

# What is an optimal CBDC strategy for small economies?

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## Introduction

Central banks in most countries of the world are looking into the potential issuance of CBDC. However, they differ in many elements. Not only do the economic circumstances, the state of the payments system and the preferences of policymakers differ from country to country; countries also stand at different stages of their explorations – some have been studying the topic for several years and have invested significant resources into the explorations, whereas others have only recently started looking into the issue seriously. Moreover, looking forward, central banks in the larger economies can afford to invest extensive resources into technological research and development, resources that might be harder to be allocate for smaller central banks. Another basic element that distinguishes between larger and smaller central banks is interdependency: while decisions taken by smaller central banks are unlikely to impact the former, the path that central banks of large economies will take will have a significant effect on the space of choices in which smaller countries will need to navigate. For example, while the launch of the sand dollar in The Bahamas was an interesting case study to learn from, it will probably hardly have any effect on decision-making and economic developments in the United States. One cannot say the same regarding the effect of the e-CNY pilot on countries in Southeast Asia.

After an initial update on the preparations being made by the Bank of Israel for the examination of a shekel CBDC, or “digital shekel”, this paper will discuss three aspects through which decisions made by large economies could affect smaller ones: (1) **monetary sovereignty and financial stability**; (2) **design choices**; and (3) **technology**. On each aspect, we will try to analyse what could be the optimal strategies for the small economies, and what decisions large economies could make in order to mitigate negative effects and increase positive externalities for the smaller countries.

## Digital shekel – a progress update

Like central banks of all other advanced economies, the Bank of Israel has not made a decision regarding issuing a CBDC. The Bank is preparing an action plan (Bank of Israel (2021)), so that if conditions develop in the future that would lead to a Bank of Israel assessment that the benefits of issuing a digital shekel outweigh the costs and potential risks, the Bank will be prepared to put such a plan into action. For this

<sup>1</sup> We are grateful to the members of the Bank of Israel Steering Committee on the Potential Issuance of a Digital Shekel for their useful comments on the first draft of this paper.

purpose, and as part of the Bank of Israel's strategic plan, at the end of 2020 the Bank of Israel Governor established a Steering Committee on the Potential Issuance of a Digital Shekel. The Steering Committee appointed a number of working groups from among professionals in various fields within the Bank, through which it is mapping the potential advantages, various issues, and risks involved in a potential issuance of a digital shekel. Although a small proof of concept (PoC) experiment was carried out on an ethereum platform, most of the efforts of the Bank have been directed to research analysis, examining the potential benefits and risks deriving from the adoption of CBDC for the Israeli economy, and how these should affect its design.

The payment system in Israel is stable and reliable. The public has no doubt in its ability to make payment transactions or that the transactions will be made properly and in a timely manner. In discussing a potential project of issuing a CBDC, the foremost question is – Why? What benefits would the Israeli economy derive from the existence of a digital shekel, and what needs would it answer? Is it important that the Israeli public be able to hold a digital means of payment that would constitute a liability of the central bank, in addition to the central bank's physical liability held by the public – cash?

The Bank of Israel's Steering Committee has mapped the advantages that a Bank of Israel digital currency may generate for the Israeli economy if it is issued in the future. **The main motivations that may lead to a decision to issue a Bank of Israel digital currency are:**

- Creating another efficient, advanced and secure alternative to the existing and new means of payment in the digital age;
- Creating an innovative technology that will ensure the adaptation of the payment system to the needs of the future digital economy;
- Ensuring adequate redundancy of the payment system and its proper functioning during emergencies or breakdowns;
- Creating an efficient and inexpensive infrastructure for cross-border payments;
- Maintaining the public's ability to use digital means of payment while ensuring a certain level of privacy;
- Supporting government policy to reduce the use of cash in the struggle against the "shadow economy".

It is important to note that some – if not all – of these benefits may be obtainable through the improvement and upgrading of the existing payment systems, and not necessarily through the issuance of a Bank of Israel digital currency. In addition, the issuance of a CBDC may involve risks. A large part of the Steering Committee's work is focused on research on these topics and on an examination of the added value that a Bank of Israel digital currency could generate for the Israeli economy over existing and future payment systems.

In order to examine the various implications of a potential issuance of a Bank of Israel digital shekel, and in order to analyse the business and technological challenges and opportunities, the Steering Committee has set out, in general terms only, a draft model for a Bank of Israel digital currency. The draft model forms the basis for a discussion and examination of alternatives by the working groups dealing with the matter at the Bank of Israel. It also serves as the basis for a discussion in the professional and academic communities in Israel regarding the necessary characteristics of a digital shekel.

The structure of the draft model assumes a partnership between the public sector (the Bank of Israel) and the private sector (banks, credit card companies, and technology and/or finance companies from Israel and abroad) – a “two-tier” approach. In terms of the technology to be adopted, the model does not at this stage determine whether the system will be based on distributed ledger technologies or on central registry technology, but it does set out that the Bank of Israel will provide the basic infrastructure to enable the private sector to develop innovative applications on it. Full and immediate conversion will be enabled between a digital shekel and existing means of payment and the system will support conversions to and from foreign currency. Payment will be enabled not only through mobile phones, but also through a variety of other means, including simple devices, and offline payments will also be enabled, at least in a limited form.

In terms of privacy, the digital shekel will be designed in keeping with anti-money laundering (AML) rules, and in a way that will not interfere with the government’s efforts to collect taxes. As such, absolute privacy will not be possible. However, various levels of privacy vis-à-vis payment providers and commercial entities will be possible.

In terms of economic characteristics, according to the draft model the digital shekel will carry a zero interest rate, but it will remain technologically possible to change this in the future. The infrastructure should allow for the authorities to be able to define restrictions on the volume of holding and use of the digital shekel. The cost of making a payment should be very low or near zero, and its use will also be made possible for those that do not have a bank account in Israel (children, tourists and so forth).

While a dialogue between the central bank and key local players and technology vendors is ongoing, the deliberations are clearly affected by what other countries are doing and we will explore some of their impacts.

## How are small economies affected by the decisions of large economies in the preparations for a CBDC?

### 1. Monetary sovereignty and financial stability

There is substantial theoretical literature showing that CBDC issuance by large economies could have significant implications for the monetary sovereignty and financial stability of neighbouring and trade partner countries. For example, Ferrari et al (2020) develop a theoretical model and show that the presence of a CBDC amplifies the international spillovers of shocks to a significant extent, thereby increasing international linkages, and that domestic issuance of a CBDC increases asymmetries in the international monetary system by reducing monetary policy autonomy in foreign economies. They note that the magnitude of these effects depends crucially on CBDC design, and can be significantly mitigated if the CBDC possesses specific technical features. This theoretical literature is yet to feed into practical policy decisions. It is not clear whether those who drafted the principle that CBDC should “do no harm” (Group of Central Banks (2020)) also meant for it to refer to the implications of CBDC for other countries. But a year later, the G7 document on retail CBDCs stated that “CBDCs should be designed to avoid risks of harm to the international monetary and financial system, including the monetary sovereignty and

*financial stability of other countries” (G7 (2021)). The importance of this statement made jointly by policymakers from G7 countries cannot be exaggerated, nor can the importance of their emphasis that “Where overseas access to a jurisdiction’s CBDC could leave other countries vulnerable to currency substitution or other spillovers, collaborative work to design and implement safeguards, particularly through relevant international organisations, can help mitigate negative effects”.*

From the perspective of a small economy, a decision by a large neighbouring country or a significant trading partner to issue a CBDC could raise several policy questions.<sup>2</sup> First, how probable is it that the citizens of the small country would want to widely adopt the foreign CBDC for domestic use? Theoretically, “dollarisation” can take place even without a CBDC; this has happened in the past, but mainly in economies that suffered hyperinflation and/or financial or political instability. If a country’s currency and financial system are stable, there is no upfront reason for citizens to “run” to a foreign CBDC, as holding a foreign currency exposes the local consumer to exchange rate risks. However, there could be specific characteristics that attract local citizens to hold and use a foreign CBDC. Technological features of a foreign CBDC might be so attractive that the benefit they carry could outweigh the exchange rate risk: for example, if the foreign CBDC features innovative programmable capabilities that enable making use of payments for goods and services in ways that the local “standard” currency does not. Other drivers could be regulatory arbitrages: for example, if the foreign CBDC allows you to pay digitally while maintaining privacy, or if the AML restrictions are softer than those that apply in the local economy. Cost and efficiency could also be an important parameter: if the foreign CBDC enables payments with smaller (or even zero) fees compared to high fees associated with available digital means of payment in the local economy, and specifically if it makes cross-border payments easier, people may prefer the foreign CBDC over the local currency. This effect may be even stronger if the two economies trade a lot, or are correlated in a manner that mitigates exchange rate risks.

When small economies are contemplating issuing a CBDC, they first and foremost try to weigh the benefits and risks in the context of local conditions. Nonetheless, considerations such as those mentioned above may have an impact on the balance of benefits and risks, and may force countries to make decisions resulting from decisions of other countries. The path that leading economies take may affect the decision space for other countries. For example, if large economies restrict the use of their CBDCs by foreigners to only minor transactions associated with tourism or retail cross-border trade, that would mitigate the risk of digital dollarisation for smaller countries and decrease regulatory arbitrages. However, this could be complicated to implement, as FX flows resulting from retail trade need to be met by opposite capital flows in the FX markets.

## 2. Design choices

As CBDCs are developing from a theoretical concept which resides mainly in academic articles to practical systems that would be implemented on the ground, central banks need to get into the nitty gritty and decide on the specific properties – from the core system all the way to the end user interface, the legal framework, and the use cases

<sup>2</sup> Similar questions could arise as a result of the emergence of a global, foreign exchange-denominated, widely used stablecoin.

that CBDC would support. This could be a lengthy and time-consuming process for policymakers, who might also need to take into account political pressures, to consider preferences of different parts of society, etc. Perhaps a “wait and see” approach may be an optimal one?

When small countries make their choices regarding design, it is worth discussing to what extent they can actually make sovereign decisions. If CBDCs are to be used in cross-border transactions, they need to be compatible with one another at least to a minimal extent (Auer et al (2021)), and while there is substantial cooperation, bilateral as well as multilateral work coordinated by the international institutions, it is probably more reasonable to expect that small countries would need to adapt their designs to those of larger countries. If, for example, the standard set in the major economies regarding anonymity would require that authorities are able to obtain information regarding a specific transaction if such information is needed for law enforcement, it may not be possible for smaller countries to execute policies that give a greater weight to privacy concerns, if they want their CBDCs to be more similar to cash in this regard. Decisions regarding limitations on holding may also have an effect on cross-border compatibility: if a large economy sets a strict limit regarding who can hold a CBDC and in what amount, smaller countries might not have the liberty to set more flexible policies if they wish to allow mutual holding of CBDCs by each country’s citizens.

Even without cross-border transactions being considered, if small countries hurry to design and launch their CBDCs due to local considerations, they may be designing relatively basic systems. These may end up being inferior to systems that are in the research phase today and may be launched within several years, and that may support advanced features such as offline payments, programmable money and smart contracts, micropayments, AI and the like. Adapting the early launched systems to advanced standards down the road may be very expensive.

### 3. Technology

The exploration of CBDCs is pushing central banks out into the frontiers of financial technology. While in the past technology was perceived mainly as an enabler for achieving the goals set by policy, CBDCs are an example of a policy issue where technology, design, and economic considerations go hand in hand through the exploration process. While the jury is still out on whether CBDCs would end up being built using technologies that are completely new to central banking, such as distributed ledger technology (DLT), or whether they would be based on familiar, centralised technologies, it is clear that either way, if CBDCs are to live up to the promise of fast, convenient, cheap, accessible and innovative means of payment, they would need to present significant technological improvements as compared to the technologies that have been used to build the current payment systems.

In 2020, nearly 60% of central banks were conducting experiments or PoCs on CBDCs, and another 14% had moved forward to development and pilot arrangements (Boar and Wehrli (2021)). However, not all central banks are at the same level of technological research. Some of the PoCs are a small-scale, internal exercise, and focus on trying to understand the basics of the technological alternatives.<sup>3</sup> On the other hand, some central banks have for several years now been deploying substantial

<sup>3</sup> We can testify that the experimental work done at the Bank of Israel is of this nature.

resources, working together with important players from academia and the private sector, and are looking to solve some of the core issues related to the potential future uses of CBDCs. While some central banks of smaller countries have been among the pioneers in technological CBDC experimentation,<sup>4</sup> clearly the bigger countries are better staged in terms of the resources they can deploy into the research, and the ability to move the research from pure theory to applied conclusions.<sup>5</sup>

Central banks of smaller countries, and especially those that have only recently started to examine the issue, may face a dilemma. As the pioneers and large central banks advance with their work, publish the results and share the insights with the global central banking community, how reasonable is it for the smaller countries to invest substantial resources in technological explorations? And given that small countries may want to ensure that they design their CBDCs in a manner that ensures compatibility with those of larger countries, perhaps here too a “wait and see” strategy would be optimal? Moreover, at the end of the day, the situation may be that there will be several large corporations that have built CBDC infrastructures for several front-running central banks. If this turns out to be the case, later adopters could rely on the services of these corporations with some necessary local adaptations, thus making redundant any intensive local technological research.

Small countries may want to invest in their own technological research for several reasons. It is a common understanding that there would not be a “one size fits all” CBDC (Group of Central Banks (2020)). Local characteristics and policy preferences may warrant different technologies for different countries. Central banks may also want to execute technological research in order to gradually increase the public interest in the CBDC project: getting the private sector involved, and gradually moving from research to PoCs to pilots that involve the general public, could turn out to be a useful strategy in terms of managing the public aspects of a CBDC project. Moreover, even if global corporations indeed end up offering custom-made products that central banks could acquire, it may be important for the central banks’ IT departments to be acquainted with these different technologies, so that they can provide their managements with skilled advice regarding the pros and cons of each product on the shelf. Another interesting motivation for conducting your own technological experiments programme was raised by the Central Bank of Norway’s CBDC Working Group: their impression was that although a lot of the work central banks are doing is being published, the publications rarely go deep into the technical details, and central banks that are conducting technological experimentations would be more willing to share their findings in detail with other central banks if the latter are conducting their own testing, and generate experience that can make the dialogue mutually beneficial (Central Bank of Norway (2021)).

In any case, increased knowledge-sharing between central banks is a win-win strategy. It may also be the case that while large countries focus on the bigger technological challenges, research conducted in small countries regarding country-specific issues could contribute to the general knowledge of the central banking community.

<sup>4</sup> Singapore and Thailand are good examples, although some of the earlier work focused on wholesale CBDCs.

<sup>5</sup> For example, the Federal Reserve Bank of Boston’s Project Hamilton and the ECB’s technological work on the digital euro.

Technological research on CBDCs is being done not only by central banks, but also by many technological companies around the world. So what are the particular needs for small economies from technology vendors, assuming they are not going to develop their own bespoke solution? In a word – **flexibility, as it was put by the Group of Central Banks (2020): “A CBDC system should be flexible and adaptable to changing conditions and policy imperatives”**. Since the future requirements for a CBDC may vary between countries and change over time, it is important that the platforms developed by vendors allow considerable flexibility to define the setup for a CBDC. Let us take the example of privacy requirements – any future platform should allow for different privacy levels, even between existing consumers, who may have different requirements regarding privacy. Some may be willing to allow some access to their data in return for, say, lower commissions. Another relevant example is remuneration. For a country like Israel, paying interest on CBDC does not seem to be a desired feature in the near future. However, if we do build a CBDC, we will be building it for decades, and it is impossible to foresee the economic circumstances and monetary policy challenges of the future. Therefore, from a technological perspective the platform should allow for the potential of paying interest, even if at the beginning it may not be needed.

## Conclusion

The way countries approach their deliberations regarding whether to introduce a CBDC and what will be the characterisation of that CBDC will clearly differ, according to each country's needs and resources. The most important element of the initial stage of the work is defining as clearly as possible what benefits you wish to derive from a CBDC and how these will impact the design of the CBDC for your particular country.

Small countries will be impacted by the progress and choices the larger countries will make. It may be possible to choose an independent, go-it-alone approach, but this risks losing the benefits that may accrue from the work being done by other countries or from the ability to interact with other countries' CBDCs. There will be trade-offs – a bespoke product allows you to design something very specific to a country's needs, but is likely to require far more resources, and may limit the interoperability of a specific country's CBDC with that of others'. It may in the end be a question of to what extent there are similarities between each country's requirements for their own CBDC.

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