



SNB Economic Note

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Piloting monetary policy implementation on a DLT-based infrastructure – Issuance of digital SNB Bills

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In June 2024, the Swiss National Bank (SNB) became the world's first central bank to conduct a live monetary policy operation on a regulated infrastructure that is based on distributed ledger technology (DLT). As part of Project Helvetia III, the SNB successfully issued digital SNB Bills settled in wholesale central bank digital currency (wCBDC) in a production environment. This pilot operation showed that implementing monetary policy on a DLT-based infrastructure is feasible and effective. While the corresponding processes bring about some improvements, new challenges emerge.

To ensure price stability, the Swiss National Bank (SNB) maintains appropriate monetary conditions, which are determined by the interest and exchange rates. The SNB sets the SNB policy rate and seeks to keep secured short-term Swiss franc money market rates close to it. The SNB achieves its objective by setting the conditions for interest on reserves¹ and by managing Swiss franc liquidity on the Swiss money market via liquidity-providing or liquidity-absorbing transactions.

One way for the SNB to absorb liquidity is by issuing its own short-term debt register claims, so-called SNB Bills. At the issuance date, SNB Bills are exchanged for reserves between the SNB and financial market participants. This process increases the stock of SNB Bills and decreases the volume of reserves.² This temporarily absorbs liquidity from the banking system and puts upward pressure on money market rates. In this way, the SNB can steer secured short-term Swiss franc money market rates.

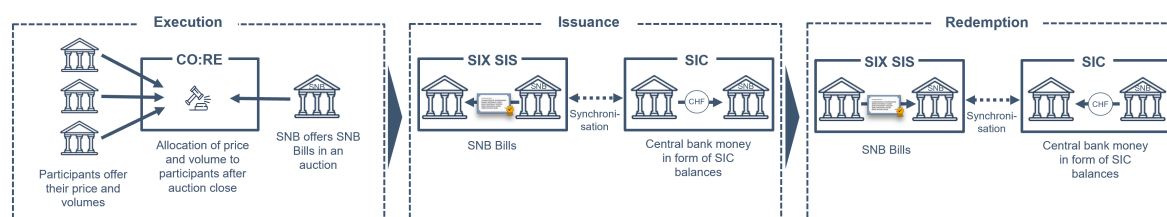
¹ In the context of the SNB, reserves are often referred to as sight deposits. We use the general term reserves. Reserves represent central bank money.

² Hence, the issuance of SNB Bills changes the composition, but not the size, of the SNB's balance sheet. See also SNB (2024a) for more details on this process.



Chart 1 depicts today's processes during the execution, issuance and redemption of SNB Bills. First, the SNB auctions SNB Bills to eligible financial market participants via the electronic trading platform CO:RE of SIX Repo Ltd.³ Second, after the auction, SNB Bills are issued on Switzerland's central securities depository (SIX SIS Ltd.). Subsequently, SIX SIS Ltd. ensures that participants automatically receive SNB Bills against payments in reserves in the SIC system.⁴ Finally, at the end of their term, on redemption day, SNB Bills are redeemed. Therefore, SNB Bills are transferred from participants' accounts back to the SNB's account on SIX SIS Ltd. At the same time, the full principal amount in reserves is credited to participants' SIC accounts.

CHART 1: EXECUTION, ISSUANCE AND REDEMPTION OF SNB BILLS



Project Helvetia III – Investigation of settlement in wCBDC

New financial market infrastructures based on distributed ledger technology (DLT) are emerging in Switzerland. The SNB follows these developments, focusing on secure and efficient payments (Maechler and Moser, 2023). In Project Helvetia III, the SNB piloted the provision of Swiss franc wholesale central bank digital currency (wCBDC) for real-value transactions carried out on the SIX Digital Exchange (SDX).⁵ Between December 2023 and June 2024, commercial banks were able to settle selected transactions involving digital assets⁶ on SDX, mainly bond issuances, using wCBDC in a production environment.

Although the SNB's focus was the provision of wCBDC, the pilot offered a unique opportunity to also investigate how monetary policy operations could be settled on a DLT-based infrastructure. The SNB, therefore, took a first step in assessing the feasibility of expanding the settlement of repo transactions to SDX and also issued digital SNB Bills on SDX (see SNB, 2024b).

³ Buyers who have a reserves account at the SNB and are authorised participants on the OTC segment of CO:RE can directly take part in SNB Bills auctions. Others can participate via commercial banks or purchase SNB Bills on the secondary market.

⁴ The Swiss Interbank Clearing (SIC) system is Switzerland's real time gross settlement (RTGS) system, which has been in operation since 1987 on behalf of the SNB by SIX Interbank Clearing Ltd, a subsidiary of SIX. The reserves held by financial market participants at the SNB are readily available for payment transactions in the SIC system and are considered legal tender.

⁵ For information on Project Helvetia and SDX, see www.snb.ch/en/the-snb/mandates-goals/international-cooperations/multilateral/bis-innovation and www.sdx.com.

⁶ The BIS (2024) defines "tokenisation [...]" as the process of generating and recording a digital representation of traditional assets on a programmable platform" and uses "digital assets" to refer to such assets in short.

Digital SNB Bills – Settlement of a monetary policy transaction on DLT

Digital SNB Bills are the same debt register claims as conventional SNB Bills from a legal perspective. The key difference is their technical representation on a DLT-based infrastructure. Hence, they fitted well into the current SNB Bills programme. Additionally, they matched well with Project Helvetia III for two reasons. First, from a technical perspective, the issuance of digital SNB Bills is not much different from the issuance of any other digital bond on SDX. Second, to function as a monetary policy instrument, issuance and redemption must be included in central bank money. During the pilot, wCBDC was provided; hence, central bank money was available.

Table 1 shows the conditions and results of the digital SNB Bills issuance.

TABLE 1: CONDITIONS AND RESULTS OF THE DIGITAL SNB BILLS

Auction date	ISIN	Denomination (CHF)	Issuance (N) / Increase (A)	Term (in days)	Payment	Redemption
07.06.2024	CH1310847111	1'000'000	N	7	11.06.2024	18.06.2024
Auction type ¹ Allotment method ²	Marginal price (%)	Yield at marginal rate (%)	Sum of bids (CHF mn)	Allotment (CHF mn)	Allotment to the issuer (CHF mn)	Outstanding volume (CHF mn)
FR	99.9718	1.45	64	64	0	64

¹ VR: variable rate tender; FR: fixed rate tender
² D: Dutch; A: American

Digital SNB Bills were issued in a so-called private placement, which is already foreseen by the SNB Bills Issue Conditions (see SNB, 2024c). In the private placement, the SNB deviated from the conventional SNB Bills programme in the following aspects:

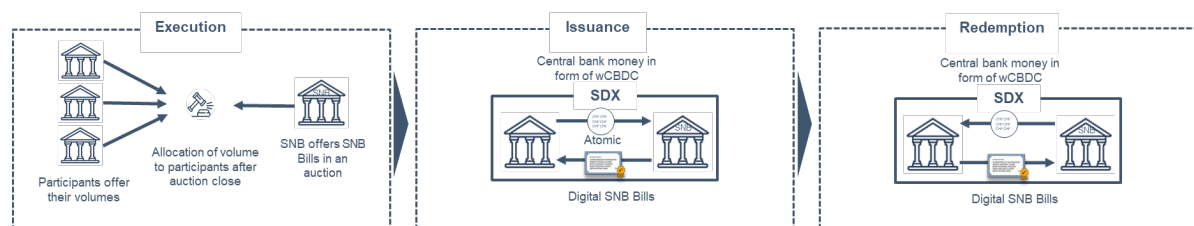
1. A deviation from the otherwise wide group of participants, allowing for more flexibility needed for the pilot.
2. A short term (i.e., seven days), which was at the time not offered in the conventional SNB Bills programme, ensuring the settlement of both issuance and redemption within the time frame of Helvetia III and thus in wCBDC.⁷

⁷ For the current programme of conventional SNB Bills, the usual tenors include 28, 84, 168 and 336 days (see www.snb.ch/en/the-snb/mandates-goals/monetary-policy/implementation#bills).

3. A pricing of digital SNB Bills, which was independent of that offered at the time in the conventional SNB Bills programme, ensuring effectiveness and consistency with conventional operations.⁸
4. An auction of the digital SNB Bills outside the usual electronic trading platform.

The processes around the issuance and redemption of digital SNB Bills are displayed in Chart 2. First, the digital SNB Bills were auctioned outside the usual electronic trading platform. Second, the SNB and participating pilot banks entered matching settlement instructions on SDX. On the issuance day, two business days after the auction, the SNB issued digital SNB Bills and participating pilot banks funded their accounts on SDX with wCBDC by exchanging it against SIC balances. Since both securities (digital SNB Bills) *and* cash (wCBDC) are present on SDX's infrastructure, there is no need for synchronisation between different systems during settlement.⁹ Consequently, as soon as sufficient wCBDC was available on SDX, settlement occurred *atomically*.¹⁰ Finally, SNB Bills were redeemed on the redemption date, with the SNB automatically transferring the principal amount in wCBDC to the participating pilot banks and in return receiving the digital SNB Bills.

CHART 2: EXECUTION, ISSUANCE AND REDEMPTION OF DIGITAL SNB BILLS



As mentioned earlier, Swiss franc liquidity is usually steered by increasing or decreasing reserves held at the SNB. In the conventional case, Chart 1 shows that this is done via SIC balances. When settling on SDX, Chart 2 shows that wCBDC is used instead. This mechanism still reduces reserve holdings since wCBDC can be seen as an alternative representation of central bank money. The SNB thus steers the same Swiss franc liquidity, regardless of whether operations are settled via SIC balances or wCBDC.

⁸ Specifically, the price of SNB Bills was fixed at a rate so that their yield was equal to the yield of the repo auction held on that day (SNB policy rate minus 5 basis points). Thus, the pricing for the digital SNB Bills occurred as a fixed rate tender. In a fixed rate tender, the SNB sets a price, and participants can offer the volume they are willing to buy. The SNB then decides whether it wants to consider all offers or if the volume should be reduced.

⁹ This is true for all infrastructures (not only DLT-based ones), where cash and securities are present on the same infrastructure.

¹⁰ We use the definition of atomic settlement suggested by Lee et al. (2022), who define atomic settlement as equivalent to simultaneous (e.g., delivery-versus-payment) settlement.

Implementing monetary policy on a DLT is possible – Nevertheless, it raises several questions

The pilot revealed that implementing monetary policy on a DLT-based infrastructure is feasible and effective. The SNB successfully absorbed Swiss franc liquidity by issuing digital SNB Bills and gained valuable experience in the process. The corresponding processes bring improvements and simplifications in some places but also give rise to new challenges. We list the main take-aways below.

First, the SNB acted as the issuer, issuer agent and paying agent. Taking these three roles allowed the SNB to gain valuable insights into pre- and post-trading operations on a DLT-based infrastructure. These operations were independently conducted by the SNB's back office, which increased internal transparency and reduced coordination efforts. At the same time, the SNB had to establish new processes that were previously outsourced to the central securities depository when issuing conventional SNB Bills.

Second, the SNB had to set up new cash management processes. For conventional SNB Bills, reserves, in the form of SIC balances, are received (or paid) in the SIC system so that only basic cash management is needed. In contrast, wCBDC had to be exchanged with SIC balances as part of the tokenisation process before it was used to settle digital SNB Bills.

Third, fully automating the processes for digital SNB Bills was out of scope to adhere to the timeframe of Project Helvetia III. If the SNB were to issue digital SNB Bills on a regular basis, then those processes would have to be addressed. For example, integrated trading and settlement, which allow for straight-through processing, would be essential for handling realistic volumes and numbers of participants during both auction and post-trading activities. Similarly, the entire potential of DLT for automating post-trading activities could not be fully investigated during the pilot and would require further work.

Overall, DLT-based markets remain niches for the time being. The number of participants and the traded volumes on DLT-based infrastructures are yet to increase. Hence, the question of whether to conduct monetary policy operations on a DLT-based infrastructure is premature. Ramping up such operations would also entail significant investment for the SNB, its counterparties as well as infrastructure providers and, in the current environment, stands in contrast to a lean monetary policy operational framework (see Bindseil, 2016). Nevertheless, the valuable insights gained via the issuance of digital SNB Bills allowed the SNB to better estimate the investments needed to implement monetary policy on DLT-based infrastructures were it to become necessary in the future.¹¹

¹¹ The issuance of digital SNB Bills on SDX was a one-time, standalone pilot and does not constitute an indication that the SNB is planning to issue further digital SNB Bills or to conduct monetary policy operations on SDX.

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