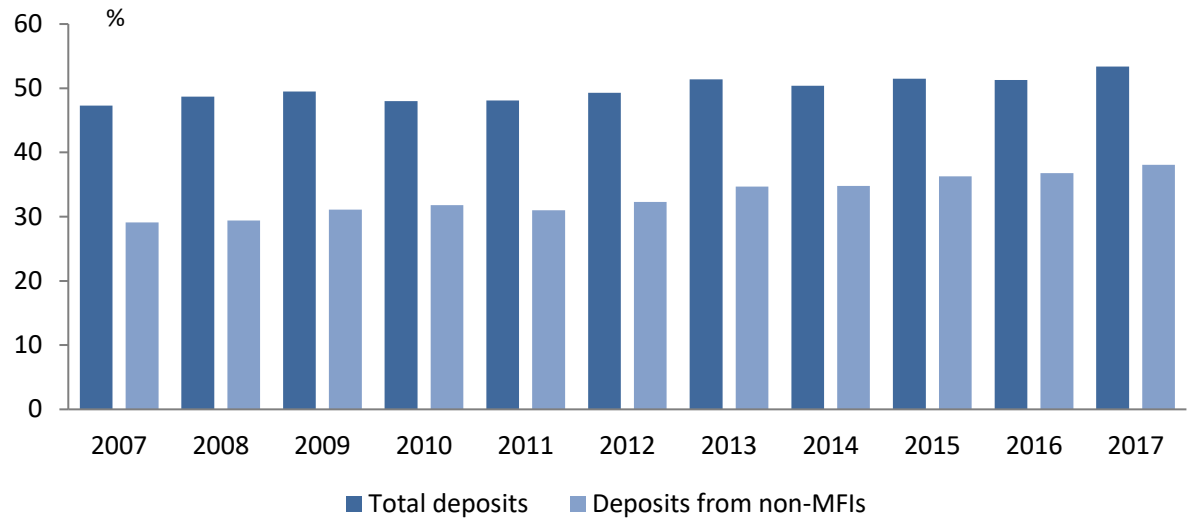
4. Implications for the banking sector and its stability

The introduction of CBDC will have implications for the stability and the profitability of the banking sector. We define as before CBDC as digital money for the general public in the form of central bank accounts.

Funding structure

In most economies, banks fund themselves through public deposits. They represent more than 50% of the main liabilities of the EU banking system.

Figure 6: Deposits as a share of total EU banking assets



Source: European Banking Federation (2018)

Offering the public an alternative way to deposit money, namely CBDC in a central bank account, could change the funding structure of the banking sector very much as well as the stability of public deposits as the predominant funding source. Deposits and CBDC would be considered as substitutes. It depends on different factors, in which way and how much the funding structure of the banking sector may change (assuming unlimited access to CBDC). To put it differently: The variation of demand for CBDC will be the main influencing factor on the changes in the funding structure of the banking sector. CBDC demand will depend on different factors:

- The interest rate spread between bank deposits and CBDC. Usually the bank deposit interest rates will be higher than the interest rate on CBDC (which could be zero by design, or variable). The lower the spread, the higher the incentive to switch to CBDC.

- The perception of safety of bank deposits. This depends on the existence and credibility of a deposit guarantee scheme. The higher the credibility, the higher the demand for bank deposits (given a positive interest rate spread).

- The efficiency of the payment system via CBDC and the related costs to do CBDC transfers in relation to the payment system through the banking sector.

While it is difficult to tell how the depositors will react to the introduction of CBDC, it is conceivable that under certain conditions the banking sector will lose an important share of its deposits and would rely more on wholesale funding. This gives rise to the question how to implement CBDC without triggering a shock. One way to buffer the shock would be to increase the financing of the banking sector through the central bank via increased repo activity.

Apart from that, a funding structure based more on capital market instruments and wholesale funding is considered usually less stable than funding structures based mainly on retail funding. Having said this, other factors may be even more important, which is the asset liability structure, thus the extent of maturity mismatch and of currency mismatch between assets and liabilities, amongst other factors.[6]

[6] *Apart from that, the macroeconomic stability plays a decisive role in form of the soundness of public finances, the inflation environment and the credibility of the central bank.*

Probability of bank runs

Some economists express their view that bank runs might become much more likely with CBDC due to the easiness to switch between bank deposits and CBDC[7]. It is quite probable that CBDC and bank deposits would become closer substitutes than cash and bank deposits currently are. Economies like Ukraine with a history of banking crises and volatile deposit switching between local and foreign currency deposits may be exposed even more to sudden switches from bank deposits to CBDC.

This may be taken by policy makers as occasion to reinforce the deposit guarantee scheme, thereby diminishing the vulnerability towards moments of stress.

Apart from that, there is one mitigating factor connected with CBDC: A banking sector which is in crisis and exposed to a bank run is confronted with logistical challenges with respect to the rapid provision of banknotes so that the demand from citizens can be fulfilled. If banknotes do not arrive in time and ATMs are empty this could lead to panic and amplify the crisis. In the case of CBDC no such logistical problem should arise as central bank money could be provided within seconds via electronic transfer. This makes a panic and a full-blown destructive bank run less probable.

The problem of Dollarization

Introducing CBDC without shaking the monetary system could prove to be quite a challenge, especially in an environment of high Dollarization. If for example CBDC were to be introduced in a shock therapy, forcing every citizen to set up a CBDC account and forbidding at the same time cash money, people might switch completely to the well-known Dollar or Euro banknotes and/or Dollar or Euro-denominated bank accounts. Drivers for such a reaction could be: 1) Low credibility of the central bank due to a history of high inflation. 2) The feature of non-anonymity of the CBDC which may be especially relevant when the informal sector plays an important role. 3) Technical shortcomings of the CBDC infrastructure.

Given that a high degree of Dollarization is doing harm to the effectiveness of monetary policy and tends to increase the instability of the financial sector in particular and of the economy in general, the introduction of CBDC must be carefully planned and prepared.

Does CBDC provide a more stable system?

On a more general discussion level, it is often argued that CBDC may provide a more stable financial system. The argument goes as follows: at the core of the banking system is the payment system. Without the payment system the economy would not work. The traditional payment system relies on the banking sector as banks, with the help of their central bank, transfer money from one customer to the other. Customers on the other hand rely on the banking sector because banks are the single providers of large-scale money transfers. Large-scale central bank money transfers without banks are only possible through cash transactions, which are forbidden, or at least limited in most countries. Apart from that, cash transactions are quite risky due to the possibility of theft, and require a personal contact between the two parties involved. Thus, the payment system relies on the banking sector. This has proved to be a problem in certain circumstances, as banks and bank money are not safe. Experiences in Greece, Cyprus, Argentina and Ukraine (to mention only a few countries) are examples for this claim.

A certain degree of safety of bank money can only be achieved by a high level of regulation, an deposit insurance and public bail outs to avoid that trust in the banking and payment system is

---

[7] See for example Carney (2018): The Future of Money, https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/the-future-of-money-speech-by-mark-carney, where he noted: "Central banks may find themselves (…) running the risk of destabilising flights to quality in times of stress."

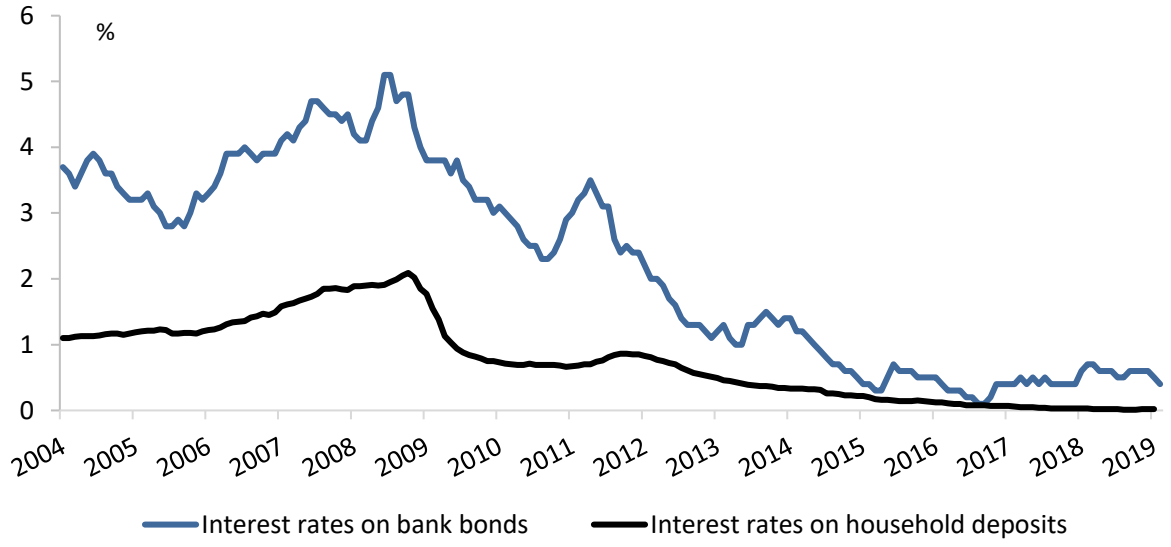
undermined. Now, if instead there is safe money in the form of CBDC and a corresponding safe payment system, the need to regulate the banking sector is much less necessary. Banks could be considered much more as normal service companies. If a bank went bankrupt, this would not harm the economy as a whole as the payment system would still work. There should not be a difference between the harm done by the insolvency of a big goods-producing company and the harm done by the insolvency of a big banking company. Therefore, there is less need for the state to intervene in such a situation. This would mean there is no more "too big to fail".

Implicitly, this idea is also mentioned in a speech of the Managing Director of the International Monetary Fund, Christine Lagarde: "The advantage [of CBDC] is clear. Your payment system would be immediate, safe, cheap, and potentially semi-anonymous. (…) And central banks would retain a sure footing in payments. In addition, they would offer a more level playing field for competition, and a platform for innovation." (Lagarde 2018).

Implications for the profitability and lending capacity of the banking sector

Public deposits are considered one of the cheapest ways to fund a bank.

Figure 7: Interest rates on household deposits and on bank bonds



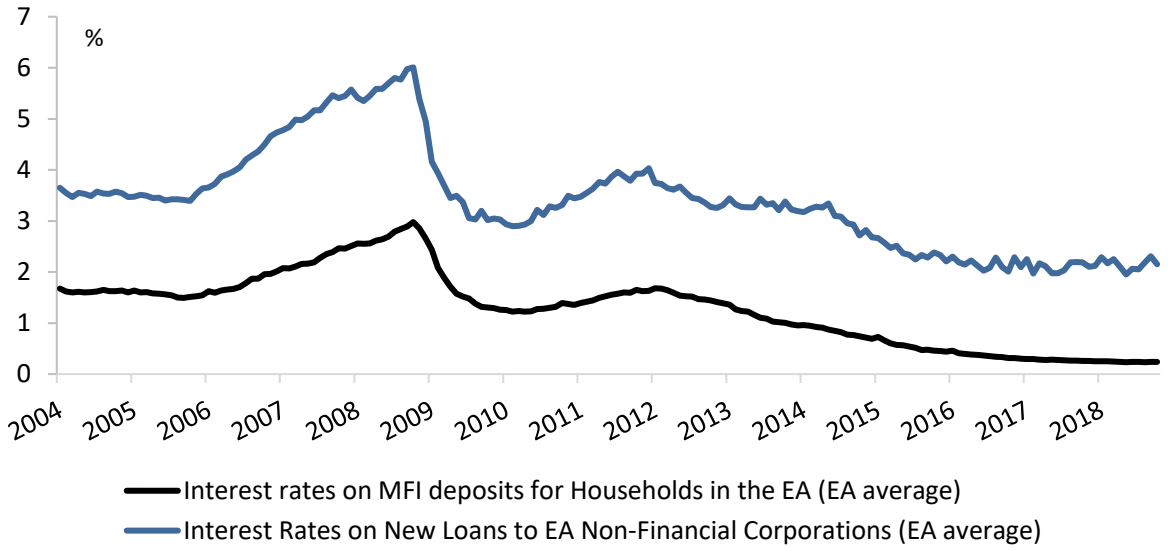
Source: Macrobond, Hamburg Commercial Bank Economics

The introduction of CBDC would have an impact on the interest rates on deposits, depending on various factors such as the interest rate level of CBDC, the trust in the safety of bank deposits in particular and the banking sector in general as well as the easiness to do payments through the payment system. As immediate reaction to the introduction of CBDC, funding should become more expensive.

If the average interest rates for funding become more expensive, banks would most probably increase the interest rates on loans, given that otherwise the interest rate margin would shrink.[8] Potentially this would lead to a lower loan volume extended to the private (non-financial) sector.

[8] *Banks could also absorb part of the higher interest rates by a decreasing interest rate margin. Assuming that banks operate in a competitive environment, and interest rate margins are at an economic equilibrium, an increase of the interest rates on loans seems to be a more realistic outcome.*

Figure 8: Loan and deposit rates in the Euro area



Source: Macrobond, Hamburg Commercial Bank Economics

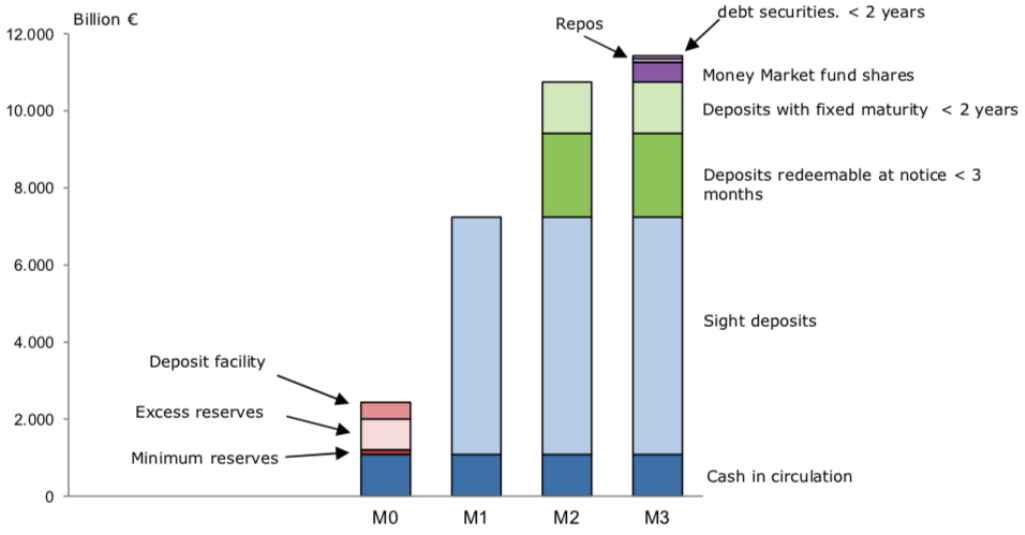
Given the dynamic technological changes which are happening in the financial sector (think of FinTech), this does not mean necessarily that the financing capacity of the whole economy would diminish. The only conclusion (and even this one may be only valid for the short term) is that the demand for loans extended by the banking sector will decrease.

5. Implications for monetary policy and central bank credibility

New definition of the relevant monetary aggregate

In the traditional system, a central bank tries to make sure that the amount of broad money M3 which is created by the loan extending activity of the banking sector (a loan extension leads to deposits, considered in M3) is consistent with stable and low inflation. M3 will shrink if loans are withdrawn; M3 will increase if more loans are extended.

Figure 9: Monetary aggregates in the euro area, January 2017



Source: Fiedler, S. et al (2017): Financial Innovation and Monetary Policy: Challenges and Prospects.
http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/602045/IPOL_IDA(2017)602045_EN.pdf

In a world where CBDC plays a bigger role, sight deposits could prove to be much more volatile than before. The amount of total deposits (bank deposits + CBDC) could remain constant if the banks are able to get CBDC from the central bank, which may act as lender of last resort for solvent banks. It would be required to find a new definition for the relevant (in the sense of its proximity to the intention to spend the money) monetary aggregate which would include CBDC on individual accounts (but not the reserve money which funds the banks).

Change of the significance of the traditional key interest rate

The traditional policy rate (which is the interest rate paid by banks in exchange for reserve money) may lose its role as the single most important instrument. Rather it would make sense to move the traditional policy rate in tandem with the interest rate on CBDC in a way that the spread between the traditional policy rate and the interest rate for CBDC is held constant.

If instead the CBDC interest rate is held constant (and not the spread) and the central bank cuts the traditional refinancing interest rates, two alternative outcomes are possible (vice versa with a hike of the interest rate):

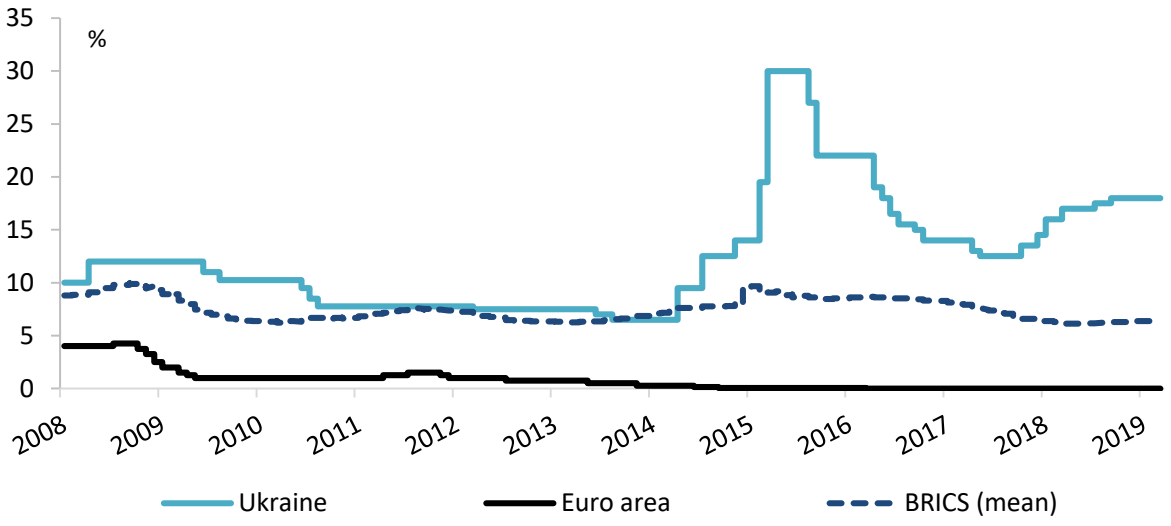
- First, if banks react in a traditional way by cutting the interest on bank deposits, people may move part of their bank deposits to CBDC as they become more attractive in relative terms. This makes it more difficult/expensive to refinance the balance sheet of banks.
- The second possibility is that the banks do not react to the cutting of the Central Bank refinancing rate, because they fear that people might move to CBDC. Banks therefore have less room to cut interest rates for their loans extended to corporates and private households. Thereby the transmission process of monetary policy is hampered. Therefore, it would make sense to have interest rate-bearing CBDC.

Elimination of the lower bound on interest rates

In advanced economies, some central banks where confronted with the so called lower bound on interest rates during the financial crisis starting in 2008, given that people started to hold cash instead of accepting negative interest rates. With CBDC, this lower bound could disappear. However, one important condition has to be fulfilled: Cash would have to be substituted completely by CBDC.

While the rather high inflation does not seem to make it relevant for the Ukraine to think about a lower zero bound, things might change in the future. In such circumstances a resurgence of Dollarization and capital flight might be the impact of the introduction of negative interest rates.

Figure 10: Central bank policy rates



Source: Macrobond, Hamburg Commercial Bank Economics

Credibility of the central bank may be endangered due to higher risks and lower seigniorage

Given the higher volatility of bank deposits in a CBDC system, the central bank may have to step in more frequently to fund banks with reserve money if their clients swap bank deposits against CBDC. While banks are usually only allowed to get reserve money from the central bank against good quality collateral, in time of systemic risk the central bank may be inclined to accept lower quality collateral. There is an increased probability that such situations may occur more often within a CBDC system then within a traditional banking system.

At the same time, political pressure on the central bank might increase: If a sudden and massive withdrawal of deposits occurred in the banking sector with deposits moving towards CBDC, the central bank may have to cut interest rates on CBDC with the purpose to make CBDC less attractive and bank deposits more attractive, thereby stabilizing the banking sector. Therefore, the political pressure on the central bank to cut CBDC interest rate may increase significantly. This may not be desirable.

Finally, there is discussion in how far seigniorage might be diminished through the introduction of CBDC, which could do harm to the financial independence of the central bank. Seigniorage is the difference between the costs of issuing central bank money, including cash, and the revenues on the assets held by the central bank. If the amount of central bank money remains the same after the switch from cash to CBDC, seigniorage should remain the same. However, in the case of non-anonymity, it is unlikely that payments related to corruption, criminality and money laundering will switch to CBDC. The higher the share of cash used in this illegal context, the higher the loss of seigniorage. This would mean in any case lower revenues for the central bank. When the revenues would not suffice to cover the costs of the central bank's operations, the Finance Ministry must get involved. This could generate an undesirable financial dependency, putting at risk the political independence of the central bank.

6. Further questions

There are many questions that remain open in this fast-moving discussion. Further research has to provide answers to those questions, of which a part is presented below.

Political issues/political decisions to be taken

1. Who should take the decision about the introduction of CBDC? Should the parliament be involved? Or is it a decision to be taken by the central bank?
2. What about privacy? Is it desirable that the central bank gets full information about the transactions of individuals? Or should some limits to such transparency be introduced?
3. Should the private sector, which could be new players (FinTechs) or traditional banks be involved in a CBDC payment system?[9]

Credibility of the central bank

4. One argument in favor of CBDC is that people get the possibility of storing their money in a safe place without the need to rely on private banks. What about the case when the government and thus the central bank as issuer of CBDC has no convincing track

[9] There are different ideas with respect to the involvement of the private sector. It seems reasonable not to have every single payment being processed real time, but instead to have e.g. once a day the payments being handled. This could happen with the help of the private sector.

record/history of double-digit inflation? Does the introduction of CBDC increase the temptation of governments to abuse the monetary authority?

Experience of other central banks

5. A few central banks have issued CBDC. Uruguay has tested for a limited time a CBDC in the real world. In Ecuador a CBDC has been introduced in 2014. However, in April 2018 the project was deactivated due too little demand.[10] The Ecuadorian experience leads to the question if CBDC should be introduced through a shock therapy (thus by introducing it from ne day to the other and forbidding the use of cash at the same time) or on a voluntary basis. In this context, India's experience is noteworthy. While India did not issue CBDC, the government withdrew 500 and 1000 Rupee banknotes[11], which comprised 86,4% of all banknotes on a very short notice in 2016. People were required to deposit the old Rupee banknotes on their bank account to foster, among other things, a cashless payment system. In how far could Ukraine learn from those experiences/experiments?

Table 3: Jurisdictions where general purpose CBCD are being (or have been) actively explored

Australia (on hold)	Bahamas
Brazil	Canada
China	Curacao and Sint Maarten
Eastern Caribbean	Ecuador (pilot complete)
Denmark (rejected)	Israel
Norway (ongoing)	Philippines
Sweden	United Kingdom (on hold)
Uruguay (pilot)	

Source: IMF (2018): IMF (2018): Casting Light on Central Bank Digital Currency, Tommaso Mancini-Griffoli er al. https://www.imf.org/~/media/Files/Publications/SDN/2018/SDN1808.ashx.

[10] Instead of 500.000 accounts planned, only 5.000 accounts were reached in 2015. See https://www.livemint.com/Opinion/bDhooV43Xhq611PaSYf5LN/A-global-outlook-on-virtual-currencies.html.

[11] The government's goals for the demonetization included removing counterfeit banknotes from circulation, reducing corruption, terror funding and black money in circulation, lowering the size of the informal sector, and promoting electronic forms of payment. While the banknotes where replaced by new ones, only a small amount of 4500 Rupee (around 60 US-Dollar) could be exchanged in new banknotes while the rest had to be deposited on a banking account. However, tax authorities would investigate where the money came from when the amount was higher than 250.000 Rupee. See https://www.bbc.com/news/world-asia-india-37974423.

International issues

6. What about international payments? Will CBDC be accepted abroad? Is there a need abroad to adapt technically to CBDC money?
7. What about the control of the capital account? Could the control be improved or is there a risk of losing control over the capital account? If control over international CBDC transfer is improved, is there the risk of capital flight through different channels like cryptocurrencies?

Implementation issues/acceptance issues

8. How should CBDC be introduced? Should it be done on a voluntary basis with the risk that only a few would adopt it which means that the network effect would not take place, bringing the experiment to an end? Or should it be enforced with the risk that people might evade the concept and go instead for alternative currencies, be it foreign fiat money or cryptocurrencies? The lower the number of people being familiar with a (online) banking account, the more difficult it may be to introduce a CBDC account for everyone as full alternative to cash. In Ukraine, only 63% of adults have a banking account, according to the World Bank. This compares with 76% in Russia, Belarus with 81%, Georgia with 61% and Germany with 99%.
9. What should be done in terms of digital infrastructure to improve the acceptance of CBDC? This concerns the access to internet, the speed of internet connections, the capability of people to handle digital accounts.

List of recent Policy Studies

- Economic implications of transport restrictions in the Sea of Azov, by David Saha, Robert Kirchner and Vitaly Kravchuk, Policy Study PS/01/2019

- Unlocking investment through reforms: Proposals from German business in Ukraine, by Robert Kirchner, Thomas Otten, Julian Ries and David Saha, Policy Study PS/03/2018

- Whatever it takes: central bank communication as an effective monetary tool?, by Cyrus de la Rubia, Robert Kirchner and Dmitry Chervyakov, Policy Study PS/02/2018

- The economic impact of FDI on Ukraine, by David Saha, Vitaliy Kravchuk and Robert Kirchner, Policy Study PS/01/2018

List of recent Policy Briefings

- Economic implications of transport restrictions in the Sea of Azov – Summary of Results –, by David Saha, Robert Kirchner and Vitaly Kravchuk, Policy Briefing PB/02/2019

- The effect of the DCFTA on Ukrainian exports to the EU and on FDI from the EU, by Veronika Movchan and Ricardo Giucci, Policy Briefing PB/01/2019

- Establishing a SME Credit Guarantee Scheme in Ukraine: Updated Recommendations, by Robert Kirchner, Thomas Otten, Julian Ries and David Saha, Policy Briefing PB/08/2018

- Unlocking investment through reforms: Proposals from German business in Ukraine, by Robert Kirchner, Policy Briefing PB/07/2018

- Industry 4.0 – Overview and Policy Implications, by Philip Steden and Robert Kirchner, Policy Briefing PB/06/2018

- Taxation of Withdrawn Capital: Recent experience from Georgia and Latvia, by David Saha and Oleksandra Betliy, Policy Briefing PB/05/2018

- Should Ukraine become part of the EU's customs union? An assessment, by Ricardo Giucci and Veronika Movchan, Policy Briefing PB/04/2018

- The economic impact of FDI in Ukraine - Summary of Conclusions -, by David Saha, Vitaliy Kravchuk and Robert Kirchner, Policy Briefing PB/03/2018

- The impact of the new Kerch strait bridge on Ukraine's trade, by David Saha, Vitaliy Kravchuk and Veronika Movchan, Policy Briefing PB/02/2018

- The impact of Russia's transit restrictions on Ukraine's exports to Kazakhstan and Kyrgyzstan, by Veronika Movchan, David Saha and Robert Kirchner, Policy Briefing PB/01/2018