

CBDCs: Potential Impact on Bank Profitability, Asset and Risk Management and Financial Stability

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CBDCs: Potential Impact on Bank Profitability, Asset and Risk Management and Financial Stability

By Brunello Rosa and Alessandro Tentori

March 2022

In this paper we discuss whether or not the introduction of CBDCs may impact the profitability of banks and their ability to accumulate capital buffers. We also assess wider financial stability risks, including those potentially deriving from cyber attacks to central banks and discuss the implications for asset and risk management and for monetary policy.

Part 1: Banks and Asset Management

Since their inception, CBDCs have been considered a challenge for the traditional banking system. Their ability to replace banks for carrying out one of their traditional functions, i.e. domestic and – in the future – international payments, is considered a threat to the income deriving from this activity, impacting their P&L and, by extension capital accumulation. The risk for banks is that of going through another period of dis-intermediation, after that of the 1980-90s, when the developments of financial markets challenged the role of banks as their main provider of financing to the real economy. Banks reacted to that challenge by becoming the largest operator in financial markets, as soon as the restrictive regulation deriving by the seminal Glass-Steagall act was progressively abolished during the 1990s (and this ultimately led to the Global Financial Crisis of 2008-09).

In this instance, the role of banks, and their profitability, has been challenged by the rise of new technologies (**Figure 1**), which have seemingly “democratised” the access to finance (via fin-tech solutions) but also by the rise of new forms of “money” (crypto-assets and stable-coins), thus potentially replacing banks in their most valuable commercial activity, i.e. the creation of money through the extension of bank loans.

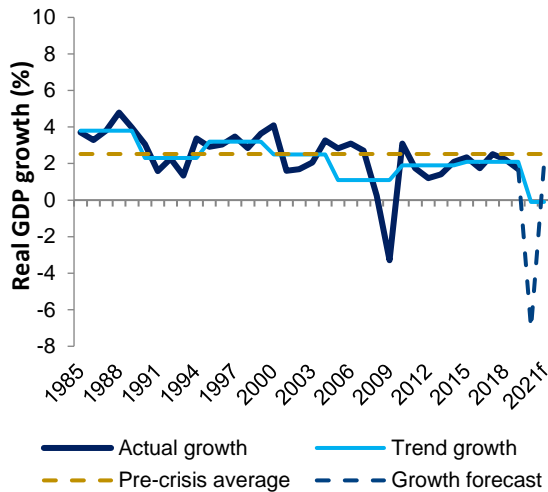
Figure 1: Examples Of Fintech Solutions In Banking And Related Financial Services

	Services	Fintech solutions	Examples
Banking infrastructure	Core Banking	Online-only, providing checking and serving accounts, with deposit, withdrawal, and transfer facilities.	Monzo (UK) Revolut (UK)
Lending	P2P Marketplace	Individual investors and borrowers meet to realize money exchanges	Zopa (UK) Prosper (US)
Payments & Remittances	Consumer Payments	Person-to-person or business payment solutions	PayPal (US) WePay (acquired by JPMorgan)
	International money transfer	Simplifying and lowering the cost of money transfers	TransferWise (UK) InstaRem (Singapore)
	Point-of-Sale Payments	Automating the transaction process	AmazonGo (US) Apple Pay (US)
Financial Management	Personal Finance	Software that lets users categories transactions and add multiple banking accounts	Microsoft Money (US) Mint (US and Canada)

Source: Rosa & Roubini Associates, 2021.

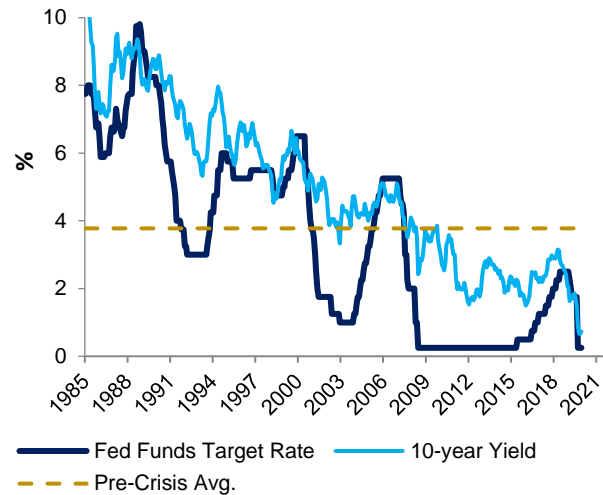
The macroeconomic environment has also proved challenging for banks. A subdued growth environment (with potential growth diminishing in large segments of the global economy, **Figure 2**) has been accompanied by falling policy and market rates, making maturity transformation (the king source of income for banks, **Figure 3**) all the more difficult.

Figure 2: Weak Macroeconomic Environment



Source: Thomson Reuters, own estimates, 2020

Figure 3: Steady Decline In Yields, Rates Are Low

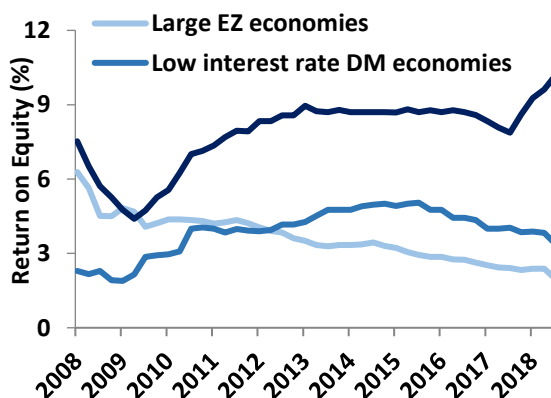


Source: Thomson Reuters, 2020.

Regarding the low-rate environment, an extra challenge to bank profitability has derived by the introduction of negative deposit rates by central banks, intended to stimulate money circulation via credit creation. In aggregate the banking system will pay the same price, but individual banks have an incentive to make use of the excess liquidity created by central banks. Financial repression has also played a role, insofar the wider population has been incentivised in using their savings to purchase the sovereign bonds issued to finance the extra deficits deriving from the expansionary fiscal policies adopted to counter the economic effects of recurrent crises (GFC or Covid-19 pandemic).

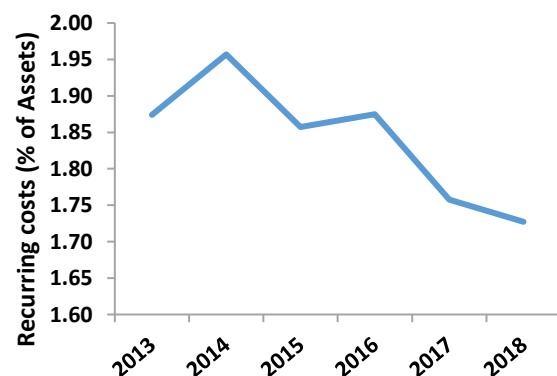
All these developments have resulted in a serious challenge to bank profitability (**Figure 4**), to which banks have reacted by reducing their operating expenses (**Figure 5**) or by consolidation, thus reducing the number of existing banks (**Figure 6**), with the remaining banks becoming of larger dimension (**Figure 7**).

Figure 4: Profitability Challenges, Particularly For Banks In Low-Rate Environments...



Source: IMF, 2020.

Figure 5: ... As Such, Banks Are Cutting Operating Expenses

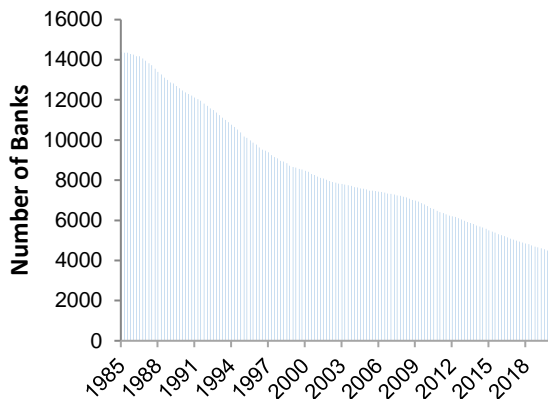


Source: IMF, 2020.

Note: Based on a sample of more than 5,000 banks. Large EZ economies = France, Germany, Italy. Low interest-rate DM economies = Japan, Sweden, Switzerland. Other DMs = US, UK, Canada.

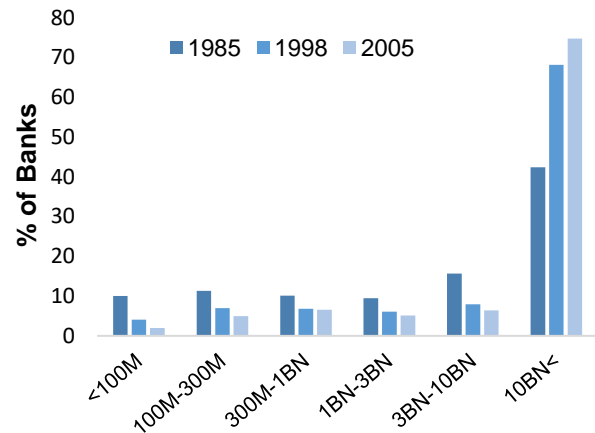
The potential impact on bank profitability and therefore on capital accumulation that could derive from the introduction of CBDCs may be one of the causes of the cautiousness with which they are introduced by central banks (and governments). Certainly, it's nobody's intention to solve one problem (e.g. reducing the cost of domestic and international payments) by causing a larger problem (e.g. financial instability by increasing the fragility of the banking system).

Figure 6: Increasingly Concentrated Sector...



Source: FRED, 2020.

Figure 7: ... With Fewer, And Larger Banks.



Source: Fed, 2020. Note: Distribution of Banks in the US by asset size (total assets, domestic and foreign)

Having said all this, CBDCs do not necessarily need to represent a threat to commercial banks' profitability. First of all, the central banks and governments will make sure that their introduction will be made in a manner and with a timing that will ensure that commercial banks' profits will be somehow protected. Just to give an example, the Bank of Japan (BoJ) recently introduced a new regime of exemptions from the deposit rate charged to the commercial banks. This was made to ensure that, if the BoJ decided to further reduce its deposit rates, bank profitability would be protected.

Secondly, CBDCs may prove the instrument that allows banks to exploit a new steepness in the yield curve even when long-term rates are low, and perform a profitable maturity transformation. In fact, let's assume that CBDCs are successfully introduced over time, and that cash is gradually phased out (as one cannot have three sources of public money provided by the state – central bank reserves, cash and CBDCs – for too long). The elimination of cash would imply the end of the *zero lower bound* in policy and market interest rates, and the fall of the *effective lower bound* into deeply negative territory. In fact, if individuals and companies cannot convert their deposits into cash, but only into CBDCs, the central bank can charge deeply negative deposit rates on CBDC deposits, to stimulate consumption and investment. Deeply negative rates would imply a steep yield curve even when long-term rates are low, as they currently are. Banks would be able to exploit that renewed steepness to perform profitable maturity transformation.

Why should central bank introduce deeply negative policy rates? In our opinion, this may prove to be necessary to combat the next crisis (of whatever nature), as central banks have already exploited most of their ammunition at their disposal. The burst of the *Dot.com* bubble saw the use of ZIRP (or near-ZIRP) as the most effective monetary policy tool. The *GFC* was solved by resorting to asset purchases

(QE, LSAPS, etc), forward guidance and negative policy rates. The *pandemic crisis* was tackled by introducing explicit and implicit coordination between monetary and fiscal policy – with forms of debt monetisation (as theorised by the Modern Monetary Theory) to further increase the effectiveness of the tools introduced to combat the GFC. We believe CBDCs may prove to be the tool that will be used to tackle the next systemic crisis, of whatever nature it may be and whenever it may occur, over the next 10-15 years (judging from recent experience).

Implications For Asset Management

In many countries, final investors have access to managed investment vehicles through the banking sector, which participates to the value chain with a business model based on distribution agreements and rebates on fees. Banks' function as a storage of cash deposits is an essential ingredient in such a framework.

Now, imagine that deposits – in part or in full – migrate from the private banking sector to the public central bank, denominated in the purest form of digital currency, i.e. the retail CBDC. Aside from well-understood financial stability risks (see further below), this migration might also challenge the current funds distribution model. It is entirely plausible to assume that banks might face a decline in their investment advisory and portfolio construction business. Why? Simply because private individuals, i.e. retail investors, would cease to have frequent contacts with their former private bank, having deposited their cash on the central bank's balance sheet.

Of course, we're overdramatising the situation as such a transition might not happen overnight and the banking sector would certainly try to keep the business model alive either through regulation or by increased competition. Furthermore, “tokenisation” of mutual fund investments is a necessary condition for initiating this transition process at all, which again requires a broad adoption of DLT by the asset management industry.

The large-scale use of blockchain technology in asset management is still very theoretical. Actual European regulation limits investments in private security tokens. Such activity might add incremental operational risk, as the post-trade process is performed manually, due to a lack of integration and shifting responsibility. Asset managers are part of a strictly regulated environment. Operating models are dependent on external institutions (e.g. depository, custodian, transfer agent and central security depository) with all of them having own regulatory obligations including controls. Using blockchain technology can in theory replace these trusted counterparties, but not under the current regulatory framework. The European Commission has issued a DLT-pilot regime as a first step, and local regulators are working alongside financial institutions to push the European transformation where needed.

In any case, the broad-based implications for the asset management industry could be:

1. The **distribution business** changes its venue from bank branch counters to a digital platform. In the process, asset managers' profitability soars in the short term, as fees are captured almost in their entirety. To stay in the market, AMs would probably need to pay a yearly “entry ticket”, which is however likely to be a fraction of the cost of rebates. After a while, though, increased competition might again compress profit margins for asset managers.
2. **Inflows and outflows** might become more random, as investors have instantaneous access to investment products (“video-game investing”). Asset management operations would need to adapt to better cope with a substantial increase in AUM volatility and to near-live pricing of large and complex portfolios. Blockchain technology is likely to become a vital part of this process.

3. Digital **financial inclusion** also merits the attention of asset managers. The term 'inclusion' ranks high on the global political agenda. As of 2020, some two billion people cannot access financial services, while according to the mobile network trade body (GSMA) 5.28 billion people have a mobile device. Given the relatively high percentage of financially excluded adults, inclusion can be fostered with the aid of DLT across several dimensions like economic identity, remittance services, services for refugees and migrants, or digital identity for citizens in poverty. While the social sphere is of utmost importance for global policymakers – think for example about microfinancing and micro insurance – the asset management industry should not overlook the potential new retail client base resulting from such a technological evolution. The opportunity arises not only from an obvious increase in the volume of managed assets, but also from the likely low saturation and high profit margins associated with this new pool of end investors.

Part 2: Implications For Risk Management And Financial Stability

As discussed above, we don't think that central banks will introduce CBDCs in a way that could be detrimental for bank profitability. This is first and foremost because that would impact the ability by banks of accumulating capital, the best defense against unforeseen events. In effect, one of the most striking differences between the GFC and the pandemic crisis was the role played by banks: in the first case, they were clearly part of the problem (as the subprime crisis fast became a generalised banking crisis, before becoming a systemic financial crisis); in the second case, they proved to be almost untouched by the crisis (so far), and in some instances even part of the solution. This was also thanks to the capital accumulated by banks, which made them more resilient over time (**Figures 8, 9 and 10**).

Figure 8: Since the GFC Banks Are Better Capitalized And Should Be More Resilient To Disruption...

Tier 1 Capital (USD bn)	Avg. Asset (USD bn)	# of Banks	Avg. Capital Assets Ratio	Profit Growth	Avg. ROC	Avg. ROA
Banks <250	3,384.2	10	6.7	28.4%	8.6	0.60
Banks 150-250	1,846.6	7	6.8	91.6%	5.2	0.47
Banks 100-150	1,196.4	3	7.9	11.5%	10.2	0.8

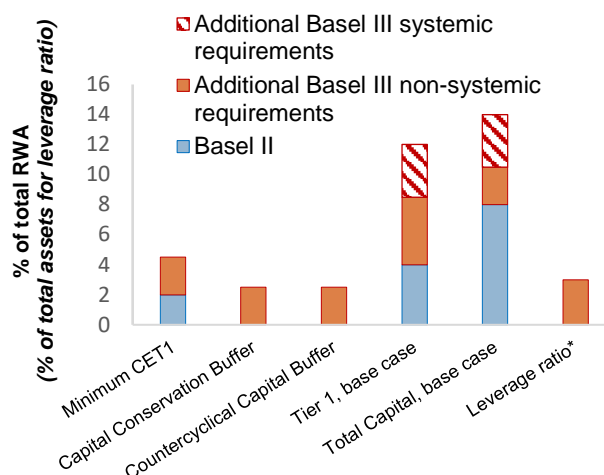
Source: [The Banker](#), 2021. Note: 1. Analysis of Top 20 banks by Tier 1 Capital. 2. Profit growth refers to y-o-y change in pre-tax profits.

However, CBDCs may provide a very specific source of risks, which has been mostly resolved by the introduction of deposit insurance schemes: bank runs. In fact, while bank run had been a recurrent phenomenon in the early stages of capitalism, especially when central banks still didn't have the monopoly of issuing the country's legal tender; their recurrence collapsed since public or private forms of deposit insurance was introduced.

But CBDCs may introduce a new form of risks: *bank runs from the home's sofa*. As CBDCs would likely be a claim directly on the central bank balance sheet, and since by definition the virtual wallet needs to remain accessible 24/7, 365 days a year, the risk of mass withdrawal from the wallet in response to the materialization of some risk perceived as systemic becomes extremely high. Also, the fact the CBDCs would be a claim directly on the central bank balance sheet would only amplify the systemic

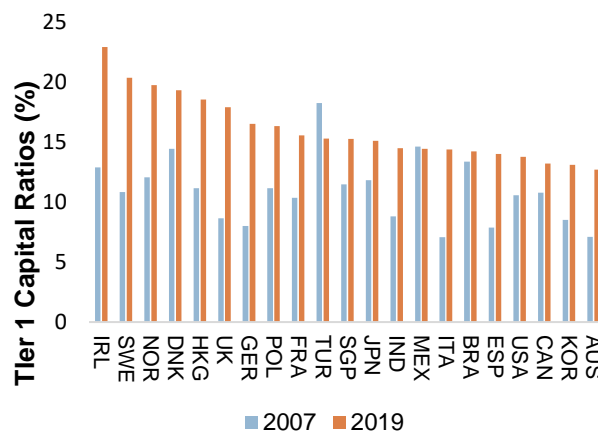
relevance of those risks. And people would not even need to physically queue outside bank buildings to withdraw their money, as they could easily do from the comfort of their home's sofa. Again, if in the meantime cash were to be abolished, this would fundamentally reduce this risk, as people would not have the asset to convert the withdrawn CBDC into.

Figure 12: Rising Tier 1 Requirements...



Source: BIS, own elaboration, 2020.

Figure 13: ... Have Developed A Significant Buffer



Source: IMF, 2020.

Another way of mitigating that risk would be of introducing only wholesale, rather than retail, CBDCs. This way, CBDCs would only be used for commercial transactions business-to-business, and that would fundamentally reduce the psychological factors underpinning mass behaviors.

There are two additional financial stability risks worth highlighting. *First*, if CBDCs were to be the instrument to introduce severely negative interest rates, this could bear financial stability risks even if bank profitability were to be protected. In fact, negative rates impact not just banks, but also insurance and re-insurance companies, pension funds, asset managers. Some of them are so large that if they were to go under, they may cause systemic repercussions. But protecting the profitability of all the segments of the financial system may prove virtually impossible and maybe not even desirable.

Secondly, CBDCs carry with themselves a cyber-security risk that other forms of public money would not have. The technology to combat counterfeiting of bank notes has developed largely in the last few months. But protecting the infrastructure needed to produce, distribute and utilize CBDCs is a challenge of a much larger order of magnitude, given the need to guarantee a safe and sound cyberspace in which CBDCs transactions can safely and efficiently occur.

For all these reasons, the main responsibility for the introduction of CBDCs may soon pass from central banks directly onto governments, as guarantors of all public interests involved. Central banks may object that CBDCs are simply a new way of discharging their traditional duties, such as ensuring the smooth functioning of the payment system and provide a public asset that can be used as legal tender. But governments may easily counter-object that the risks involved by the introduction of CBDCs is of a totally different scale, which requires an attentive oversight by elected officials. After all, a state's sovereignty is symbolised by the unicity of the flag, the national anthem and the coinage of a currency.

Implications For Risk Management

The introduction of CBDC won't affect the risk characteristics of existing financial instruments: It does not make a difference whether a swap is denominated in US dollars or digital US dollars. Nor will the

market infrastructure change, as existing counterparties will all retain their functions. Why would the Fed want to replace CME or LCH in the market for cleared derivatives? The co-existence of physical and digital cash might imply some sort of basis risk, depending on the level of interest rates and the central bank's tiering rules. However, for most "trading" and "investment management" purposes, this basis might be ignored. On the other hand, risk management and operations might have to take into account the potential disruptive changes of privately operated digital currencies. For example, the transition to a private stablecoin might absorb larger quanta of existing VaR- and/or counterparty-limits.

Triple-Circulation And Financial Stability Risk

By entering the retail deposit arena, a central bank would likely face fierce competition from private commercial banks. The case in which a CBDC is simply a substitute for cash in circulation is not controversial (**Figure 14**).

Figure 14: CBDCs May Substitute Cash in Circulation

Private non-banks	
Banknotes	-1
CBDC	+1
Central bank	
Banknotes issued	-1
CBDC issued	+1

Source: CBDC and AXA IM Research, 16 March 2021

On the other hand, the case in which a CBDC becomes a substitute for retail deposits might affect the cost of funding for the banking sector and is therefore the less trivial case from a policy perspective. In this sense, a CBDC could become a truly disruptive instrument on a central bank's balance sheet. If needed, the government could always isolate the central bank from this competition using fiscal policy, however such a distortion might have far reaching consequences in terms of allocation of resources.

Research in this area is still in its early stages. However, using a standard monetary model, Fernandez-Villaverde et al. (2020), formulate an equivalence theorem showing that "the set of allocations achieved with private financial intermediation will also be achieved with a CBDC, provided competition with commercial banks is allowed and depositors do not panic". Unfortunately, additional analysis also suggests that the central bank might become a monopolist on the cash deposit market as households internalise the CBDC's superiority in terms of store of value. The consequences are twofold; *first*, commercial banks might suffer a substantial reduction in their retail funding (negative for credit ratings and stress tests etc.) and *secondly*, by definition, the monopolist will have a limited incentive to deliver an optimal maturity transformation to the private economy.

Conclusion

The introduction of CBDC is not entirely devoid of risks. Central banks and financial market regulators have correctly identified several critical issues related to the prevailing business models. Our analysis highlights banks' profitability as one of the main features that need to be discussed when designing a CBDC. We further refine this area into a) the business of cash deposits as a source of stable funding, as well as b) the investment products business. The latter establishes an important synapse to the asset management industry, where CBDC might also prove to be disruptive. Overall, we argue for a gradual and thoroughly researched transition to a centralised ecosystem that includes both physical and digital currencies. Both financial regulators and industry and financial markets representatives will be asked to cooperate in the process. The transition will not and should not happen "overnight".



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