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How money is created by the central bank and the banking system

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Ladies and Gentlemen

It is a great pleasure for me to be your guest here tonight. The subject of my speech is the creation of money in our economy. Since money creation in our financial system is closely linked to the granting of loans by banks, I am also going to talk about lending. I shall, moreover, address the issues of sovereign money and access to digital central bank money, insofar as they relate to our main topic.

We are all aware of how profoundly the economic and monetary developments of the last ten years have been shaped by the global financial and economic crisis. Central banks responded swiftly and resolutely to the crisis, reducing interest rates and pumping large amounts of liquidity into the banking system. Once interest rates were down to almost zero, central banks were forced to adopt unconventional measures. Against the backdrop of a dramatic appreciation of the Swiss franc, the Swiss National Bank resorted mainly to interventions in the foreign exchange market, supplemented for a while by a minimum exchange rate for the Swiss franc against the euro. Since the discontinuation of this minimum exchange rate, the SNB has charged interest – known as negative interest – on the sight deposits of banks. The aim of all these measures has been to stabilise price developments and to support economic activity.

The financial crisis has had the effect of generally raising the level of public interest in monetary issues – not least the question of how, given the strong expansion of liquidity, the interaction between central banks, banks and the public affects money and credit aggregates.¹ For obvious reasons, the financial crisis also spurred debate in the world of financial market regulation, with central banks and financial market supervisory authorities grappling with weaknesses exposed by the crisis. Their conclusions are reflected in the new international minimum requirements known as Basel III, as well as in supplementary national regulations. The most important adjustments include stricter capital requirements and the introduction of international liquidity standards for banks.

Some radical proposals have also gained traction as a result of the crisis. In Switzerland, the sovereign money initiative attracted enough signatures to ensure a popular vote. The initiative demands that the creation of money and the granting of loans be separated by barring commercial banks from creating deposits through lending. The Federal Council, parliament and the SNB have all come out in opposition, but the final decision rests with Swiss electorate, who will vote in a referendum on the matter later this year.

As an alternative to the concept of sovereign money, some academics have launched the idea of making digital central bank money accessible to all. This means that sight deposit accounts with the SNB would no longer remain the sole preserve of banks and a few other financial market participants. The aim of this proposal is thus to broaden the public's access to central

¹ Accounts of the current situation published by the Bank of England and the Deutsche Bundesbank found considerable resonance in the media and the economic blogosphere. Cf. M. McLeay, A. Radia and R. Thomas (2014), Money Creation in the Modern Economy, Bank of England, *Quarterly Bulletin*, Q1, pp. 14–27; Deutsche Bundesbank (2017), Die Rolle von Banken, Nichtbanken und Zentralbank im Geldschöpfungsprozess, *Monatsbericht*, April, pp. 15–36.

bank money, without prohibiting banks from creating deposits through lending. However, as I will show, this too leaves a number of questions unanswered. We therefore take a critical stance on this proposal.

Let me now turn to the basics of money creation in our present-day financial system.

Money creation in today's financial system

Types of money

When speaking about money, we need to distinguish between various types of money. Especially important with regard to our topic is the distinction between central bank money on the one hand and commercial bank money – i.e. deposits with commercial banks – on the other. The two differ in terms of characteristics and risks, as well as in the way they are created.

Central bank money comprises banknotes in circulation and the sight deposits held by commercial banks at the central bank.² Both are legal tender, which means that no restriction may be imposed on their acceptance.³ Central bank money, like all nominally denominated money, is subject to the risk of inflation, in other words to the risk of losing in value as a result of rising prices for goods and services. Apart from this, however, central bank money is practically risk-free.⁴

In Switzerland, central bank money is created by the Swiss National Bank. Whenever, for example, the SNB purchases foreign currency or Swiss franc denominated securities from a commercial bank, it credits the amount paid to the sight deposit account of the bank concerned in Swiss francs. If the SNB wants to reduce the amount of central bank money, also known as the monetary base, it can conduct transactions in the opposite direction. It then sells foreign currency or Swiss franc denominated securities to banks and charges the corresponding amount to their sight deposit accounts. The SNB is thus in a position to either increase or decrease the monetary base in accordance with its monetary policy goals.

The breakdown of the monetary base into banknotes in circulation on the one hand and sight deposits held by banks at the SNB on the other is determined by public demand for banknotes. If you, ladies and gentlemen, withdraw more money than usual before Christmas to do your Christmas shopping, the volume of banknotes in circulation increases, only to decrease again after Christmas when the money taken in by the shops flows back to the SNB via the commercial banks. Banks can, through the SNB, exchange banknotes against sight deposits and vice versa. They thus have access to both banknotes and a sight deposit account

² In Switzerland, central bank money as defined by the SNB comprises banknotes in circulation and the sight deposits held by domestic banks at the SNB.

³ The Federal Act on Currency and Payment Instruments (CPIA) requires unrestricted acceptance of Swiss banknotes as payment, and unrestricted acceptance of sight deposits with the SNB as payment by anyone holding an SNB sight deposit account (art. 3 CPIA).

⁴ Residual risks are currency reform, settlement disruption in the payment system, and the possibility of banknotes being lost or stolen.

at the SNB, while the public has access to banknotes only, since private individuals cannot hold an account with the SNB.

Sight deposits are used by banks for cashless interbank payment transactions. Payments between banks – or their customers – are effected via the Swiss Interbank Clearing (SIC) system and result in the reallocation of sight deposits across the participating banks' accounts at the SNB. Moreover, banks are obliged to fulfil the minimum reserve requirements of the National Bank Act, i.e. to hold sufficient reserves either in the form of banknotes or as sight deposits with the SNB.

Deposits with commercial banks are distinct from central bank money. When speaking of these deposits in my remarks today, I will be referring to the sight deposits – also known as demand deposits – of their customers. Customers also hold savings and time deposits with banks. These cannot be directly drawn on for transaction purposes, but they are cash equivalents and are therefore included in broader definitions of money.

Bank customers can use their sight deposits to make payments. Unlike central bank money, the deposits with commercial banks are not legal tender, but they do represent a claim on central bank money. Bank customers can withdraw sight deposits in the form of banknotes, i.e. central bank money, or instruct their bank to make a cashless payment. The latter leads to a reallocation of SNB sight deposits – again, central bank money – from the customer's to the payment recipient's bank.

From the public's perspective, cash and deposits with commercial banks are virtually the same for payment purposes. However, deposits are subject not only to the risk of inflation, but also to credit risk. If their bank becomes insolvent, customers' claims to central bank money cannot be redeemed, or can be redeemed only up to the maximum amount covered by the deposit guarantee scheme.⁵ It is mainly in times of crisis that the public becomes aware of this risk. Were this not the case, there would be no runs on banks such as have been experienced time and again in the past. Credit risk is, however, offset by a number of advantages. Unlike banknotes, sight deposits with banks provide access to services in connection with payment transactions. In normal times, they also generate interest income.

How are deposits at commercial banks created?

How do deposits at commercial banks, i.e. customer deposits in Swiss francs, come into existence?

In our present-day financial system, the creation of deposits by banks is closely linked to the granting of loans. When a bank provides a loan, it credits the amount in question to the borrower in the form of a deposit to his or her account. This leads to an increase in credits on the assets side and in customer deposits on the liabilities side of the bank's balance sheet.

⁵ In Switzerland, the national deposit guarantee scheme covers a maximum of CHF 100,000 per customer in the event of a bank failure.

As a rule, borrowers will immediately use their new deposit to acquire the goods or services for which they requested and received the loan. They thereby trigger a payment that reduces their deposits while increasing the deposits on the payment recipient's account. By far the most common form of loan in Switzerland is a mortgage. When a mortgage is taken out for the purchase of a house or an apartment, the deposit does not normally even appear on the borrower's account, since the bank remits the loan amount directly to the seller of the house or apartment in exchange for the mortgage certificate.

To execute the payment, the bank needs to have sight deposits with the SNB. If it holds enough liquidity in the form of central bank money, the payment can be made without delay. If not, the bank needs to obtain liquidity on the interbank market or via credit facilities at the SNB, which only works if the bank has sufficient collateral in the form of securities or if it is prepared to pay a premium.

Our example illustrates the following key points: An individual commercial bank cannot use the granting of loans to ensure a lasting increase in the deposits it holds. Due to payment transfers, the deposit created by a loan flows out and disappears from the books of the lending bank. For the banking system as a whole, however, things look different. The payment transfer creates a new deposit at another bank. While the total volume of central bank money remains unchanged, lending by an individual bank increases deposits in the banking system and hence also the overall money supply.⁶

The outflows of deposits and central bank money generated by account holders' payment transactions are – just like the inflows – spread over time and normally represent only a fraction of total deposits. Accordingly, it is neither necessary nor legally required that a bank hold one franc in central bank money for each franc it holds in customer deposits. A part of the inflows of central bank money can be used for the granting of loans. This is what is known as a fractional reserve system, as only a fraction of customer deposits have to be covered by central bank money. The Swiss sovereign money initiative, which I will speak about later, aims to abolish this fractional reserve system.

What limits the banking system's credit and money creation?

As we have seen, the banking system can increase the volume of customer deposits by granting loans. This certainly does not mean that banks are free to create unlimited amounts of credit and money, however. The reasons are to be found in the banks' risk/return calculations and the SNB's monetary policy.

⁶ There are a number of other transactions that change the volume of customer deposits at banks. When a bank purchases securities from a customer, the customer's deposits at this bank increase. Customer deposits also rise whenever the SNB acquires foreign exchange or Swiss franc denominated securities from a non-bank seller. Likewise, customer deposits at a bank grow when customers make a shift in their portfolio from medium term debt certificates issued by the bank to deposits, or if they take cash to the bank and have it credited to their account. When transactions are conducted in the opposite direction, or when borrowers pay off their loan, the banks' customer deposits decrease accordingly.

Let us take a step back and look briefly at what actually goes on at an individual bank.⁷ A bank's balance sheet typically contains comparatively illiquid, long-term claims such as loans on the assets side and comparatively liquid, short-term liabilities such as sight deposits on the liabilities side. The bank therefore engages in liquidity and maturity transformation, mediating between the diverging requirements of savers and investors. Savers want secure and readily available deposits, while investors need long-term loans to finance projects, which tend to be illiquid. The bank thus bears both credit risk and liquidity risk. Due to the large number of depositors and borrowers, these risks can be diversified. Moreover, with their focus on lending activities, banks have the advantage over individual savers of being better able to assess and monitor borrowers. This opens up access to loans for parts of the economy that cannot raise funds on the capital market and would hardly be able to finance their projects without a bank.

By providing loans, banks therefore perform an important economic task. The profit they derive from their lending activities ultimately result from the interest spread between loans and deposits. It compensates banks for the credit and liquidity risks assumed, for services linked to customer deposits, and for the assessment and monitoring of borrowers.

So banks will only grant a loan if doing so makes economic sense. Lending does not automatically generate a profit – each loan is the result of a careful weighing-up of risks and returns. In their calculations, banks take into consideration factors such as current and future interest on loans and deposits, the likelihood of deposit withdrawals and credit defaults, and the liquidity and capital adequacy requirements in force. All these factors constrain the lending – and thus also money creation – activities of commercial banks.

Central banks, for their part, take a special interest in the impact of monetary policy on money and credit creation within the banking system. As you know, the SNB steers a short-term interest rate with its monetary policy and thereby influences the level of interest rates. A tightening of monetary policy leads to a rise in interest rates and thus dampens the demand for loans. Moreover, rising interest rates cause the economy to slow, which further reduces demand for loans.

Higher interest rates also have a negative impact on the banks' credit supply. As a rule, rising interest rates increase the likelihood of credit defaults, which means that the quality of banks' loan portfolios deteriorates in the eyes of market participants. This pushes up the financing costs for banks beyond the general rise in interest rates. With all other conditions being equal, banks will, as a result, curtail their credit supply.

The SNB's monetary policy thus influences developments in lending both via demand for credit on the part of companies and households and via the banks' credit supply. This keeps the creation of money by the banking system in check.

⁷ For a more comprehensive list of a banks' activities, cf. for example X. Freixas and J.-Ch. Rochet (2008), *Microeconomics of Banking*, 2nd edition, MIT Press, pp. 1–13.

Why the image of ‘creating money out of thin air’ is misleading

Ladies and gentlemen, I have tried to somewhat demystify the subject of money creation by the commercial banks. The topic has repeatedly become a focus of attention, especially among bank critics, and the language used is often provocative. Featuring prominently is the image of ‘privileged banks’ that can ‘create money out of thin air’. The image has a long history, yet is often misunderstood. Some erroneously assume that banks are in a position to raise funds via the creation of deposits and so ultimately pull themselves out of trouble by their own bootstraps, as it were. This is, of course, nonsense. If it were true, there would be no financial crises. Illiquid banks would always be able to create the money they need to meet their obligations themselves. Reality is not like that. The deposits created by the banking system belongs to the banks’ customers. It is the customers who can use it to procure goods or services, or to meet financial obligations, not the banks.⁸

What also needs to be pointed out is that the impetus for credit and money creation comes not from the banks, but from their customers. A bank sets the conditions and must be able to transact the payments that its customers want to make with their deposits. But it is the customers who decide whether or not they want to take up the bank’s offer.

The idea of ‘creating money out of thin air’ is more applicable to central banks. Since the demise of the gold standard, central bank money can no longer be exchanged for gold. This means that central banks really are in a position to simply ‘print money’, as the expression goes, which enables them to meet their obligations in their own currency anywhere and at any time. But even central banks face certain restrictions. Their tasks are defined by law, which in most countries requires them to ensure price stability. The instruments that allow them to create money thus serve the sole purpose of fulfilling a central bank’s legal mandate.

Calls for broader access to central bank money

In the second part of my speech I would like to address two proposals calling for broader access to central bank money. The first calls for the introduction of so-called ‘sovereign money’. A people’s initiative on this issue has been submitted in Switzerland, and a referendum is to be held later this year. The second proposal concerns allowing private individuals (as opposed to just commercial banks) to hold sight deposits at the central bank. Both proposals give the public access to digital central bank money and have consequences for money and credit creation by banks and thus for the financial system.

Comments on sovereign money

What specifically does the Swiss sovereign money initiative propose? At the heart of the initiative lies the separation of money and credit. Under the current regime, as we have seen, there are two types of money: central bank money created by the SNB, and bank deposits, which are created by commercial banks in their interactions with the general public and the

⁸ Cf. D. Niepelt (2017), Geldschöpfung «aus dem Nichts», *Neue Zürcher Zeitung*, 238 (267), 16 November.

central bank and represent a claim on central bank money. Under the Swiss sovereign money initiative, bank deposits would be converted into central bank money – what the proponents of the initiative call ‘sovereign money’. Customers’ sight deposits would be transferred from commercial banks’ balance sheets and kept as separate sovereign money accounts. Sovereign money would be issued by the SNB through allocations of central bank money to the Confederation and cantons, or directly to the public. Banks would ultimately be payment agents for the SNB. Any loans they granted would have to be financed through savings deposits, debt certificates or equity.

Proponents of this initiative believe that the introduction of sovereign money would create safer money, a more stable financial system and higher revenue from the note-issuing privilege (or ‘seigniorage’) for the general public. Opponents, however, claim that the measures demanded in the initiative are both inappropriate and ineffective for achieving these goals. The Federal Council and parliament have recommended the electorate reject the initiative, and have not offered a counterproposal. The SNB shares the Federal Council’s view.

I would like to confine my remarks today to the possible consequences for lending and monetary policy of a switch to a sovereign money system. With respect to lending and the financial system, I regard the following three points as key:

First, the switch to sovereign money would be a move away from the historical distribution of responsibilities between the central bank and commercial banks. In this tried-and-tested, two-tier system, commercial banks compete with one another to supply households and companies with credit and liquidity, while the central bank acts as the bankers’ bank and conducts monetary policy. With the introduction of sovereign money, the SNB would be landed with a difficult role in lending. The initiative calls for the SNB to guarantee the supply of credit to the economy by financial services providers. In order to carry out this additional mandate, the SNB could provide banks with credit, probably against securitised loans. Depending on the circumstances, the SNB would have to accept credit risks onto its balance sheet and, in return, would have a more direct influence on lending. Such centralisation is not desirable. The smooth functioning of the economy would be hampered by political interference, false incentives and a lack of competition in banking.

Second, sovereign money limits liquidity and maturity transformation as banks would no longer be able to create deposits through lending. Sovereign money thus restricts the supply of liquidity and credit to households and companies. The financing of investment in equipment and housing would likely become more expensive. Those sectors which have no access to the capital market and rely on bank loans to raise funds – notably, small and medium-sized companies as well as households – would be the most affected.

Third, it would be naive to hold out too much hope on the financial stability front. Investors and borrowers will always make misjudgements. A switch to sovereign money would thus not prevent harmful excesses in lending or in the valuation of stocks, bonds or real estate. Also, while the sovereign money initiative targets traditional commercial banks, let us not forget the

role played by ‘shadow banks’ in the global financial crisis of 2008/2009. More importantly, when governments and central banks were rescuing systemically important financial institutions, they had not only the protection of sight deposits and thus payment transactions in mind, but also borrower-lender relationships. They feared that if systemically important financial institutions were to suddenly fail, financial sector lending might collapse and the economy implode. So the sovereign money initiative, with its focus on payment transaction accounts, does not resolve the ‘too big to fail’ issue. Regulatory adjustments, of the kind that are already being implemented, offer a better solution.

The Swiss sovereign money initiative would likewise have a number of problematic consequences for our monetary policy. The initiative requires that the SNB manage the money supply, an idea we abandoned some 20 years ago. Today, the SNB steers monetary conditions via money market rates, a strategy which has served it well over the years. A switch to monetary targeting would therefore be an unnecessary step backwards from our perspective.

Another problem for monetary policy would arise from the mechanism for issuing sovereign money set out in the sovereign money initiative. Sovereign money would be created ‘debt-free’, rather than through the SNB’s market operations, i.e. purchasing securities or granting secured loans. It is by no means the case that the SNB’s monetary policy goals only ever require an increase in the money supply; they can also require a reduction, but it is far from clear how the money supply could be reduced if money were to enter circulation ‘debt-free’, as a sort of ‘gift’.

Finally, a more general and significant objection to the sovereign money initiative is that the acceptance of the initiative would plunge the Swiss economy into a period of extreme uncertainty. Switzerland would have an untested financial system that would differ fundamentally from that of any other country. This would create turmoil on the financial markets even before its implementation. The changeover would in any case be very difficult and the long-term consequences uncertain.

Many questions therefore remain unanswered. This is not surprising since the introduction of a sovereign money system represents a profound change in the monetary order and a radical move away from the manner in which the SNB has conducted its monetary policy to date.

Comments on digital central bank money for the general public

The second suggestion, which I would like to discuss briefly, is the introduction of digital central bank money for the general public. Digital central bank money is defined as electronic money issued by the central bank, denominated in the national currency. In Switzerland, academics have mooted the idea as an alternative to the sovereign money initiative.⁹

⁹ Cf. D. Niepelt (2016), Elektronisches Notenbankgeld ja, Vollgeld nein, *Neue Zürcher Zeitung*, 237 (138), 16 June, p. 10; A. Berentsen, ‘Die Alternative’, vollgeld-initiative.com (consulted on 31 October 2017).

Proponents see the idea as a way of broadening the public's access to central bank money, while at the same time avoiding the disadvantages of the sovereign money initiative.

A simple way to envision digital central bank money for the general public is in the form of sight deposits with the SNB. Unlike the situation today, not only banks, but also households and companies would be able to open an account with the SNB. There might also be other forms of digital central bank money for the public, e.g. digital banknotes which would be issued rather like private cryptocurrencies. From an economic perspective, however, the features of the different forms of digital central bank money are largely identical. Therefore, when I speak about digital central bank money, I will continue to use the example of money held at the SNB in the form of a sight deposit account.¹⁰

Implementation throws up a number of practical questions: How would eligibility for digital SNB money be defined? Would residence in Switzerland be the decisive factor? What account holder due diligence would the SNB have to carry out as part of compliance? What services might account holders expect? Would deposits generate interest and, if so, at what rate? In addition, would it be possible to invest all of one's assets at the SNB, or would there be an upper limit? Depending on the answers to these questions, the economic impact of broader access to digital central bank money could vary greatly.

This evening, we are principally interested in the implications for commercial banks' money and credit creation. Much would depend on the structuring of any sight deposit accounts, most especially with respect to interest rates. Yet we can assume that some households and companies would make use of the central bank's offer and hold part or all of their deposits there. The resulting withdrawals of customer deposits at commercial banks associated with broader access to digital central bank money would impair the ability of the banking system to engage in liquidity and maturity transformation. Consequently, commercial banks would scale back liquidity and maturity transformation and thus the volume of their lending, rather like under the sovereign money scenario. In an extreme case, if customers were to transfer all of the sight deposits held at commercial banks to SNB sight deposit accounts, this would be tantamount to introducing sovereign money.

Furthermore, granting broader access to sight deposit accounts at the central bank carries risks for financial stability. In periods of heightened uncertainty, the public would likely convert large amounts of their sight deposits at commercial banks into digital central bank money. Sight deposits with commercial banks can already be converted into central bank money today, namely into cash. However, holding cash is comparatively expensive and inconvenient. In a scenario where the public is granted access to digital central bank money, the SNB would probably have to provide the banks with liquidity ('lender of last resort') more frequently and on a larger scale than is the case today. In return, it would have to take assets of the banks and the associated risks onto its own balance sheet.

¹⁰ For purposes of distinguishing between different types of digital central bank money, a discussion of its characteristics and a comparison with existing payment options, cf. M. Bech and R. Garratt (2017), Central bank cryptocurrencies, *BIS Quarterly Review*, September.

Ladies and Gentlemen, as with the sovereign money scenario, any moves to grant broader access to digital central bank money for the public would call into question the traditional division of tasks between the central bank and commercial banks, whereby the central bank acts as the bankers' bank, while commercial banks supply households and companies with credit and liquidity. The central banks would assume a bigger role in financial intermediation. In other words, the SNB would have to take on new financial risks and tasks which were previously borne or carried out by the private sector. Moreover, there are financial stability risks associated with households and companies potentially being able to move their deposits back and forth between their accounts with the central bank and the commercial banks.

In order to be economically desirable and sensible, sovereign money and broader access to digital central bank money would have to outperform the current monetary system; in our view, neither of these two proposals meets this requirement. This is why the SNB firmly opposes the sovereign money initiative and is also critical of the idea of making digital central bank money available to everyone in the form of accounts with the SNB.

The technologies underlying digital currencies are evolving rapidly, however. And developments in this field will undoubtedly have implications for the financial system that, in turn, will impact a number of central bank tasks. The SNB therefore monitors developments closely and analyses them from various angles. Naturally, we pay particularly close attention to the likely impact of such changes on the structure and stability of the financial system and any consequences for monetary policy and payment transactions.

Concluding remarks

Finally, one might ask why the private sector itself has not found ways of enabling households and companies to hold bank deposits that are fully secured by central bank money. Such an approach would offer the public deposits that are virtually identical to digital central bank money or sovereign money accounts. Why does nothing like this exist? The answer may be that bank customers are broadly satisfied with what is available today. Banks offer customers holding sight deposits with them a range of services, mostly relating to account management and payment transactions. In addition, they generally pay interest. From the point of view of customers, the services offered by commercial banks and the fact that they are paid interest on deposits probably offsets any disadvantages stemming from the fact that sight deposits with commercial banks are not central bank money.

All in all, I believe that today's banking system in Switzerland works well and has proved its worth. If we look back to the time when the first deposit banks were established in Italy in the late Middle Ages, we see that the financial system has undergone continual change. After the establishment of banks, central banks and bank regulation emerged, partially in response to the fragility of the banking system in its early years. What we see today is a system that has evolved incrementally over time. While there are differences between countries – often for historical reasons – they all have a fractional reserve system, i.e. they do not have sovereign money.

We will no doubt continue to see changes. Technological advances, which are notoriously difficult to predict, are among the key drivers here. It is therefore hard to know precisely how the banking system will look in the future. It is clear, however, that central banks and financial market supervisory authorities will need to find ways of responding to these changes. This is not a new challenge, but it is one we will have to face time and again.