Potential effects of issuing a digital shekel on the Israeli banking system

Digital Shekel

The Bank of Israel Steering Committee on the Potential Issuance of a Digital Shekel

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1. Introduction

Similar to many central banks around the world, the Bank of Israel is building an action plan for a potential issuance of a central bank digital currency (CBDC) – the digital shekel (SHAKED).[1,2] Among the issues being examined are the nature and intensity of the impact of issuing a SHAKED[3] on the stability of the financial system in general, and of the banking system in particular; and the impact on the banking system's ability to continue fulfilling its role as a financial intermediary in the economy—the risk of banking disintermediation.[4] The money available to the public (M1) is composed of cash in the hands of the public (M0) and the public's demand deposits in the banking system. Should the public choose to replace cash with SHAKED, it will have no effect on the public's deposits in the banking system, since the SHAKED will comprise a new component within the M0 aggregate. However, the potential transition of some of the public's current deposits to the SHAKED may have a material impact on: (1) the structure and quality of the banking system's sources; (2) the banking system's costs of financing; (3) the volume and price of bank credit issued to the public; and more. The transfer of deposits to the SHAKED may also have direct and potential impacts on the Bank of Israel's balance sheet.

In order to examine these issues, two general scenarios were drafted, presenting these effects on the balance sheet of the Israeli banking system, and accordingly also on the Bank of Israel's balance sheet. In addition, a simulation was prepared with the aim of examining the nature and intensity of the potential impacts on the business results and main indicators of the banking system. **The simulation shows that even though a transition from the public's deposits at the banking system to SHAKED may have a negative impact on the banking system's profitability, under reasonable scenarios regarding the volume of substitution between deposits and SHAKED, there is no concern for the system's stability. In particular, the Tier 1 equity ratio remains high. However, the liquidity coverage ratio[5] (hereinafter "LCR") erodes directly, and in some situations the banking system would be required to take actions to make sure that this ratio does not fall below the required regulatory minimum**, as detailed later in this paper.

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[1] Bank of Israel (2021).

[2] "SHAKED" is a nickname for the digital shekel – in Hebrew, it is an acronym of the words "digital shekel", and coincidently the meaning of the word is "almond", and The almond tree and its fruit are of major importance in Israel both as a cultural concept and in the physical landscape.

[3] The basis for the analysis in this paper assumes that the SHAKED will be a retail currency and will not bear interest.

[4] See, for instance, the report by the Federal Reserve, the BIS, the Bank of England, the European Central Bank, the Bank of Japan, the Swiss National Bank, the Bank of Canada, and the Sveriges Riksbank (Group of Central Banks, 2020).

[5] The ratio between the stock of high-quality liquid assets and the expected net outgoing cashflow during the following 30 calendar days. The regulatory requirement is that this ratio be no lower than 100 percent. For more details, see Proper Conduct of Banking Business Directive 221.

Many central banks have published various working papers analyzing the effect of issuing a CBDC on the economy, and particularly on the financial system's resilience. A group of seven central banks together with the BIS[6] have analyzed the implications of issuing a digital currency on financial stability.[7] Norges Bank (Norway)[8], Sveriges Riksbank (Sweden)[9], and the Monetary Authority of Singapore[10] presented analyses linking the effects on the banking system's balance sheet with the central bank's balance sheet, and the implications for the banking system and monetary policy. Economists at the Bank of Canada[11] analyzed the impact of issuing a digital currency on the banking system's ability to finance itself through deposits.

In this paper, the Bank of Israel joins the list of central banks publishing their work and their progress in examining a potential issuance of a CBDC, as part of the work plan for a potential issuance of a digital shekel in the future (should the Bank of Israel's assessment be that the benefits of issuing SHAKED outweigh the potential costs and risks). It is important to emphasize that, similar to many other central banks, the Bank of Israel has not yet decided whether it intends to issue a digital currency.

It is difficult to impossible to reliably assess what will be the scope of the substitution between deposits and SHAKED, since it depends greatly on the technological and business characteristics of the SHAKED, which have not yet been determined, on the economic environment that will prevail following after the SHAKED is launched that may be decided upon, and more. The aforementioned paper by the seven central banks and the BIS presents an estimate, according to which demand for a CBDC will range between 1.5 and 14 percent of the public's deposits, assuming that every citizen wants to hold CBDC at the level of his or her monthly income (or according to another calculation, US$3,000). According to this estimate, the substitution will come entirely from the public's deposits with the banking system, or will be divided equally between existing cash and the public's deposits. A Bank of Canada study[12] presented a very broad estimation of between 4 and 52 percent of the public's liquid assets, depending partly on how the public perceives the digital currency—as an alternative to cash, or as an alternative to a bank deposit. In this context, it should be emphasized that **this paper does not try to forecast the substitution rate that would prevail in Israel following the issuance of a digital shekel.**

The aim of this paper is to identify the main items in the banking system's balance sheet[13] that may be impacted by the issuance of a digital shekel and its adoption by the

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[6] Bank for International Settlements, Bank of Canada, Bank of England, Bank of Japan, European Central Bank, Federal Reserve, Sveriges Riksbank, and Swiss National Bank (Group of Central Banks, 2020).
[7] BIS (2021)
[8] Norges Bank (2021)
[9] Svergies Riksbank (2018)
[10] MAS (2021)
[11] (Bank of Canada, 2020)
[12] (Bank of Canada, 2021)
[13] This paper examines the potential effect on the banking system as a whole, from a macroprudential standpoint. It does not examine the potential effect on each bank separately.

public, as well as the nature and dominance of the impact on the banking system's business results, under certain assumptions. This paper does not take into account potential changes that the banking system may make in order to adapt its business model to account for new developments in the world of money. In addition, it is not an overall analysis of all of the potential effects of issuing a digital shekel on the banking system, the financial system, or the entire economy. In particular, the main assumption of this paper is that following the issuance of a digital shekel, the banking system would be interested in maintaining a static balance in which the public's credit portfolio and total deposits (other than transfers due to the issuance of the digital shekel) would remain at their pre-SHAKED levels.[14] In other words, the banks will provide credit at the same level of current credit repayments. Furthermore, the analysis in this paper reflects comparative statistics between the point of departure and the new equilibrium where the system stabilizes following the issuance of the digital shekel, only as a result of the issuance, and does not take into account the dynamics of the natural increase in credit, deposits, or the various monetary aggregates. In addition, the banks' managements have a variety of possible measures to enable each bank to meet the risk appetite set out in its internal restrictions and in the regulatory requirements such that there would not necessarily be a significant erosion of profitability. In this paper, we assume that the banks' managements will not adopt such measures, but will only take the measures detailed in the scenarios below. Another point that is important to note is that even though comparative statistics simulate a rapid transition, at one point in time, of part of the public's deposits to the digital shekel, in reality, if the Bank of Israel issues a digital shekel and the public begins to adopt it, it is reasonable to assume that the process will be spread out over a long period. We further note that some of the developments analyzed later in this paper may have real economy implications that, in turn, may have a repeat impact on the banking system, but these are not analyzed in this paper. In addition, the issuance of a digital currency for the Israeli economy may also have an impact on the payments industry[15] and on extreme situations such as a run on the bank[16], but these are not detailed and not analyzed in the paper. As we noted above, this paper reflects the first step in a broader analysis of various economic aspects currently being examined and that will be examined in the future at the Bank of Israel, as part of the Bank of Israel's work plan toward the potential issuance of a digital shekel.

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[14] During routine times, both the growth rate of credit to the public and the growth rate of the public's deposits are greater than zero, and reflect growth in economic activity and advanced banking activity.

[15] The broader the transition to the digital shekel is, the greater the potential will be to use the digital shekel as a means of payment instead of the currently existing means of payment, particularly in relation to credit-card-based payments. In the latter case, there may be a decline in the income of the banks and credit card companies in respect of card holders (issuer's fees, service fees, and fees for transactions abroad), as well as in the income of credit card companies from the provision of settlement services to merchants.

[16] In the extreme scenario where there is concern over the stability of a bank, the ease of transition from bank money to the digital shekel may accelerate the crisis at that bank and in the banking system as a whole. One of the solutions discussed around the world in this context, which is also mentioned in the draft model that the Bank of Israel's steering committee published, is the imposition of restrictions on the volume of digital currency holdings.

Most of the data in this paper are annual data for 2020 that were available at the time of the analysis. It is important to note that that year, when the COVID-19 crisis began, was unique both from the standpoint of the monetary measures implemented by the Bank of Israel, their ramifications on the Bank of Israel's balance sheet and the balances sheets of the banking system, and in terms of the credit market and the business results of the banking system. The results of the scenarios and simulations are influenced by this, and this must be taken into account when analyzing the results presented in this paper. The low interest rate environment also has an effect on the results of the analysis.

Following this introduction, the second section of the paper details the various potential effects of issuing a digital shekel on the balance sheet of the Israeli banking system and on the Bank of Israel's balance sheet. The third section analyzes the intensity of each of the potential effects on the banking system's results, based on a designated simulation. The fourth section sums up and details the main conclusions.

2. Potential effects of issuing a digital shekel on the Israeli banking system and on the Bank of Israel's balance sheet

The public's deposits in the Israeli banking system are the main source for the provision of credit to the public. Accordingly, transferring a certain volume of money from the public's deposits to SHAKED means a loss of sources of credit for the banking system. Against the public's deposits, the banking system must meet the reserve requirement[17], as well as regulatory liquidity ratios (NSFR and LCR[18]). **The analysis in this paper is based on an assumption that the banking system will maintain the current volume of the credit portfolio to the public as well as the price of credit to the public, while continuing to meet the regulatory liquidity requirements. As a result, there will be situations, as we will show below, where the banking system will need to take measures in order to maintain the volume and structure of sources that will enable this.** For instance, the banking system will be able to raise the interest rate paid to the public on deposits, and even pay interest on current accounts (with the aim of maintaining the desired volume of current

[17] There is a requirement to hold "liquid assets" as a reserve at the Bank of Israel, in accordance with the liquidity directives. "Liquid assets" are assets that are part of the monetary base, and include cash in the banks' vaults and the banks' current accounts at the Bank of Israel. The rate of the reserve requirement depends on the type of deposit: 6 percent on demand deposits, and 3 percent on deposits with a term of one week to one year. For deposits with a term of more than one year, there is no liquidity requirement. The Bank of Israel does not pay interest to the banks on the reserve requirement or on surplus reserve.

[18] From January 2022, the banking corporations are also required to meet a net stable financing ratio (NSFR) of at least 100 percent. The NSFR is defined as the amount of stable financing available (defined as part of the equity and the liabilities that can be relied upon during the coming year) divided by the required amount of stabile financing (which is a function of the liquidity characteristics and periods remaining to repayment of the various assets held by that banking corporation, as well as of its off-balance-sheet exposures).

accounts and deposits in view of the transfer of some of the public's deposits to SHAKED) or to raise alternative sources (such as by issuing bonds[19]). Another tool that may provide a response for maintaining the liquidity level is a loan from the Bank of Israel.[20]

Insofar as the banking system must take such measures as stated above, its sources are expected to become more expensive, thereby eroding its profits. In recent years, the Israeli banking system's surplus liquidity has been high. Assuming a liquidity level that is similar to that of recent years, it is likely that such measures would only be necessary when the volume of public deposits being moved to SHAKED is significant. However, the public's deposits in the banking system create income for the system from various account management fees (bank transfers, checking activity, line item fees, teller-executed transaction fees, and so forth), so that having deposits move to SHAKED may also have an impact on the banking system's income side. It should be noted that the balance of demand deposits, and the rates of change in that balance, are a significant parameter in the banking system's internal models such as liquidity models and interest models, and a significant transfer of those deposits may lead the banks to take various measures even before they are required to do so in order to meet formal regulatory requirements, in order to meet the risk appetite according to each individual bank's internal restrictions. **The analysis in this paper is based on the banks' requirement to meet the regulatory requirements, and does not consider the various assumptions of the internal models in the banking system.**

As stated, the adoption of the digital shekel by the public may also have an impact on the Bank of Israel's balance sheet. This impact is comprised of direct effects, such as a decline in the monetary aggregate and an increase in the volume of money in circulation, and potential effects such as an increase in loans to the banks (insofar as the Bank of Israel enables this and insofar as there is demand for this by the banking system).

2.1 The effects of issuing a digital shekel on the balance sheets of the banking system and of the Bank of Israel

We first outline the structure of the banking system's balance sheet, as of December 2020[21], divided into the main relevant items (Table 1). The public's deposits[22] are the main item on the liabilities side of the banking system's balance sheet. Other items include bonds and deferred notes, and deposits from the Bank of Israel, which are relevant for this discussion

[19] The banking system is already issuing bonds and deferred notes, but their share of total credit to the public is lower than 10 percent (as of December 2020), and their share of total deposits by the public is even lower, at about 5.5 percent (as of December 2020).

[20] Against full collateral, and insofar as the Bank of Israel enables this. It is important to note that as of now, taking a loan from the Bank of Israel to cover the banking system's liquidity needs is a negative signal. Setting out the appropriate mechanism as part of the issuance of a digital shekel may deal with this issue.

[21] The analysis in this paper is based on 2020 data, since part of it is based on annual flow data that are still not available for 2021 at the time of the analysis.

[22] About 95% of the public's deposits are in Israel, and over 60% of those are current deposits that can be withdrawn at any time

even though they are not of significant volume. On the assets side, credit to the public is the main item, while deposits at the Bank of Israel are also significant.

Table 1
The Banking System's Balance Sheet, December 2020
(NIS billion)

Assets		Liabilities	
Deposits at the Bank of Israel	418	The public's deposits	1,534
Credit to the public	1,122	Bonds and deferred notes	88
Other assets	377	Deposits from the Bank of Israel	20
		Other liabilities	148
		Equity	127
Total	**1,917**	**Total**	**1,917**

First scenario – Substitution volume of X[23] between the public's deposits in the banks and the digital shekel

In this scenario, we assume that the volume of the public's deposits that move from the banking system to SHAKED (hereinafter – the substitution volume) is NIS X billion (hereinafter – X). As a result of the transfer, the banking system's total balance sheet will be reduced by X (Table 2): The public's deposits in the banking system[24] will be reduced by X, and accordingly, deposits at the Bank of Israel will also be reduced by X, since the Bank of Israel will debit the banks' accounts at the Bank of Israel against the digital shekels that will be issued (similar to the mechanism for when banks withdraw physical cash from the Bank of Israel's vaults).[25] The following is the change that will take place in the banking system's balance sheet (the items in which there is a reduction are shown in red):

[23] In this scenario, we assume that X is significantly smaller than the volume of monetary deposits at the Bank of Israel.

[24] We assume that the public's deposits from which the substitution will take place are non-interest-bearing demand deposits only. (As of December 2020, this item is about NIS 535 billion.)

[25] Accordingly, the banking system will hold less available cash (since a volume of X was paid to deposit holders), so the volume of actual monetary deposits will be reduced by X.

Table 2 The Banking System's Balance Sheet – Substitution Volume (X) (NIS billion)			
Assets		**Liabilities**	
Deposits at the Bank of Israel	418 - X	The public's deposits	1,534 - X
Credit to the public	1,122	Bonds and deferred notes	88
Other assets	377	Deposits from the Bank of Israel	20
		Other liabilities	148
		Equity	127
Total	**1,917 - X**	**Total**	**1,917 - X**

Together with the change in the banking system's balance sheet, there would also be a change in the Bank of Israel's balance sheet upon the public's adoption of the digital shekel. We first outline the Bank of Israel's balance sheet as of December 2020, divided into the main relevant items (Table 3). In 2020, the Bank of Israel's balance sheet was NIS 645 billion. On the liabilities side, the monetary aggregate components (monetary deposits and *makam*) are the most significant items, followed by cash in circulation. On the assets side, while loans to banks[26] are marginal in volume, they are relevant for our discussion.

Table 3 The Bank of Israel's Balance Sheet, December 2020 (NIS billion)				
Assets		**Liabilities**		
Loans to banks	20	Cash in circulation (physical cash)		106
Foreign exchange reserves	573	Banking corporations' deposits	Monetary deposits	365
Securities (NIS)	53		Demand deposits	53
		Makam		87
		Other liabilities		78
		Equity and asset revaluation		-43
Total	**646**	**Total**		**646**

As the public will want to transfer a volume of X in deposits from the banking system to the SHAKED, the Bank of Israel's total balance sheet will not change, but there will be a change in its composition (Table 4). On the liabilities side, SHAKED (which is essentially an addition

[26] This item is all due to the special loans issued by the Bank of Israel to the banking system during the COVID-19 crisis to incentivize the banks to provide credit to small businesses during the crisis. Against this item, there are deposits from the Bank of Israel totaling NIS 20 billion on the liabilities side of the banking system's balance sheet.

to total cash in circulation) totaling X will be added.[27] Accordingly, and as detailed above, the monetary deposits item will be reduced by X. Essentially, the bank of Israel's liabilities to the banking system are converted to the Bank of Israel's liabilities to the public. Table 4 presents the change that would take place in the bank of Israel's balance sheet (the item that increases is marked in green, and the item that decreases is marked in red):

Table 4
The Bank of Israel's Balance Sheet – Substitution Volume (X)
(NIS billion)

Assets		**Liabilities**		
Loans to banks	20	Cash in circulation	Physical cash	106
			Digital shekel	X
Foreign exchange reserves	573	Banking corporations' deposits	Monetary deposits	365 - X
Securities (NIS)	53		Demand deposits	53
		Makam		87
		Other liabilities		78
		Equity and asset revaluation		-43
Total	**646**	**Total**		**646**

Second scenario – Substitution volume of X+Y[28]

We will now assume that the volume of the public's adoption of the digital shekel increases by a further NIS Y billion (hereinafter – "Y"), so that the total substitution volume is X+Y. We further assume that the additional Y replacement volume threatens to harm the structure and quality of the sources of the banking system, and that it threatens to erode the various liquidity ratios (NSFR, LCR[29]) to below the required regulatory minimum. It should be noted that at the individual bank level, the banks' managements have a variety of possible steps they can take with the appropriate timing in order to avoid such a threat. However, this paper examines the impact of the substitution between the public's deposits and the digital shekel, at a certain point in time, under the assumption that the banking system will maintain the existing volume of the credit portfolio and meet the regulatory requirements. Therefore, under these assumptions, and in order to prevent the abovementioned decline, the banking system will have to raise new sources against customers' withdrawal of Y,

[27] A similar change takes place in the Cash in circulation item even if the public's adoption of the digital shekel would be as an alternative to physical cash (and not on account of withdrawing deposits from the banking system).

[28] Further to the foregoing, in this scenario as well we assume that X+Y is significantly smaller than the volume of monetary deposits at the Bank of Israel.

[29] In an examination based on estimations, the NSFR ratio in the banking system is high and the various scenarios erode it, but even in the stress scenarios discussed in this paper, it remains higher than the regulatory minimum. In this paper, we will relate only to the analysis of the LCR ratio.

without affecting the supply of credit, and while continuing to meet the required regulatory ratios.

As described above, new sources can be raised in three main ways (or a combination of them): maintaining the original volume of deposits from households[30] (by raising the interest paid on the deposits), loans from the Bank of Israel (against full collateral set by the Bank of Israel), or issuing bonds in the capital market. In this context, it should be emphasized that if a certain bank raises a new deposit that is transferred to it from another bank, that transfer will not increase the total deposits in the banking system. However, we will assume that in the scenario of significant withdrawals from deposits, the banking system will increase the interest paid on households' deposits, and perhaps even on their current accounts, in order to make it worthwhile for households to continue holding money in the banking system and not transfer additional money out of the banking system into digital shekels (which, as stated, will not bear interest). This assumption has an impact on the financing expenses of the banking system, and we will discuss this in greater detail in the third section of this paper. In this context, we note that another possibility may be for the banking system to encourage the transfer of institutional investors' current account balances to long-term deposit tracks, where this possibility does not affect the banking system's balance sheet or the mixt that it uses to improve the LCR, while it does work to increase the banking system's financing expenses.

We now assume that in view of the scenario, and in order for the banking system not to reduce its credit portfolio, the Bank of Israel will provide the banking system with loans. These loans will be against full collateral as defined by the Bank of Israel. We note that insofar as the Bank of Israel requires liquid collateral, the banking system's use of loans from the Bank of Israel will be limited: While loans from the Bank of Israel will increase the cash in the banking system, thereby improving the liquidity ratios, the provision of liquid collateral against such loans will erode those ratios to the same extent. As such, insofar as the Bank of Israel sets out conditions for providing loans against other collateral[31] that the banking system can provide, the banking system will be able to raise the entire Y through loans from the Bank of Israel. As a result, there would be no change in the banking system's balance sheet, but there would be a change in its composition (Table 5). Due to the transition to digital shekels, the public's deposits in the banking system would decline by Y (in addition to the decline by X). In accordance with this scenario, a decline of Y in the level of deposits in the banking system may have a negative impact on meeting the liquidity requirements. The banks would therefore borrow Y from the Bank of Israel. In this way, the banking system's asset side would not change, and its liquidity ratios would suffer no negative impact.

[30] We distinguish between households and other depositors (financial and nonfinancial) since the bank's liquidity needs differ for each one of them.

[31] For instance, during the COVID-19 crisis, the Bank of Israel built an infrastructure to expand the variety of assets that the banking system could provide as collateral against credit to small and micro businesses. https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/6-7-2020.aspx

Table 5 The Banking System's Balance Sheet, Substitution Volume (X+Y) (NIS billion, borrowing from the Bank of Israel)			
Assets		**Liabilities**	
Deposits at the Bank of Israel	418 - X	The public's deposits	(1,534 – X) - Y
Credit to the public	1,122	Bonds and deferred notes	88
Other assets	377	Deposits from the Bank of Israel	20 + Y
		Other liabilities	148
		Equity	127
Total	**1,917 - X**	**Total**	**1,917 - X**

If the banking system borrows from the Bank of Israel, the Bank of Israel's total balance sheet will increase by Y and there is a change in its composition (Table 6). The "Loans to banks" item increases by Y, and the "monetary deposits" item remains unchanged since the volume of substitution of the additional Y reduces this item while the loan from the Bank of Israel increases it by the same amount.

Table 6 The Bank of Israel's Balance Sheet – Substitution Volume (X+Y) (NIS billion, **loans from the Bank of Israel**)				
Assets		**Liabilities**		
Loans to banks	20 + Y	Cash in circulation	Physical cash	106
			Digital shekel	X + Y
Foreign exchange reserves	573	Banking corporations' deposits	Monetary deposits	365 - X
Securities (NIS)	53		Demand deposits	53
		Makam		87
		Other liabilities		78
		Equity and asset revaluation		-43
Total	**646 + Y**	**Total**		**646 + Y**

Alternatively, let us now assume that the banking system will raise all of Y by issuing bonds in the capital market (labeled hereinafter as Y_{BONDS}, where the substitution volume Y will be labeled Y_{CBDC})[32]. As a result, deposits totaling Y_{BONDS} are converted to the banks' liabilities, as bonds. The "Bonds and deferred debt notes" item on the banking system's liabilities side increases, while the "Public's deposits" item declines by the same amount—Y_{BONDS} (in

[32] In both cases, the volumes are of NIS Y billion, where the purpose of the subscript labeling (BONDS or CBDC) in this section is to emphasize the source of the movement in the balance-sheet item.

addition to the substitution volume of $X+Y_{CBDC}$)—in respect of the money leaving the public's current account. Bonds are generally issued in the capital market to institutional investors. We therefore assume that the decline in deposits as a result of the bond issuance is from the deposits of institutional investors and not from those of households. Without getting into too much detail at this stage about how the LCR is calculated, we emphasize that the liquidity requirements in respect of institutional investors' deposits are higher than those in respect of households' deposits, such that issuing bonds to institutional investors leads to less liquidity needs on the part of the banking system. As such, together with the same volume of cash (meaning total cash after the substitution volume of $X+Y_{CBDC}$ to the digital shekel), a higher LCR is generally obtained than what was obtained previously. In such a situation, the banking system's total balance sheet declines by Y_{CBDC} (which is replaced by the digital shekel, in addition to the decline by X), and there is also a change in its composition (Table 7).

Table 7
The Banking System's Balance Sheet, Substitution Volume (X+Y)
(NIS billion, raising sources by issuing bonds in the capital market)

Assets		**Liabilities**	
Deposits at the Bank of Israel	$418 - X - Y_{CBDC}$	The public's deposits	$(1{,}534 - (X - +Y_{CBDC}) - Y_{BONDS}$
Credit to the public	1,122	Bonds and deferred notes	$88 + Y_{BONDS}$
Other assets	377	Deposits from the Bank of Israel	20
		Other liabilities	148
		Equity	127
Total	**$1{,}917 – (X+Y_{CBDC})$**	**Total**	**$1{,}917 – (X+Y_{CBDC})$**

In a case where the banking system issues bonds in the capital market, there is no effect on the Bank of Israel's total balance sheet, since the banks' total cash and deposits with the Bank of Israel decline by exactly the same amount as the increase in the "Digital Shekel" item. However, there is a change in the balance sheet's composition (Table 8). The Digital Shekel item will increase by Y_{CBDC} while the volume of monetary deposits declines by Y_{CBDC}, such that in the end, the total balance sheet remains unchanged.

Table 8
The Bank of Israel's Balance Sheet – Substitution Volume (X+Y)
(NIS billion, raising sources by issuing bonds in the capital market)

Assets		Liabilities		
Loans to banks	20	Cash in circulation	Physical cash	106
			Digital shekel	$X + Y_{CBDC}$
Foreign exchange reserves	573	Banking corporations' deposits	Monetary deposits	$(365 – (X + Y_{CBDC}$
Securities (NIS)	53		Demand deposits	53
		Makam		87
		Other liabilities		78
		Equity and asset revaluation		-43
Total	**646**	**Total**		**646**

In summation, we can see that an issuance of a digital shekel can have a direct impact on the banking system's balance sheet, both on the total balance and on its composition. In particular, in some cases, issuing a digital shekel is expected to reduce the banking system's total balance sheet by the substitution volume, mainly through the "Public's deposits" item and accordingly through the "Deposits at the Bank of Israel" item. **Later in this section, we estimate the maximum possible substitution volume that would not require the raising of new alternative sources by the banks, under the assumptions of the scenario. (We try to answer the question: "What is the maximum possible X?")** The issuance of a digital shekel would also have a direct impact on the Bank of Israel's balance sheet. The composition of the Bank of Israel's liabilities would change, with an increase in liabilities to the public and a decline in liabilities to the banking system, and if the increase in digital shekels makes it necessary for the banking system to take out loans from the Bank of Israel, the Bank of Israel's balance sheet would increase.

2.2 The effects of issuing a digital shekel on the banking system's financing costs

As the foregoing analysis shows, new sources can be raised (in a scenario where the substitution volume is X+Y) against those transferred to the digital shekel in three main ways: deposits from the public, loans from the Bank of Israel, and issuing bonds in the capital market (or a combination of them). Each method involves higher financing costs to the banking system. The system's ability to raise alternative deposits from the public relies on an assumption that the interest that will be paid to the depositors will be more attractive than what is currently paid; when taking a loan from the Bank of Israel, the loan will bear interest that is generally higher than the interest paid to depositors on their deposits; and the interest rates on bonds are higher than on the other sources of finance (such as the public's deposits), meaning that issuing bonds will create higher interest costs. In this

context, it should be noted that banks may be able to operate as participants in the SHAKED, thereby perhaps compensating for some of the erosion of their profitability. However, in this paper, and particularly in the simulation outlined in the third section, we do not relate to this type of activity.[33] In the simulation presented in the third section of this paper, we estimate the intensity of the potential effect on the banking system's business results for a given substitution volume.

2.3 Sensitivity analysis regarding the maximum substitution volume ("What is X?")

We now examine what the maximum possible substitution volume is for the banking system to be able to maintain the current volume of the credit portfolio to the public while meeting the regulatory requirements. In other words, we will estimate the maximum X described in the first scenario above. There are a number of limitations to the maximum substitution rate. Primarily, it should not be higher than the volume of monetary deposits, and it should not erode the liquidity ratios (NSFR, LCR) to below the regulatory minimum. There may be other limitations derived from erosion of the bank's profitability and capital ratios.

The analysis we conducted shows that the most effective limitation is the LCR requirement. As per the regulations, a bank is required to have an LCR of at least 100 percent. As part of the examination described below, we assumed that the banking system, due to its conservative approach, will need to take action even before reaching the minimum regulatory ratio. As such, we examined what the maximum substitution volume would be given that the LCR would not decline below 110 percent, or 115 percent. It is important to note that the estimations presented below are not forecasts or expectations of the expected substitution volume, but of the maximum possible substitution volume under the LCR restriction that is, as stated, an effective restriction for this analysis.

The transfer of demand deposits to the SHAKED affects both the numerator and the denominator of the LCR. (Details of the calculation can be found in Appendix A.)

- The numerator is the stock of high-quality liquid assets. In view of the decline in the volume of the banks' deposits at the Bank of Israel, the stock of liquid assets in the banking system declines by precisely the same amount. This leads to a decline in the numerator of the LCR.
- The denominator is the net outflow during the next 30 days (in a stress scenario). This outflow includes the assumption that in the stress scenario, about 5 percent of total stable deposits in the bank, including households' demand deposits, will be withdrawn in the next 30 days. Accordingly, a decline in the volume of households'

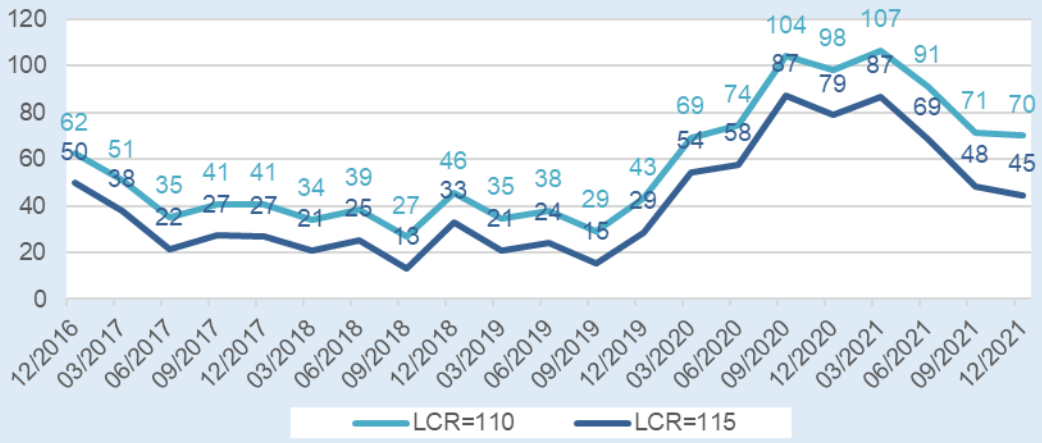
[33] A bank that serves as an intermediary in the SHAKED system, provides its customers with technological access to the system, for instance through the wallet that holds digital shekels. This does not compensate for the bank's loss of sources, but it may create income for it in accordance with the business model to be determined for intermediaries in the SHAKED system.

demand deposits would lead to a decline in net outflow of just 5 percent of the total substitution volume. This would lead to a decline of just 5 percent of the substitution volume in the denominator of the LCR.

In summation, the substitution volume has a stronger impact on the stock of high-quality liquid assets (the numerator in the LCR) than it does on the net outflow (the denominator), and therefore the higher the substitution from deposits to SHAKED, the lower the LCR. The maximum substitution volume (X), which does not erode the LCR to be under a specific threshold, changes according to the actual LCR in each period, meaning in accordance with the stock of high-quality liquid assets vis-à-vis the total net outflow, and in accordance with the examined minimum LCR (Figure 1). In particular, we can see that during the COVID-19 crisis, a period in which there was very high liquidity in the economy and the volume of demand deposits increased significantly, the maximum substitution volume (X) also increased significantly.

The maximum substitution volume changes according to the LCR level in each period.

Figure 1
Substitution Volume (Deposits to CBDC)



SOURCE: Based on reports to the Banking Supervision Department.

3. Analysis of the potential intensity of the impact of a digital shekel issuance on the banking system's results, and on the system's ability to continue serving as a financial intermediary (bank disintermediation)

In order to examine the potential intensity of the effect on the banking system of substitution between the public's deposits and the digital shekel, we built a framework for conducting simulations that enables us to examine the implications of various scenarios on the banking system's balance sheets and business results. The simulations are based on certain assumptions, external parameters, data reported to the Banking Supervision Department, and certain indices that were calculated on the basis of those data. These are presented below in brief. More information and details can be found in Appendix B.

The assumptions underlying the simulations:

- The substitution of money from deposits in the banking system to digital shekels is expected to be a certain percentage of the public's noninterest-bearing demand deposits.
- There is no decline of bank credit to the public.
- The banking system absorbs the erosion of the credit margin.
- In order to moderate the erosion of the LCR, the banking system takes a mix of the following steps: maintaining loss of further households deposits (by increasing the interest paid on such deposits), obtaining loans from the Bank of Israel, and issuing bonds in the capital market.
- The digital shekels held by the public cannot be used as a source for the banking system (similar to cash held by the public).

3.1 The scenarios in the model

The model that we built enables us to examine the various scenarios (vectors) as a function of the following five parameters[34]: (1) the substitution rate between deposits and digital shekels (hereinafter – the substitution rate); (2) the rate of deposits (as a share of the substitution rate) in respect of which the banking system's deposits at the Bank of Israel will be reduced; (3) the rate of deposits (as a share of the substitution rate) in respect of which a loan will be taken out from the Bank of Israel; (4) the rate of bond issuances (to institutional investors) as a share of the substitution rate; and (5) the interest increment on the public's

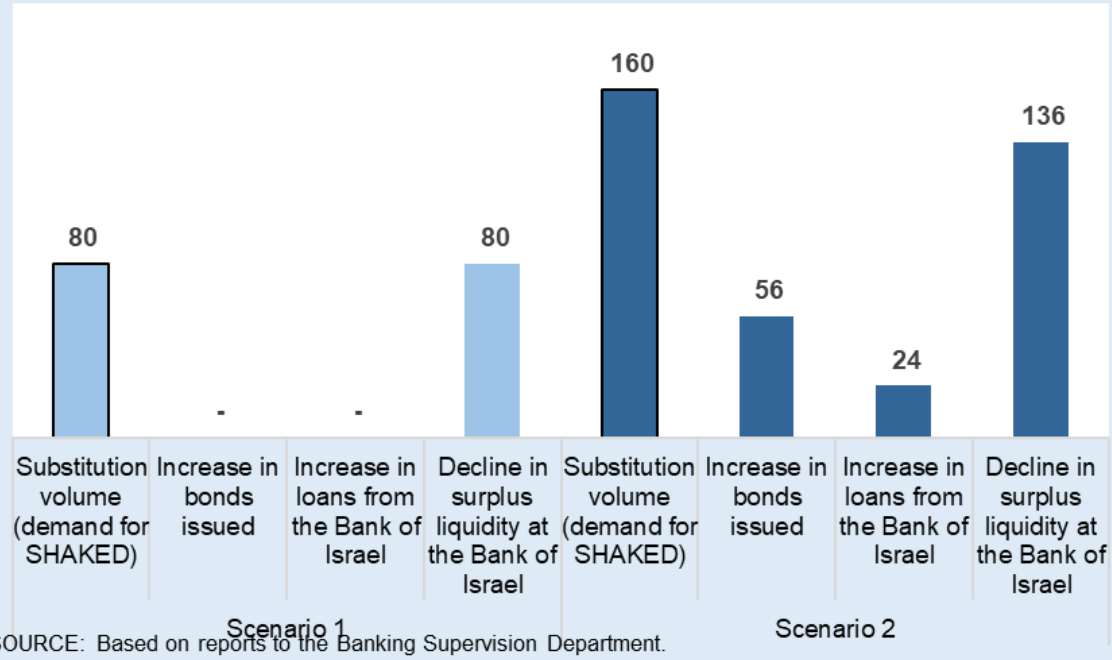
[34] Parameters 2 and 3 present the distribution of financing sources for the substitution volume such that they add up to 100 percent.

demand deposits.[35] For instance, the vector (5%, 50%, 50%, 20%, 10%) describes a scenario in which: (1) 5 percent of the public's deposits[36] are moved to the SHAKED; (2) 50 percent of the substitution volume is paid by reducing the banking system's deposits with the Bank of Israel; (3) 50 percent of the substitution volume is raised through loans from the Bank of Israel; (4) bonds are issued totaling 20 percent of the substitution volume; and (5) the interest rate on the public's demand deposits is raised by 10 percent[37] from the currently existing rate.

As noted above, we can use this model to examine many scenarios in accordance with the assessment of the expected substitution volumes and in accordance with the stress situations we want to examine. In this section, we will focus on two scenarios, similar to the scenarios presented in Section 2. **The appropriate vector for the first scenario (hereinafter – Scenario 1) is: (15%, 100%, 0%, 0%, 15%).** In this scenario, the substitution volume is 15 percent, which is approximately the maximum substitution rate that would enable the banking system to meet the LCR requirement under the assumption that the LCR is no lower than 115 percent, where the full volume comes from reducing surplus liquidity at the Bank of Israel while increasing the interest in the public's demand deposits so that more deposits don't leave the banking system. **The appropriate vector in the second scenario (hereinafter – Scenario 2), which is basically a stress scenario, is (30%, 85%, 15%, 35%, 25%)**. In this scenario, the substitution rate is 30 percent, 85 percent of which comes from reducing surplus liquidity at the Bank of Israel, with the rest (15 percent) coming from loans taken from the Bank of Israel. Issuing bonds to the institutional investors, totaling 35 percent of the substitution volume, makes it possible to rely more on surplus liquidity at the Bank of Israel without having an impact on the LCR. In this scenario, we assume that in order to maintain the public's remaining demand deposits, the banking system will need to increase interest expenses on them by 25 percent. In accordance with the vectors detailed above, the scenario's data are as detailed below in Figure 2. In Scenario 2 in which the substitution volume is NIS 160 billion, the decrease in the banking system's deposits with the Bank of Israel is the same as the substitution volume minus the total loans from the Bank of Israel.

[35] Interest-bearing and noninterest-bearing.
[36] The public's noninterest-bearing demand deposits in Israel.
[37] 10 percent, not 10 percentage points. For instance, in 2020, the interest expenses on the public's deposits were about 0.35 percent, and an increase of 10 percent means that the rate will increase to about 0.385 percent.

Figure 2
Main Relevant Data for Each Scenario
(NIS billion)



SOURCE: Based on reports to the Banking Supervision Department.

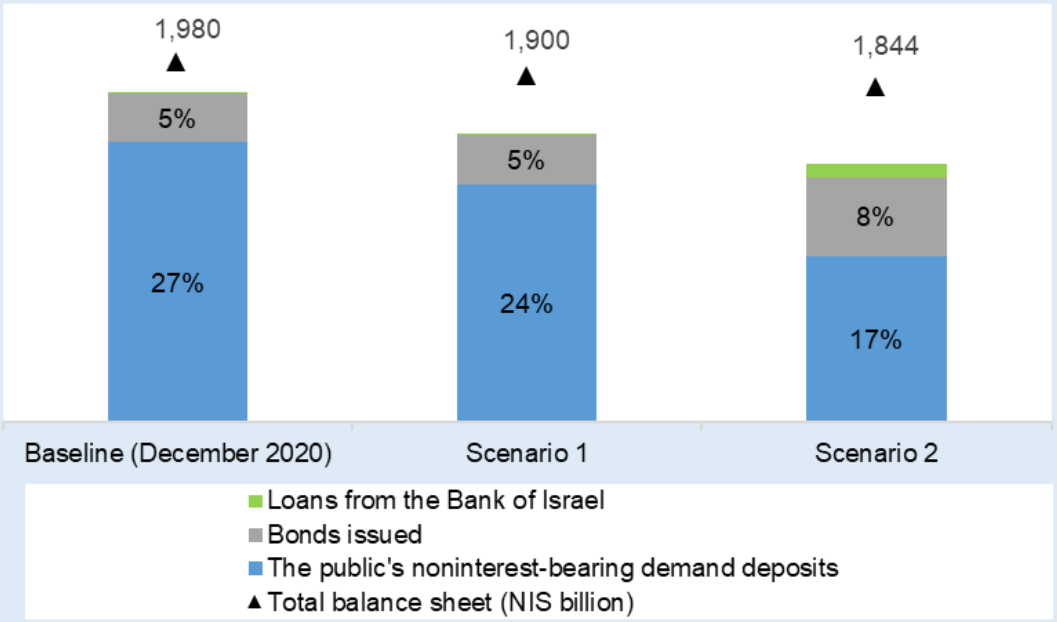
3.2 Results of the model

The following are the model's results for Scenario 1 and Scenario 2—the two scenarios' effects on the banking system's balance sheet and business results.

The banking system's balance sheet – Similar to what is outlined in Section 2 above, the departure of the public's deposits to SHAKED and offsetting it by reducing the banking system's deposits at the Bank of Israel reduce the banking system's total balance sheet (through the "Public's deposits" item on the liabilities side and the "Deposits at the Bank of Israel" item on the assets side) by the substitution volume (Figure 3). We can see that in Scenario 2, where the substitution volume is double what it is in Scenario 1, and where some of the substitution is financed by bonds, the system's balance sheet also declines by the volume of money raised, such that the total balance sheet is lower than in Scenario 1. In addition, the composition of the balance sheet changes in view of the financing of the second half of the substitution volume through a loan from the Bank of Israel and the issuance of bonds. We can also see the decline in the public's total deposits as a share of the total balance sheet, from a baseline of 27 percent to about 17 percent in Scenario 2.

In both scenarios, we can see a reduction in the balance sheet, while there is also a change in its composition in Scenario 2.

Figure 3
Change in the Distribution of the Main Liability Items of the Banking System

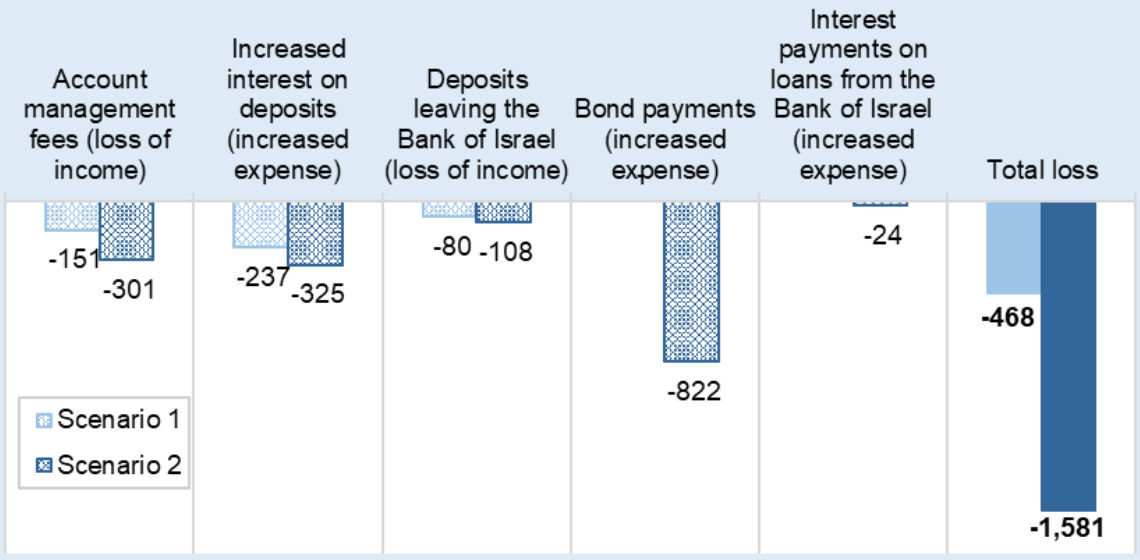


SOURCE: Based on the banks' reports to the Banking Supervision Department.

The banking system's business results – The departure of the public's deposits from the banking system erodes the banking system's net profit. The erosion of pretax profit comes from a number of items, some of which reflect a reduction in income and some of which reflect an increase in expenses (Figure 4). In Scenario 1, the total decline in revenue amounts to about NIS 468 million (about 3.8 percent of the banking system's pretax profit in 2020), while the decline in Scenario 2 is more significant, amounting to about NIS 1,581 million (about 12.7 percent of the banking system's pretax profit in 2020). Most of the difference between the two scenarios is from an increase in expenses in Scenario 2 as a result of the issuance of bonds. Other significant items include the loss of income from current account management fees, and an increase in expenses due to the increase in interest on the public's deposits.

The erosion of profit is significantly greater in Scenario 2, mainly due to the increase in expenses in respect of bonds.

Figure 4
Composition of the Impact on Pretax Profits for Each Scenario
NIS million

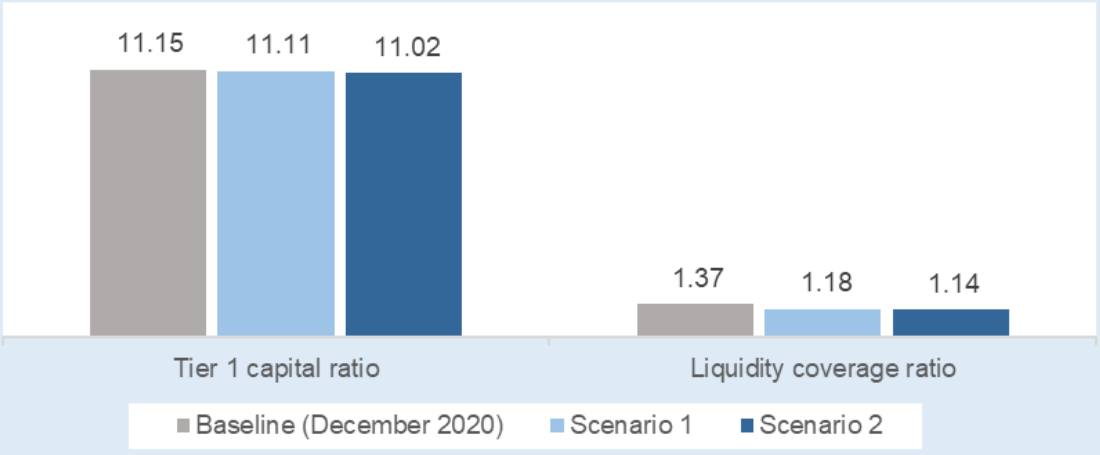


SOURCE: Based on the banks' reports to the Banking Supervision Department.

The banking system's regulatory ratios – The departure of the public's deposits to SHAKED erodes both the capital ratios and the LCR of the banking system, with the effects of Scenario 2 being stronger (Figure 5). The LCR is directly affected by the departure of the public's deposits from the banking system, with most of the effect coming from the decline in the stock of liquid assets. (While the total outflow also declines slightly, its effect is minor.)

The Tier 1 capital ratio remains stable, while the LCR erodes more significantly.

Figure 5
Changes in the Tier 1 Capital Ratio and the Liqidity Coverage Ratio



SOURCE: Based on the banks' reports to the Banking Supervision Department.

4. Conclusion

The simulation shows that under acceptable assumptions of the substitution volume from the public's deposits to SHAKED, the issuance of a digital shekel is not expected to lead to a significant erosion of the banking system's business results, stability, or ability to provide credit and fulfill the classic functions of a banking system in a modern economy. However, if the substitution volume is high, the apparent erosion of the LCR may make it necessary for the banking system, or part of it, to take actions in order to maintain an LCR that is in accordance with regulations and in order to enable the continued functioning of current credit. These actions could increase the erosion of profitability.

As part of the simulation, we examined the maximum substitution volume that is possible before one or more banks are required to take such actions.[38] As detailed above, the effective limitation in this respect is the minimum regulatory LCR. As of December 2021, in order for the LCR not to go below 110 percent or 115 percent, the maximum substitution volumes are about NIS NIS 70 billion, or NIS 45 billion respectively[39]. However, it is important to note that there was no assessment of the expected substitution volume as part of this paper, and that this volume may be dynamic. In certain situations, the public may hold digital shekels only in order to make a small portion of its current payments. In other situations, the public may want to hold a larger share of its money in digital shekels, which may undermine the stability of the banking system.

Central banks around the world are holding many discussions regarding the attributes and features that a central bank digital currency must have. One topic of such discussions surrounds the limitation of the volume of use of a CBDC, at the customer level or at the total volume level. Setting such a limitation may shed new light on the examination presented in this paper, as well as on the discussion of banking disintermediation in general. The Bank of Israel is continuing to examine the latter issue, as well as other issues that arise as part of its research and preparation for a potential issuance of digital currency in the future (should the bank's assessment be that the advantages of such an issuance outweigh the potential costs and risks). It should again be emphasized that, similar to many other central banks, the Bank of Israel has not yet decided whether it intends to issue a digital currency.

[38] The scenarios in this paper did not take into account various actions on the part of banking system management. However, it is important to note that in practice, the banks' managements have various tools to manage a situation where deposits are withdrawn on the scales discussed.
[39] Reflecting substitution rate of 7 and 12 percent, respectively.

Bibliography

Bank of Israel (2021, 05). "A Bank of Israel Digital Shekel – Potential Benefits, Draft Model, and Issues to Examine", BoI Publications.
https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/11-5-21.aspx

Bank for International Settlements (2020, 10). "Central Bank Digital Currencies: Foundational Principles and Core Features", BIS other publications.
https://www.bis.org/publ/othp33.htm

Bank for International Settlements (2021, 09). "Central Bank Digital Currencies—Executive Summary", BIS other publications.
https://www.bis.org/publ/othp42.htm

Garcia, A., B. Lands, X. Liu, & X. Slive (2020, 07). "The Potential Effect of a Central Bank Digital Currency on Deposit Funding in Canada", Bank of Canada Staff Analytical Notes.
https://www.bankofcanada.ca/2020/07/staff-analytical-note-2020-15/

Jukes, R. (2018). "When a Central Bank Digital Currency Meets Private Money: Effects of an e-krona on Banks", Sveriges Riksbank Economic Review.
https://www.riksbank.se/when-a-central-bank-digital-currency-meets-private-money

Li, J. (2021, 12). "Predicting the Demand for Central Bank Digital Currency: A Structural Analysis with Survey Data", Bank of Canada Staff Working Paper.
https://www.bankofcanada.ca/2021/12/staff-working-paper-2021-65/

Monetary Authority of Singapore (2021, 11). "A Retail Central Bank Digital Currency: Economic Considerations in the Singapore Context", MAS Economic Policy Group.
https://www.mas.gov.sg/publications/monographs-or-information-paper/2021/retail-cbdc-paper

Norges Bank (2021, 05). "Central Bank Digital Currencies - Third Report of Working Group", Norges Bank Papers.
https://www.norges-bank.no/en/news-events/news-publications/Reports/Norges-Bank-Papers/2021/papers-12021/

Appendix A

LCR is the ratio of high-quality liquid assets held by the banking corporation and total net cash outflow (expected cash outflow minus expected cash inflow) in a defined stress scenario during the following 30 calendar days. **The following is a general and simplified representation of calculating the LCR, to help understand the effects of the measures taken in the scenarios that are detailed in the paper. In particular, this representation does not completely or precisely reflect how the liquidity coverage ratio is measured or the various parameters it includes. For details of the full definitions and the precise calculation, please see Proper Conduct of Banking Business Directive 221.**[40]

In this document, and in order to simplify the analysis, we assume that households' demand deposits are considered "stable". Accordingly, for the LCR calculation, we assume that just 5 percent of them will be included in the expected outflow during the following 30 calendar days, while the wholesale deposits of institutional investors are not considered "stable" and are therefore fully weighted in the expected outflow during the following 30 calendar days.

Legend

R – Qualified reserves at the Bank of Israel
D1 – Stable retail deposits at commercial banks
D2 – Wholesale deposits by institutional investors at commercial banks
L – Additional variables that are part of the stock of high-quality liquid assets
Cf – Additional variables that are part of the expected cash outflow

The formula for calculating the LCR is:

$$LCR = \frac{(L + R)}{\underbrace{[(Cf + 0.05D1 + D2) - If]}_{\text{Net outflow}}}$$

A scenario where demand deposits totaling Y are moved to SHAKED:

$$LCR = \frac{(L + R - Y)}{[(Cf + 0.05(D1 - Y) + D2) - If]}$$

40 https://www.boi.org.il/en/BankingSupervision/SupervisorsDirectives/ProperConductOfBankingBusinessRegulations/221_et.pdf

We can see that the numerator declines by Y, while the denominator declines only by 0.05Y, a relatively negligible decline. Therefore, the LCR erodes.

Now, in a scenario in which the banking system issues bonds to institutional investors, the institutional investors' deposits (which were included beforehand in the LCR) are replaced with bonds (which have a negligible effect on the LCR, and for reasons of simplicity we assume in this illustration that they are not) on the liabilities side of the banking system's balance sheet:

$$LCR = \frac{(L + R - Y)}{[(Cf + 0.05(D1 - Y) + (D2 - Y)) - If]}$$

We can see that the decline in the volume of institutional investors' deposits is fully offset by the total net outflow. The LCR therefore returns to close to the level it was at prior to the departure of Y demand deposits to SHAKED. (Essentially, the LCR reaches a slightly higher ratio after the last stage than at the starting point. This is due to the fact that to start with, the actual LCR is greater than 100 percent—the numerator is higher than the denominator—and accordingly, a decline of Y in both the numerator and the denominator leads to a ratio that is slightly higher than the situation prior to the decline.

Appendix B

1. The assumptions underlying the simulations

1.1 **The substitution from deposits in the banking system to the digital shekel is expected to be a certain percentage of the public's noninterest-bearing demand deposits**. These deposits are completely liquid for the customers, and the vast majority are current balances, for which customers do not accrue interest. As such, the digital shekel can serve as an alternative to keeping this money in the banking system.

1.2 **There is no reduction of credit**. The model assumes that there is no reduction in the balance of the credit portfolio to the public, and therefore, as detailed below, the banking system works to maintain the required volume of sources. It should be noted that this is a conservative assumption, since the decrease in the volume of sources may lead to a reduction in the supply of bank credit as an alternative to raising alternative (and more expensive) sources.

1.3 **The banking system absorbs the erosion of the credit margin**. In other words, the increased cost of the sources is not rolled over to making credit more expensive.

1.4 **Withdrawing the public's noninterest-bearing demand deposits is the equivalent of closing customers' current accounts**. This assumption means that the bank loses its income from managing these accounts. This is a stringent assumption, since customers may transfer some of their money and leave some of it in the bank, thereby continuing to pay the bank for managing their account (in relation to the balances remaining in the bank).

1.5 **Raising the alternative sources will be based on reducing the banks' deposits at the Bank of Israel, raising deposits from the public, obtaining loans from the Bank of Israel, and issuing bonds in the capital market**. In particular, the model assumes that the volume of the public's deposits in the banking system will remain fixed, other than the substitution volume.

1.6 **The digital shekels held by the public will not serve as a source for the banking system**. While a bank may be one of the parties in a two-tier model that offers digital shekel-based wallet services, it will not be able to use the balances in the wallet as a source.

2. Parameters of the simulations

2.1 **The substitution rate between deposits (the public's noninterest-bearing demand deposits in Israel) and the digital shekel (hereinafter – "the substitution rate")**. In other words, the rate of noninterest-bearing demand

deposits that depart the banking system and were replaced by digital shekels, as a share of total noninterest-bearing demand deposits.

2.2 **The distribution of alternative sources of finance that would replace the deposits that leave the banking system**. In other words, the rate of reduction of deposits at the Bank of Israel, loans from the bank of Israel (which together add up to 100 percent) , and bonds raised, as a share of the volume of deposits that left the banking system and for which alternative sources of financing must be found.

2.3 **The rate of the increment (in percent) to the interest rate on deposits**. As detailed above, the model assumes that the banking system will maintain the existing volume of deposits (other than the volume that would move to digital shekels), and will therefore offer a higher interest rate on deposits with the aim of enticing depositors to leave their money at the bank.

3. Data in the model[41]

3.1 The public's total deposits at the end of the same period last year (2019);
3.2 The public's total noninterest-bearing demand deposits in Israel;
3.3 Income from account management fees;
3.4 Interest expenses on the public's deposits;
3.5 Interest expenses on bonds;
3.6 Total bonds and deferred notes at the end of the same period last year (2019);
3.7 The Bank of Israel's declared interest rate.

4. Indices and estimations calculated in the model

4.1 **The rate of income from account management fees in respect of deposits (hereinafter – "the fee income rate")** – is calculated as total income from account management fees, divided by total public deposits at the end of the same period last year.[42]

4.2 **The cost of the financing source in respect of loans from the Bank of Israel** – For the purpose of the simulation, we assumed that the cost of a loan from the Bank of Israel is the same as the Bank of Israel interest rate.

4.3 **The cost of the financing source in respect of bonds** – is calculated as interest expenses on bonds, divided by total liabilities for bonds and deferred notes during the same period last year.

4.4 **The cost of financing in respect of deposits that became more expensive** – is calculated as the product of the increment to the interest on deposits (see

[41] Bank data, as reported to the Banking Supervision Department. The data are up to date as of December 2020, unless noted otherwise.

[42] This calculation attributes the account management fees to all deposits, including those that don't create such fees (for instance, a deposit account that does not include a current balance), due to the availability of existing data. We examined this rate including only demand deposits (a very strict assumption) and found that the effect on the simulation results is negligible.

Section 2.3 above) multiplied by the index of the cost of financing in respect of the public's deposits currently (see Section 4.2 above).

4.5 **The volume of deposits that would leave the banking system and be replaced by digital shekels (hereinafter** – "the substitution volume") – is calculated as the product of the substitution rate multiplied by the public's total noninterest-bearing demand deposits.

4.6 **The volume of loans obtained from the Bank of Israel (as one of the alternatives to outgoing deposits)** – is calculated as the product of the rate of raising sources through loans from the Bank of Israel (as detailed in Section 2.2 above) multiplied by the volume of outgoing deposits.

4.7 **The volume of bonds issued (as one of the alternatives to outgoing deposits)** – is calculated as the product of the rate of bonds issued (as detailed in Section 2.2 above multiplied by the volume of outgoing deposits.

4.8 **The volume of the decline in income from account management fees** – is calculated as the product of the rate of income from fees multiplied by the volume of outgoing deposits.

4.9 **The volume of growth in financing expenses / decline in interest income** –

4.9.1 **In respect of deposits that have become more expensive** (increase in financing expenses) – is calculated as the product of the public's total noninterest-bearing demand deposits in Israel (Section 3.2 minus Section 4.5) multiplied by the additional cost of financing in respect of deposits that have become more expensive (Section 4.4).

4.9.2 **In respect of additional bonds issued** (increase in financing expenses) – is calculated as the product of the volume of bonds issued multiplied by the cost of financing in respect of bonds.

4.9.3 **In respect of loans obtained from the Bank of Israel** (increase in interest expenses) – is calculated as the product of the volume of loans taken from the Bank of Israel (Section 4.6) multiplied by the cost of financing in respect of loans from the Bank of Israel (Section 4.2).

4.10 **Total reduction in pretax profit** – is calculated as the sum of the decline in income from account management fees and the increase in financing expenses.